

THE TEACHER SELF-EFFICACY, PERSONAL COMPATIBILITY, AND ACTIVE
INVOLVEMENT IN INSTRUCTION OF HIGH SCHOOL GENERAL AND SPECIAL
EDUCATION CO-TEACHERS: AN ACTOR-PARTNER INTERDEPENDENCE
MODEL

by

Todd Johnson
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Dedication

I dedicate this dissertation to my wife Laura and my two children Noelle and Trey. You are my special gifts from God and I love you very much!

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My first word of acknowledgement must be to God. To God be all the honor, glory, and praise for the great things He has done. I am thankful for God's abundant blessings and know that "I can do all things through Christ which strengtheneth me" (Philippians 4:13; KJV).

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To my children, Noelle and Trey, I am so thankful for you! Your daddy loves you so much, and I am so glad to be done so we can have more time to play. I think I hear the beach calling our names...

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List of Abbreviations and/or Symbols

Actor-Partner Interdependence Model.....	APIM
Actor-Partner Interdependence Model with moderation	APIMoM
Students with disabilities	SWD
Teacher self-efficacy.....	TSE

Abstract

THE TEACHER SELF-EFFICACY, PERSONAL COMPATIBILITY, AND ACTIVE INVOLVEMENT IN INSTRUCTION OF HIGH SCHOOL GENERAL AND SPECIAL EDUCATION CO-TEACHERS: AN ACTOR-PARTNER INTERDEPENDENCE MODEL

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Co-teaching is a common service delivery model that high schools employ to provide students with disabilities (SWD) access to high quality content instruction and special education services (Magiera & Zigmond, 2005; Murawski, 2006; Zigmond & Magiera, 2001) by combining the unique skill sets of general and special educators. The purpose of the current study was to examine co-teachers' self-efficacy beliefs, perceptions of personal compatibility, and active involvement in instruction, and to examine TSE and personal compatibility as potential predictors of co-teachers' active involvement in instruction. Data gathered from 56 high school co-teaching dyads were analyzed using Actor-Partner Interdependence Modeling (APIM) to determine the relationships among TSE, personal compatibility, and active involvement in instruction. Results revealed that general and special education co-teachers did not differ on TSE and personal

compatibility, but general education co-teachers did report significantly higher active involvement in instruction than special education co-teachers. Results of APIM analyses revealed that TSE was predictive of active involvement in instruction for general education co-teachers, but not for special education co-teachers. Personal compatibility was not predictive of active involvement in instruction for general education co-teachers or special education co-teachers. Finally, personal compatibility was not found to have a significant moderating effect on the relationship between TSE and active involvement in instruction. Results are discussed and suggestions for future research and implications for practice are provided.

Chapter One

Federal legislation has been enacted that mandates students with disabilities (SWD) be provided specially designed instruction and access to supplementary aids and services while accessing the general education curriculum in the least restrictive environment (EHA, 1975; IDEA, 2004; NCLB, 2002). In response, some high schools have adopted co-teaching, defined by Kloo and Zigmond (2008) as “two certified teachers—one general educator and one special educator—[who] share responsibility for planning, delivering, and evaluating instruction for a diverse group of students, some of whom are students with disabilities,” (p. 13) as a service delivery-model (Magiera & Zigmond, 2005; Murawski, 2006; Zigmond & Magiera, 2001). According to Kloo and Zigmond’s (2008) definition, both co-teachers should be actively involved in tasks that take place before, during, and after instructional time in co-taught classes. To date, little research has been done on co-teaching at the high school level, and little is known about co-teachers’ active involvement in tasks relevant to co-teaching. Furthermore, little is known regarding the factors that influence how actively involved general and special education co-teachers are in co-teaching tasks. The purpose of the current study is to examine teacher self-efficacy (TSE) and personal compatibility as potential factors impacting high school general and special education co-teachers’ active involvement in instruction in co-taught classes.

Statement of the Problem

Although co-teaching seeks to pair general educators who possess an understanding of the structure, content, and pacing of the general education curriculum with special educators who have expertise in adapting curriculum and instruction to meet the individual needs of SWD, research has found that co-teaching does not consistently result in enhanced instruction and improved outcomes for SWD (Murawski & Swanson, 2001; Scruggs, Mastropieri, & McDuffie, 2007; Solis, Vaughn, Swanson, & McCulley, 2012; Weiss, 2004). Some research on co-teaching has found a lack of parity, or an unequal distribution of roles and responsibilities, between general and special education co-teachers, with general education co-teachers in charge of instruction and special education co-teachers taking on the role of a paraprofessional (Bessette, 2008; Harbort et al., 2007; Keefe & Moore, 2004; Magiera, Smith, Zigmond, & Gebauer, 2005; Mastropieri et al., 2005; Moin, Magiera, & Zigmond, 2009; Murawski, 2006; Pearl & Miller, 2007; Scruggs et al., 2007; Rice & Zigmond, 2000; Zigmond & Matta, 2004). Furthermore, some research has found instruction in co-taught classes does not differ markedly from the instruction delivered by general education teachers in solo-taught classes, and evidence of individualized and differentiated instruction is rare (Harbort et al., 2007; Keefe & Moore, 2004; Magiera et al., 2005; Mastropieri et al., 2005; Moin et al., 2009; Murawski, 2006; Pearl & Miller, 2007; Rice & Zigmond, 2000; Scruggs et al., 2007; Zigmond, 2006). On the other hand, some research has provided evidence of both general and special education co-teachers actively involved in providing enhanced instruction to students with and without disabilities in co-taught classes (Dieker, 2001;

King-Sears, Brawand, Jenkins, & Preston-Smith, 2014; van Hover, Hicks, & Sayeski, 2012). The problem that the current study seeks to address is that combining two fully certified co-teachers, one general educator and one special educator, does not consistently result in the type of instruction or learning outcomes that co-teaching was intended to produce (Harbort et al., 2007; Keefe & Moore, 2004; Leafstedt, Richards, LaMonte, & Cassidy, 2007; Magiera et al., 2005; Mastropieri et al., 2005; Moin et al., 2009; Murawski, 2006; Pearl & Miller, 2007; Rice & Zigmond, 2000; Scruggs et al., 2007; Zigmond, 2006).

Significance of the Problem

Currently, more than 56% of all high school SWD are educated in general education settings for more than 80% of the school day, and many of these students are taught by co-teachers (U.S. Department of Education, 2013). The most recent national assessment data show that eight-grade SWD, about to enter high school, possess lower skills in reading, writing, and mathematics than their non-disabled peers (National Center for Education Statistics, 2011, 2015). Results of the 2015 National Assessment of Educational Progress (NAEP) Mathematics assessment revealed that 72% of eighth-grade SWD performed at the "below basic" level in mathematics, and results for reading (67% below basic) and writing (63% below basic) on the NAEP assessments (2011, 2015) were similar to those in mathematics. The number of SWD receiving instruction in co-taught classes, and the challenges SWD may face in the foundational skill areas of reading, writing, and math, may present a challenge for high school co-teachers (Murawski, 2006; van Hover et al., 2012). If general and special education co-teachers are to successfully

combine their unique skill sets to provide enhanced instruction to meet the learning needs of co-teachers, both co-teachers need to be actively involved in instruction. More research is needed to determine how actively involved general and special education co-teachers are in instructional tasks, and what factors influence co-teachers' active involvement in instruction.

Description of Co-Teaching

Co-teaching is defined by Cook and Friend (1995) as “two or more professionals delivering substantive instruction to a diverse, or blended, group of students in a single physical space” (p. 2). As certified professionals, general and special educators partner as co-teachers, because each has a unique skill set to enhance teaching approaches and instructional strategies for students with and without disabilities, in ways not possible by one teacher working alone (Friend, Reising, & Cook, 1993). Kloo and Zigmond (2008) added that co-teaching involves general education and special education co-teachers “shar[ing] responsibility for planning, delivering, and evaluating instruction for a diverse group of students, some of whom are students with disabilities” (p. 13). Kloo and Zigmond also point out that the potential in co-teaching lies in combining the skill set of a general educator “who understands the structure, content, and pacing of the general education curriculum” (p. 13) with the skill set of a special educator “who identifies unique learning needs of individual students and enhances curriculum and instruction to match those needs” (p. 13).

Murawski and Lochner (2011) emphasized that instruction in co-taught classes should not look the same as instruction in solo-taught general education classes, and that

general and special education co-teachers should both take an active role in co-teaching. Specifically, Murawski and Lochner identified three collaborative tasks in which both co-teachers should be actively involved: co-planning, co-instructing, and co-assessing. Similarly, Fennick and Liddy (2001) and Hang and Rabren (2009) identified several tasks that active co-teachers engage in, including lesson planning, instruction, evaluation, making modifications, and behavior management.

However, some research examining high school co-teachers indicates that special education co-teachers often function as paraprofessionals rather than active co-teachers (Harbort et al., 2007; Keefe & Moore, 2004; Moin et al., 2009; Murawski, 2006; Rice & Zigmond, 2000; Scruggs et al., 2007). For example, Moin et al. (2009) observed the special education co-teacher mostly “drifting around the room, redirecting students, doing clerical work, or just observing the lesson” (p. 694). The researchers reported infrequently observing the special education co-teacher actively involved in instruction. Likewise, in the high school English co-teaching pair she observed, Murawski (2006) identified the special education co-teacher as “the drifter” and the general education co-teacher as the leader of instructional activities.

Some research has connected the dominance of instruction by general education co-teachers, who mainly deliver classroom instruction using whole-group lecture, to a lack of differentiated instruction based on the individual needs of SWD (Harbort et al., 2007; Keefe & Moore, 2004; Moin et al., 2009; Murawski, 2006; Rice & Zigmond, 2000; Scruggs et al., 2007). For example, Moin et al. (2009) observed 53 high school science co-taught lessons and found that instruction was most often delivered by the general

education co-teacher through whole-group lecture. The researchers also concluded that instruction in the observed co-taught classes did not represent a marked improvement over solo-taught instruction, and that greater involvement of special education co-teachers may be needed to offer specialized instruction to address the learning needs of students with and without disabilities.

General and special education co-teachers can deliver instruction to their students in the co-taught class using a variety of formats that reflect different roles and responsibilities. Friend, Cook, Hurley-Chamberlain, and Shamberger (2010) identified six common co-teaching models:

1. One teach, one observe: one co-teacher takes a clear lead in the classroom while the other co-teacher observes.
2. One teach, one assist: one co-teacher takes a clear lead in the classroom while the other co-teacher drifts around the room assisting students with and without disabilities as needed.
3. Station teaching: Co-teachers divide instructional content into two or more segments and each co-teacher presents a content segment to heterogeneous groups of students at separate stations within the classroom. All students participate in all stations, including a station for independent work or practice.
4. Parallel teaching: Co-teachers deliver the same content simultaneously to two heterogeneous groups of students of roughly equal size.
5. Alternative teaching: One co-teacher delivers large-group instruction, while the other delivers the same or different instruction to a smaller group of students.

6. Team teaching: Both co-teachers share the planning and instruction of students in a coordinated fashion.

While the various models of co-teaching may all be appropriate under certain conditions, King-Sears et al. (2014) point out that each model represents a different set of roles and responsibilities for the co-teachers. These researchers suggest greater parity, which they defined as an even distribution of roles and responsibilities, is evident in the team teaching model as opposed to the one teach, one assist model, which usually involves the special educator being relegated to a “more passive role with few (if any) instructional responsibilities for the whole class” (p. 654).

Bouck (2007) engaged in nine weeks of observation and interviews with a United States history co-teaching team who were in their first year co-teaching together and still developing and establishing their co-teaching roles. One of the findings was a lack of parity between the general and special education co-teachers in the co-taught class with the special education co-teacher reporting that the students, and even she herself, viewed her as a paraprofessional and not an equal teacher. The special education co-teacher characterized her role in the co-taught classroom as “less active,” and also shared being unaware of lesson plans. Bouck concluded that the co-teachers needed to consider how they shared instruction, and that both teachers needed to be open to engaging in large group as well as one-on-one instruction.

The need for greater parity in instruction was echoed in Leafstedt et al.’s (2007) focus group interviews of students with learning disabilities in high school co-taught classes. The students interviewed reported that special education teachers provided less

specialized instruction in the co-taught class than in the special education solo-taught setting. The students explained that they needed “to have the work broken down, explained more slowly, explained in different ways, and to have a smaller amount of work to complete” (p. 180) and preferred receiving instruction in the special education solo-taught setting where the special education teacher delivered instruction. The interview data in Leafstedt et al.’s study suggests that the students’ perceptions of their own learning were connected to the special educators’ involvement in delivering instruction.

Research on Co-Teaching

The research base on co-teaching provides information regarding four themes that inform the current study: parity within co-teaching teams (Bessette, 2008; Dieker, 2001; Harbort et al., 2007; Keefe & Moore, 2004; King-Sears et al., 2014; Magiera et al., 2005; Mastropieri et al., 2005; Moin et al., 2009; Murawski, 2006; Pearl & Miller, 2007; Scruggs et al., 2007; Rice & Zigmond, 2000; van Hover et al., 2012; Zigmond & Matta, 2004), differentiated instruction (Harbort et al., 2007; Keefe & Moore, 2004; Magiera et al., 2005; Mastropieri et al., 2005; Moin et al., 2009; Murawski, 2006; Pearl & Miller, 2007; Rice & Zigmond, 2000; Scruggs et al., 2007; van Hover et al., 2012; Zigmond, 2006), personal compatibility between co-teaching partners (Buckley, 2005; Cramer & Nevin, 2006; Keefe & Moore, 2004; Malian & McRae, 2010; Noonan et al., 2003; Pratt, 2014; Rice & Zigmond, 2000; Scruggs et al., 2007; van Hover et al., 2012), and co-teachers’ active involvement in instruction (Fennick & Liddy, 2001; Hang & Rabren, 2009; Harbort et al., 2007; King-Sears et al., 2014). Regarding parity, some researchers

found the distribution of roles and responsibilities within co-teaching teams to be unequal, with special education co-teachers assuming the role of a paraprofessional minimally involved in instruction (Bessette, 2008; Harbort et al., 2007; Keefe & Moore, 2004; Magiera et al., 2005; Mastropieri et al., 2005; Moin et al., 2009; Murawski, 2006; Pearl & Miller, 2007; Scruggs et al., 2007; Rice & Zigmond, 2000; Zigmond & Matta, 2004). Some researchers also found that differentiation of instruction was underutilized in co-taught classes, and that the instruction provided in co-taught classes was not markedly different from what occurs in solo-taught classes (Harbort et al., 2007; Keefe & Moore, 2004; Magiera et al., 2005; Mastropieri et al., 2005; Moin et al., 2009; Murawski, 2006; Pearl & Miller, 2007; Rice & Zigmond, 2000; Scruggs et al., 2007; Zigmond, 2006). Other studies have yielded more positive results regarding parity between general and special education co-teachers along with evidence of enhanced instruction provided to SWD (Dieker, 2001; King-Sears et al., 2014; van Hover et al., 2012).

Research on co-teaching has identified personal compatibility as a strong determinant impacting the success of co-teaching (Keefe & Moore, 2004; Pratt, 2014; Rice & Zigmond, 2000; Scruggs et al., 2007; van Hover et al., 2012). Personal compatibility has been described both in terms of the co-teaching partners “getting along” with each other on an interpersonal level (Buckley, 2005; Keefe & Moore, 2004), as well as co-teaching partners sharing similarities on philosophies and approaches to teaching and personal and professional characteristics (Cramer & Nevin, 2006; Malian & McRae, 2010; Noonan et al., 2003; Pratt, 2014; Rice & Zigmond, 2000). Similarly, co-teachers’ active involvement in instruction has been conceptualized differently in different studies.

Harbort et al. (2007) and King-Sears et al. (2014) focused their research on what co-teachers do during instruction, whereas Fennick and Liddy (2001) and Hang and Rabren (2009) examined co-teachers' activities more broadly to include tasks that co-teachers engage in before (e.g., planning), during (e.g., delivering instruction), and after (e.g., evaluating learning) instructional time.

Parity. Scruggs et al. (2007) conducted a meta-analysis of 32 qualitative research studies on co-teaching, 14 of which took place in middle school or high school classrooms and three which took place in both elementary and secondary settings. The researchers reported that the most prevalent model of co-teaching that co-teachers engaged in was the “one teach, one assist” model, with the general educator fulfilling the role of lead teacher and the special educator assuming a subordinate, less actively involved, role in instruction (e.g., Magiera et al., 2005; Mastropieri et al., 2005; Rice & Zigmond, 2000; Zigmond & Matta, 2004). Descriptions of co-teachers' active involvement in instruction included tasks that took place during instruction (e.g., delivering content, assisting individuals and small groups, managing classroom behavior), as well as co-planning, which took place outside of instructional time. Co-teachers consistently communicated need more co-planning time than what was provided (e.g., Austin, 2001; Dieker, 2001).

Scruggs et al. (2007) found evidence suggesting that the limited role of special education co-teachers may be linked to special educators' lack of content knowledge (e.g., Mastropieri et al., 2005; Rice & Zigmond, 2000; Weiss & Lloyd, 2002). However, “turf issues” were also credited with contributing to the subordination of special

education co-teachers, with general education co-teachers reported as viewing the co-taught class as “theirs” and seeking to maintain control of many aspects of running the class. Special education co-teachers spoke in terms of being outsiders who entered into the general educator’s environment. Special education co-teachers also reported struggling to have ideas accepted by general education co-teachers (Buckley, 2005).

Bessette (2008) analyzed elementary and middle school students’ drawings of co-teaching and interviewed co-teachers to gain a better understanding of the roles of general and special education co-teachers in co-taught classes. Bessette reported that around 70% of middle school students’ drawings depicted either the one-teach, one observe co-teaching model or the one teach, one assist co-teaching model. In these pictures, general education co-teachers were depicted as leading instruction and special education co-teachers were depicted as either observing the class or “[drifting] among rows of desks seeking students in need of clarification or reteaching” (p. 1388).

In interviews, many general education co-teachers communicated needing to be more aware of the instructional needs and feelings of their students. Special education co-teachers communicated challenges with “feelings of under-utilization (“sometimes I feel like an aide—I just don’t teach”); over-extension (trying to stay 1 chapter ahead of students in higher-level mathematics or science classes); time constraints; lack of planning time; lack of administrative support and/or training; and concern over drawings that suggested little student/student or student/teacher interaction” (p. 1391). Both general and special education co-teachers communicated that the special education co-teacher had the ability to play a greater role in instruction but was not being effectively

utilized in the co-taught classes. It is important to emphasize that, although special education co-teachers perceived themselves (and were perceived by the general education co-teaching partners) as capable of taking a more active role in instruction, the nature of their co-teaching relationship resulted in special education co-teachers taking a less active role in instruction.

Brusca-Vega et al. (2011) also examined the roles and practices of co-teachers by conducting observations and interviews in three middle school co-taught science classes where a hands-on, inquiry-based curriculum was used. In interviews, the co-teachers confirmed that they used the one teach, one assist model for about 80% of instruction, team teaching (15%), and station teaching (5%). The general education co-teachers delivered the majority of science instruction while the special education co-teachers were most often observed working with individual students or small groups of students. The researchers reported that “Only one of the special education teachers was observed teaching to the whole group in a reciprocal manner with the science teacher” (p. 27). While general education co-teachers described as the leaders in the co-taught class, the researchers also reported that special education co-teachers were actively involved in both co-planning and instruction, and differentiation of instruction was evident. The researchers noted co-teaching partners “communicated regularly about the implementation and organization of lesson plans and student issues including classroom discipline, seating arrangements, and grading” (p. 27).

While several studies have found parity in co-teaching relationships to be problematic (Bessette, 2008; Harbort et al., 2007; Keefe & Moore, 2004; Magiera et al.,

2005; Mastropieri et al., 2005; Moin et al., 2009; Murawski, 2006; Pearl & Miller, 2007; Scruggs et al., 2007; Rice & Zigmond, 2000; Zigmond & Matta, 2004), some studies have evidenced a more balanced distribution of roles between general and special education co-teachers (Dieker, 2001; King-Sears et al., 2014; van Hover et al., 2012). In their case study of one high school science co-teaching pair, King-Sears et al. (2014) observed both co-teachers to be actively involved in delivering instruction, although the general education co-teacher delivered instruction more often. The researchers also surveyed the co-teachers and their students and found that most students indicated teaching was divided in half. An equal percentage of students identified the general education co-teacher as in charge of instruction (43%) as identified both teachers as in charge (43%). Van Hover et al. (2012) conducted a case study of a high school history co-teaching team and also found evidence that both co-teachers maintained equal roles and were actively involved in instruction. Dieker (2001) observed seven middle school co-teaching teams and two high school co-teaching teams, and found that in almost half of the teams (4 out of 9) both co-teachers were equally involved in the development, presentation, delivery, and evaluation of lessons. Dieker observed one additional team in which the special education co-teacher was in the lead role and the general education co-teacher maintained a support role.

Differentiated instruction. In their review of qualitative co-teaching research, Scruggs et al. (2007) found that general education co-teachers preferred whole-group adaptations rather than strategies designed to meet the needs of individual students (e.g., Buckley, 2005; Magiera et al., 2005). Evidence of differentiated instruction was not

common, and rarely were special education co-teachers reported to be actively involved in instructional tasks (e.g., Magiera et al., 2005; Mastropieri et al., 2005). Responsibilities attributed to special education co-teachers included making minor modifications to curricular materials and providing temporary assistance to students by answering questions, prompting, and redirecting when students were not properly engaged (e.g., Magiera et al., 2005; Mastropieri et al., 2005; Rice & Zigmond, 2000; Zigmond & Matta, 2004). Special education co-teachers were generally described as facilitating the instructional activities of the general education co-teacher by dealing with classroom management issues so that the instruction of the general educator would not be interrupted. Scruggs et al. (2007) found some evidence that cooperative learning, or peer tutoring, had been successfully employed in some cases, but overall there was little evidence that instructional approaches that have been found effective for teaching SWD were being employed (e.g., Dieker, 2001; Mastropieri et al., 2005). Both general and special education co-teachers communicated that lack of co-planning time was a challenge (e.g., Austin, 2001; Dieker, 2001).

Pearl and Miller (2007) conducted repeated observations of four middle school mathematics co-teaching teams over a six-week period. The researchers observed whole-class instruction being used to deliver content in 16 out of 16 instructional sessions with time also allocated for review of content and guided and independent practice. Small-group instruction was observed only once. Instruction in the co-taught classes was found to be the same as what occurred in solo-taught classes with the researchers reporting that co-teachers gave little attention to curricular adaptations while placing great importance

on maintaining the same pace of instruction in co-taught classes as solo-taught classes. The researchers also noted that while several learning strategies to support problem solving or memorizing were briefly introduced, “systematic strategy instruction was not observed; teaching methods did not require students to recite, practice or apply strategy steps in solving mathematics problems” (p. 13).

While several studies report a lack of differentiated instruction to meet the learning needs of SWD in co-taught classes (Harbort et al., 2007; Keefe & Moore, 2004; Magiera et al., 2005; Mastropieri et al., 2005; Moin et al., 2009; Murawski, 2006; Pearl & Miller, 2007; Rice & Zigmond, 2000; Scruggs et al., 2007; Zigmond, 2006), some studies found evidence that the learning needs of SWD were being met in co-taught classes (Dieker, 2001; King-Sears et al., 2014; van Hover et al., 2012). King-Sears et al. (2014) reported observing examples of effective instruction including differentiation from the high school science co-teaching pair in their case study. Furthermore, the researchers found evidence that the learning needs of students were being met with more than 85% of students either agreeing or strongly agreeing that they learned more in the co-taught class, and 100% of students either agreeing or strongly agreeing they learned better in the co-taught class. Van Hover et al. (2012) reported observing the co-teaching pair in their case study explicitly teach strategies for learning and retaining content. The researchers also reported that the special education co-teacher embedded reading comprehension and study skills instruction into daily lessons. Finally, the co-teaching pairs that Dieker (2001) observed used activity-based learning in more than 50% of lessons to engage students and increase their participation in learning.

Personal compatibility. Scruggs et al. (2007) found that for co-teachers the most commonly reported benefit to co-teaching was the opportunity to learn from another professional with a different skill set. Special educators reported gaining content knowledge and general educators reported gains in classroom management and ability to make adaptations to the curriculum (e.g., Austin, 2001; Buckley, 2005; Rice & Zigmond, 2000). While results indicated that general and special education co-teachers derived positive benefit from participating in co-teaching, Scruggs et al. (2007) reported that co-teachers' ability to learn from each other was dependent on the two teachers being personally compatible. Co-teachers often described instances where a lack of compatibility negatively impacted the effectiveness of co-teaching (Buckley, 2005; Rice & Zigmond, 2000). Personal compatibility was described both in terms of the co-teachers "getting along" with each other on an interpersonal level, as well as sharing similar philosophies on education (e.g., Buckley, 2005; Rice & Zigmond, 2000). Rice and Zigmond (2000) interviewed and observed 17 middle and high school co-teachers to find out what co-teachers perceived as factors influencing co-teaching. The researchers reported that most of the co-teachers identified personal compatibility as critical factor determining the success of co-teaching.

Scruggs et al. (2007) reported that co-teachers often referred to co-teaching as a "marriage" that required effort and flexibility to work, and interpersonal factors such as mutual trust and respect and appropriate attitudes were highlighted as was the importance of sharing a similar level of motivation and beliefs about teaching (Buckley, 2005; Mastropieri et al., 2005; Rice & Zigmond, 2000). Overall, Scruggs et al. (2007) reported

that the need for personal compatibility between co-teaching partners was mentioned very often in the studies they reviewed, and that a lack of personal compatibility between co-teaching partners undermined the effectiveness of the co-taught classroom (e.g., Buckley, 2005; Rice & Zigmond, 2000).

Pratt (2014) examined effective co-teaching relationships using classroom observations, questionnaires, and focus-group and individual interviews. Pratt found personal compatibility between co-teaching partners was an important factor in determining the effectiveness of co-teaching. Effective co-teaching was defined as both general and special education co-teachers using their unique skill sets to work interdependently, and with a common vision, to support the learning of students with and without disabilities. Personal compatibility was defined as general and special education co-teaching partners sharing similar beliefs and approaches to teaching including: expectations for student performance, classroom management styles, and views toward curriculum standards (including views on curricular adaptations). The researchers found co-teachers believed that sharing similar philosophies on teaching was beneficial, and that shared views regarding inclusion of SWD in the co-taught class was noted as particularly relevant.

Keefe and Moore (2004) interviewed general and special education co-teachers and concluded, “The importance of the [personal compatibility] between the co-teachers appeared to be the most important determinant in how successful the teachers viewed co-teaching and how likely they would be to continue co-teaching” (p. 86). These researchers described personal compatibility mainly in terms of co-teachers forming

positive interpersonal relationships, and reported that effective collaboration between the general and special education co-teachers benefited both students with and without disabilities who were able to access individualized support.

Active involvement in instruction. In the current study, active involvement in instruction refers to how much co-teachers do on tasks relevant to delivering instruction in co-taught classes. Among the tasks researchers have identified as relevant to co-taught instruction are: planning instruction, delivering instruction, evaluating student progress, and managing the classroom (Fennick & Liddy, 2001; Hang & Rabren, 2009; Harbort et al., 2007; King-Sears et al., 2014). Harbort et al. (2007) and King-Sears et al. (2014) observed the actions of co-teachers during delivery of instruction, while Fennick and Liddy (2001) and Hang and Rabren (2009) used self-report surveys to examine tasks that co-teachers engage in before (e.g. planning), during (e.g. delivering of instruction, managing the classroom), and after (e.g., evaluating student learning) instruction.

Fennick and Liddy (2001) examined general and special education co-teachers' perceptions of co-teaching roles and responsibilities using survey research. The researchers reviewed co-teaching literature to develop a 29-item survey that captured relevant tasks that general and special education co-teachers engage in to deliver instruction in co-taught classes. Items were grouped into the following categories: planning, instruction, evaluation, and behavior management. Some examples of co-teaching tasks that the researchers used to measure co-teachers' roles and responsibilities include: planning daily lessons, presenting new content, and teaching learning strategies and study skills.

Based on survey responses, Fennick and Liddy (2001) found that special education co-teachers were perceived as responsible for tasks specifically related to SWD (e.g., taking special education students out for extra help, adapting lessons/materials for special education students, monitoring the progress of students with disabilities), and general education co-teachers were perceived as responsible for tasks related to the class as a whole (planning the curriculum, presenting new content, grading/evaluating all students). Also, the researchers found that general education co-teachers and special education co-teachers disagreed on who was more responsible for instructional and behavior management tasks, with both groups seeing themselves as more responsible.

Hang and Rabren (2009) administered a survey to 31 general education co-teachers and 14 special education co-teachers that included a subscale designed to measure general and special education co-teachers' perceptions of co-teaching roles and responsibilities in co-taught classes. The researchers developed eight items, based on a review of literature and expert-panel review, to capture tasks relevant to co-teaching including: lesson planning, instruction, evaluation, making modifications, behavior management, and remediation. Each co-teaching task included in Hang and Rabren's (2009) subscale is also represented in Fennick and Liddy's (2001) longer scale.

Similar to Fennick and Liddy's (2001) findings, Hang and Rabren (2009) also found disagreement between general and special educators on who was responsible for behavior management tasks. The researchers reported that 90% of general education co-teachers indicated that they were primarily responsible for managing students' behaviors, but on the same item 93% of special education co-teachers indicated that they were

primarily responsible for managing students' behavior. The researchers did not provide information on the other tasks measured (lesson planning, instruction, evaluation, making modifications, and remediation).

Harbort et al. (2007) and King-Sears et al. (2014) used observation, as opposed to teacher self-report, to examine co-teachers' actions during delivery of instruction. Co-teachers' observed actions were assigned codes including: managing behavior; presenting instruction; responding to students, and monitoring. Behaviors that represented engagement in non-instructional tasks were also observed and coded.

Harbort et al. (2007) observed general education co-teachers to be actively involved in delivering instruction and responding to students in large groups (6 students or more). Special education co-teachers were observed to be actively involved in responding to individual students, but not actively involved in delivering instruction. Observation of either co-teacher engaging in behavior management activities was minimal.

King-Sears et al. (2014) also observed general education co-teachers to be actively involved in delivering instruction and responding to students in large groups (6 students or more). In contrast to Harbort et al.'s findings (2007), King-Sears et al. (2014) observed special education co-teachers to also be actively involved in delivering instruction and responding to students in large groups, albeit less frequently than general education co-teachers. Similar to Harbort et al.'s (2007) findings, King-Sears et al. (2014) did not observe either co-teacher engaging in behavior management activities.

Summary of co-teaching research. General and special education co-teachers are to be actively involved in co-teaching tasks that take place before, during, and after instructional time (Fennick & Liddy, 2001; Hang & Rabren, 2009; King-Sears et al., 2014). While some research on co-teaching has evidenced general and special education co-teachers both maintaining active roles in instruction (Dieker, 2001; King-Sears et al., 2014; van Hover et al., 2012), some research has found a lack of parity between co-teaching partners and special education co-teachers less actively involved in instruction (Bessette, 2008; Magiera et al., 2005; Mastropieri et al., 2005; Pearl & Miller, 2007; Rice & Zigmond, 2000; Zigmond & Matta, 2004). Given that the potential of co-teaching lies in combining the unique skill sets of general and special educators, investigating co-teachers' beliefs about their capabilities of teaching students with and without disabilities in co-taught classrooms may give an indication of the roles that general and special education co-teachers feel capable of fulfilling in the co-taught classroom. Additionally, the personal compatibility between co-teaching partners should be examined as an influential contextual variable based on research identifying personal compatibility as a critical factor in achieving effective co-teaching (Buckley, 2005; Keefe & Moore, 2004; Pratt, 2014; Rice & Zigmond, 2000). Finally, Bessette's (2008) report that special education co-teachers were being underutilized in co-taught classes suggests that the relationship between co-teachers' capability beliefs and active involvement in instruction may be impacted the personal compatibility between co-teaching partners.

Co-Teachers and Teacher Self-Efficacy

When there is lack of parity in co-taught classes, co-teachers' active involvement in instruction may not reflect the impact that an individual co-teacher is *capable* of having on students' instruction (Bessette, 2008). The active involvement in instruction of co-teachers, and special education co-teachers in particular, may be stifled by the unequal distribution of roles and responsibilities in co-taught classes. Therefore, it is important to consider what co-teachers believe they are capable of in terms of instruction in co-taught classes, and to examine the relationship between co-teachers' capability beliefs and their active involvement in instruction.

Teacher self-efficacy (TSE) is a construct that can be used to measure teachers' capability beliefs (Bandura, 1997; Gibson & Dembo, 1984; Tschannen-Moran & Woolfolk Hoy, 2001). Tschannen-Moran and Woolfolk Hoy (2001) define TSE as “a [teacher's] judgment of his or her capabilities to bring about desired outcomes of student engagement and learning, even among those students who may be difficult or unmotivated” (p.783). Tschannen-Moran and Woolfolk Hoy derived their definition of TSE from Bandura's (1997) conception of perceived self-efficacy which Bandura defined as “beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments” (p. 3). For co-teachers, TSE reflects co-teachers' beliefs about how capable they believe themselves to be to bring about desired educational outcomes for students with and without disabilities in co-taught classes.

Fives and Buehl (2012) posit that TSE influences the quality of teachers' practices by affecting the way in which teachers set goals and the effort and persistence they

expend in meeting those goals. In co-teaching, an example of Fives and Buehl's view of how TSE impacts the quality of teachers' practices might be as follows: a high TSE general education co-teacher who believes that he or she is able to instruct SWD in a co-taught algebra class might have a goal that all students, including SWD, achieve mastery of the basic algebraic concepts presented in the curriculum. That same teacher may be more likely to be actively involved in developing and implementing instructional strategies so that SWD are able to access the algebra lessons effectively. The high TSE co-teacher is also more likely to persist in teaching a student who struggles, putting forth the effort to develop and implement new strategies and to alter instruction based on the individual learning needs of the student. Conversely, a low TSE general education co-teacher who does not believe that he or she is able to instruct SWD in a co-taught algebra class might just have a goal of "getting the students through the content" with the expectation that some SWD just will not be successful. The low TSE co-teacher may put forth minimal effort to provide alternate strategies or differentiate instruction for students who are not successful with initial instruction. The low TSE co-teacher may also be less likely to persist in working with struggling students, choosing instead to be satisfied with lower levels of achievement for SWD.

The current study aims to examine factors that may influence general and special education co-teachers' active involvement in instruction. Is active involvement in instruction determined by a co-teacher's TSE? What role does the co-teacher's personal compatibility with their co-teaching partner play? In the case of Bessette's (2008) study, special education co-teachers felt capable of contributing to instruction, but their

collaborative relationship with their general education co-teaching partners somehow limited special educators' involvement in instructional activities. Bessette's findings regarding co-teachers' perceptions and role distributions support further exploration of the relationship between TSE, personal compatibility, and active involvement in instruction for general and special education co-teachers.

Measurement of Teacher Self-Efficacy

The measurement of TSE began when two items from an extensive questionnaire on teacher characteristics and student learning proved to be among the most powerful factors in a study conducted by Rand researchers (Armor et al., 1976; Dembo & Gibson, 1985; Henson, 2002; Klassen, Tze, Betts, & Gordon, 2011; Tschannen-Moran & Woolfolk Hoy, 2001). The two items were:

Rand item 1. "When it comes right down to it, a teacher really can't do much because most of a student's motivation and performance depends on his or her home environment."

Rand item 2. "If I really try hard, I can get through to even the most difficult or unmotivated students."

Several studies followed, using these two items to predict various teacher and student outcomes (e.g., Armor et al., 1976; Bergman, McLaughlin, Bass, Pauly, & Zellman, 1977). Based on the success of the Rand items in predicting teacher and student outcomes, researchers attempted to develop more extensive measures hoping to provide a more reliable and accurate measure of TSE, as well as shed light on the nature of the TSE construct (Ashton, Olejnik, Crocker, & McAuliffe, 1982; Greenwood, Olejnik, & Parkay,

1990; Guskey, 1981, 1982, 1988; Rose & Medway, 1981). The first TSE instrument grounded in Bandura's (1997) conception of self-efficacy that was used more widely in research was Gibson and Dembo's (1984) Teacher Efficacy Scale (Dembo & Gibson, 1985; Henson, 2002; Klassen et al., 2011; Tschannen-Moran & Woolfolk Hoy, 2001). Gibson and Dembo (1984) used teacher interviews, along with existing research on effective teachers to develop 30-items, which the researchers proposed represented two factors: personal teaching efficacy and general teaching efficacy.

Personal teaching efficacy: "belief that one has the skills and abilities to bring about student learning" (p. 573)

General teaching efficacy: "belief that any teacher's ability to bring about change is significantly limited by factors external to the teacher, such as the home environment, family background, and parental influences." (p. 574)

Gibson and Dembo (1984) equated the personal teaching efficacy factor with Bandura's (1977) conception of self-efficacy beliefs and the general teaching efficacy factor with outcome expectancy. Bandura defines outcome expectancy as an individual's judgment of the likely consequences of his or her actions (Bandura, 1986). Although Gibson and Dembo (1984) sought to develop their measure based on Bandura's (1977) conception of self-efficacy, Bandura (1986) later asserted that behavior has more to do with an individual's beliefs about his or her own capabilities and expected level of performance (personal teaching efficacy) than the individual's beliefs about what others would be able to accomplish under similar circumstances (general teaching efficacy).

In line with Bandura's assertion, Tschannen-Moran and Woolfolk Hoy (2001) and Henson (2002) questioned the theoretical soundness of Gibson and Dembo's (1984) two-factor structure, and they argued that a measure of teacher self-efficacy should stick to measuring teachers' beliefs about their own capabilities and not include items regarding the potential impact that teachers in general are able to have on students despite external challenges. Tschannen-Moran and Woolfolk Hoy (2001) and Henson (2002) also pointed out that several research studies examined the factor structure of Gibson and Dembo's (1984) scale and only achieved alpha reliabilities ranging from .64 to .77 for the general teaching efficacy factor, and that several items exhibited problems with cross-loading (e.g., Coladarci & Fink, 1995; Guskey & Passaro, 1994; Henson, 2002; Woolfolk & Hoy, 1990). Overall, Tschannen-Moran and Woolfolk Hoy (2001) and Henson (2002) concluded that Gibson and Dembo's (1984) two-factor teacher self-efficacy measure was not strong psychometrically and did not adequately reflect Bandura's (1986, 1997, 2001) conceptualization of self-efficacy.

Several researchers since Tschannen-Moran and Woolfolk Hoy (2001) and Henson (2002) have examined the nature of TSE and its factor structure for purposes of improving the measurement of TSE (Duffin, French, & Patrick, 2012; Fives & Buehl, 2010; Klassen et al., 2009; Ryan, Kuusinen, & Bedoya-Skoog, 2015; Tsigilis, Koustelios, & Grammatikopoulos, 2010). Most notably, Fives and Buehl (2010) and Klassen et al. (2009) examined the structural validity of Tschannen-Moran and Woolfolk Hoy's (2001) Teachers' Sense of Efficacy Scale (TSES) using exploratory and confirmatory factor analysis techniques, and concluded that the TSES can be considered a sound

measurement tool for inservice teachers' efficacy beliefs. The TSES (Tschannen-Moran & Woolfolk Hoy, 2001) measures efficacy beliefs across three factors (instructional strategies, classroom management, and student engagement) that encompass the actual tasks that teachers must perform in the classroom. Tschannen-Moran and Woolfolk Hoy (2001) stated, "In order to be useful and generalizable, measures of teacher efficacy need to tap teachers' assessments of their competence across the wide range of activities and tasks they are asked to perform" (p. 795). This is in line with Bandura's (1986) recommendation that any instrument seeking to measure self-efficacy must be linked directly to the task of interest. The long form of the TSES consists of 24 items total (8 items per factor: instruction, classroom management, and student engagement), and the short form consists of 12 items taken from the long form. Both the long and short form of the TSES have shown strong structural validity for inservice teachers across multiple studies (Fives & Buehl, 2010; Klassen et al., 2009; Ryan et al., 2015; Tschannen-Moran & Woolfolk Hoy, 2001).

Research on Teacher Self-Efficacy

Klassen and Tze (2014) reviewed 43 studies examining the impact of TSE and personality-based variables on teaching effectiveness. The researchers noted a lack of research specifically connecting TSE to teaching performance. An examination of effect sizes from six studies' comparisons of TSE and teaching performance provided evidence of a substantial positive relationship between TSE and teaching performance. Several other studies not included in Klassen and Tze's meta-analysis also provide evidence that TSE predicts teachers' engagement in instructional tasks (De Neve et al., 2015;

Holzberger, Philipp, & Kunter, 2014; Muijs & Reynolds, 2002; Rimm-Kaufman & Sawyer, 2004; Ryan et al., 2015; Skaalvik & Skaalvik, 2014). However, some studies provide evidence questioning the predictive nature of TSE (Brown, 2005; Holzberger et al., 2014; Shi, 2014).

How TSE is conceptualized and measured is not consistent across studies, making comparison and synthesis of results from studies on TSE difficult. Several studies (e.g., Brady & Woolfson, 2008; Brown, 2005; De Neve et al., 2015; Ryan et al., 2015; Siciliano, 2016; Woolfson & Brady, 2009) have measured TSE using Tschannen-Moran and Woolfolk Hoy's (2001) Teacher Sense of Efficacy Scale (TSES), which conceptualizes TSE as a teacher's belief in his or her own capabilities to bring about desired student outcomes and operationally defines TSE using three factors: classroom management, instruction, and student engagement. Alternatively, some studies (e.g., Allinder, 1995; Wertheim & Leyser, 2002) adopted Gibson and Dembo's (1984) Teacher Efficacy Scale representing TSE as comprised of two factors: personal efficacy and teaching efficacy. Personal efficacy refers to an individual teachers' belief in his or her own skills, but teaching efficacy refers to a more general belief regarding the benefit of educational experiences for students. Various other measures and definitions of TSE are represented in other studies, including scales that researchers either developed or revised to suit the goals of their particular studies (e.g., Hines & Kritsonis, 2010; Holzberger, Philipp, & Kunter, 2013; Holzberger et al., 2014; Montgomery & Mirenda, 2014; Muijs & Reynolds, 2002; Rimm-Kaufman & Sawyer, 2004; Shi, 2014; Skaalvik & Skaalvik, 2014).

Research on TSE indicates that teacher autonomy, which can be compromised in co-teaching partnerships that lack parity, may be linked both to TSE and teachers' engagement in instructional tasks (De Neve et al., 2015; Holzberger et al., 2014; Skaalvik & Skaalvik, 2014). Other teacher beliefs, including beliefs about instructing students with disabilities in special education classes and beliefs about adapting instruction, have also been linked to TSE (Brady & Woolfson, 2008; Montgomery & Mirenda, 2014; Wertheim & Leyser, 2002; Woolfson & Brady, 2009). Finally, one study found evidence that peers' attributes (including peers' TSE) may influence teachers' efficacy beliefs (Siciliano; 2016).

Teacher self-efficacy in general education. Muijs and Reynolds (2002) collected data from 103 elementary teachers and their students to examine the relationship between teacher beliefs, teacher behaviors, and student achievement in math. TSE for teaching mathematics was measured with five self-report items addressing teachers' beliefs in their own capabilities to teach: number, calculation, probability, measurement, and data handling. Teacher behavior was measured using a researcher-developed classroom observation instrument consisting of nine factors: classroom management, behavior management, direct instruction, review and practice, classroom interaction, constructivist methods, mathematical language, varied teaching, and classroom climate. Students' mathematics achievement was measured using a numeracy test. Using structural equation modeling, the researchers found TSE to have a significant direct effect on teacher behavior, and a significant indirect effect on student achievement through teacher behavior. Teachers with higher self-efficacy scored higher on the teacher

behavior scale, and the students of more active teachers produced higher math achievement scores.

Hines and Kritsonis (2010) examined the relationship between TSE, race, and student math achievement in a low socioeconomic and racially diverse middle school that the researchers characterized as a high-performing school. TSE was measured using a modified version of Bandura's (1977) teacher self-efficacy scale, that included three factors: instruction, classroom management, parent/community involvement. TSE was compared to student scores on the Texas Assessment of Knowledge and Skills benchmark tests for seventh grade mathematics. The researchers found that students of high-efficacy teachers achieved significantly better scores on all three benchmark mathematics tests than students of low-efficacy teachers. The relationship between TSE and student achievement was also examined within three racial categories: African American, Caucasian, and Hispanic. Within each category, students of high-efficacy teachers outperformed students of low-efficacy teachers, however, evidence of statistical significance was not provided. The researchers suggested that although all teachers in this study were faced with difficult teaching challenges, the high TSE teachers may have spent more time planning and used more instructional methods to teach students than low TSE teachers. Therefore, evidence from this study connected higher TSE to increased teacher behavior, and ultimately to increased student learning outcomes.

Ryan et al. (2015) examined the factor structure of the TSE construct, differences in TSE between elementary and middle school teachers, and the relationship between TSE and classroom quality. TSE was measured using the Teacher Sense of Efficacy

Scale (TSES; Tschannen-Moran & Woolfolk Hoy, 2001), which measures efficacy teachers' beliefs across three factors: classroom management, instruction, and student engagement. Ryan et al. (2015) developed an additional factor, self-efficacy for managing peer relationships, for examination. Classroom quality was measured using Pianta, Karen, Paro, and Hamre's (2008) classroom observational instrument which measured teacher behaviors using three factors: classroom organization, instructional supports, and emotional supports.

Results from exploratory factor analysis confirmed the factor structure of the TSES and Ryan et al.'s (2015) newly developed factor, self-efficacy for managing peer relationships. The researchers examined bivariate correlations between each TSE factor and each classroom quality factor, and found teacher self-efficacy for both classroom management and management of peer relationships to be significant predictors of classroom quality. Finally, the researchers compared the TSE of elementary and middle school teachers and found that middle school teachers reported significantly lower teacher self-efficacy for classroom management and managing peer relations than elementary school teachers.

The results of Ryan et al.'s (2015) study provide evidence that supports the use of the TSES (Tschannen-Moran & Woolfolk Hoy, 2001) as a valid measure of teachers' efficacy beliefs. The results also provide evidence of a positive relationship between TSE and teacher behaviors. Finally, the results of this study suggest that differences in TSE may exist between teachers at different levels (elementary, middle, and high school).

Rimm-Kaufman and Sawyer (2004) examined how elementary teachers' engagement in classroom practices representative of the Responsive Classroom (RC) approach related to teachers' beliefs, including TSE. TSE was measured using a 19-item questionnaire adapted from Bandura (1993) that included four factors: disciplinary self-efficacy (similar to classroom management), instructional self-efficacy, efficacy to create a positive school environment, and efficacy to influence decision making. Use of RC classroom practices was measured with a 41-item scale that "asked teachers about their use and characteristics of: (1) hand signals; (2) classroom opening exercises; (3) classroom rules and consequences; (4) classroom organization; (5) introduction of materials; (6) student choice; (7) student reflection; (8) assessment and parent communication; (9) time-out; and (10) problem-solving class meetings" (p. 328).

Rimm-Kaufman and Sawyer (2004) found that teachers who were high in disciplinary self-efficacy, efficacy to create a positive school environment, and efficacy to influence decision-making reported significantly greater use of RC practices and RC resources than low TSE teachers. Use of RC resources referred to teachers' use of "RC books and web site, participation in network meetings, and consultation with RC trainers" (p. 328). The researchers also found a significant positive relationship between TSE and amount of RC training. Finally, the researchers found that teachers who were high in disciplinary self-efficacy and efficacy to create a positive school environment prioritized classroom practices in a manner more consistent with the RC approach than low TSE teachers. Among the classroom practices that were highly prioritized in the RC approach were having a morning routine and providing classroom activities that foster a sense of

community. Overall, the results of Rimm-Kaufman and Sawyer's (2004) study provide evidence of a positive relationship between TSE and teacher behaviors, and identify access to training as connected to TSE.

Skaalvik and Skaalvik (2014) surveyed 2,569 Norwegian elementary and middle school teachers to examine whether TSE and teacher autonomy are predictive of engagement, job satisfaction, and emotional exhaustion. TSE was measured using the Norwegian Teacher Self-Efficacy Scale (NTSES; Skaalvik & Skaalvik, 2007), which defines TSE using six factors: instruction, adapting education to individual students' needs, motivating students, classroom management, cooperating with colleagues and parents, and coping with changes and challenges. This conceptualization of TSE is somewhat similar to that of Tschannen-Moran & Woolfolk Hoy (2001) in that TSE is conceptualized as task-specific, being operationally defined by the types of tasks teachers engage in. Teacher autonomy, engagement, job satisfaction, and emotional exhaustion were all measured with brief scales (between three and nine items per scale). The researchers found TSE and teacher autonomy to be significantly and positively related to engagement and job satisfaction. The positive relationship between TSE and engagement provides evidence that teachers' behaviors are influenced by their TSE, and the positive relationship between teacher autonomy and engagement suggests that teacher autonomy may be an important determinant of teachers' behaviors.

One set of researchers used data from 155 German secondary mathematics teachers and 3,483 9th grade students for two separate studies on TSE (Holzberger et al., 2013; 2014), one of which also linked teacher autonomy to TSE (Holzberger et al., 2014).

Holzberger et al. (2014) examined TSE and teachers' intrinsic need satisfaction (inclusive of autonomy), as predictors of instructional behaviors. TSE was measured using four items from Schwarzer, Schmitz, and Daytner's (1999) Teacher Self-Efficacy Scale. This brief scale does not represent specific instructional tasks, so this conceptualization of TSE is not similar to that of Tschannen-Moran and Woolfolk Hoy (2001). The items do, however, ask teachers to report on individual teachers' belief in their own skills, which represents Gibson and Dembo's (1984) definition of personal efficacy. The four items measured TSE using a 4-point scale, and are listed below.

1. If I try hard enough, I know that I can exert a positive influence on both the personal and academic development of my students.
2. I am confident in my ability to be responsive to my students' needs even if I am having a bad day.
3. I am sure that I can develop creative ideas for changing unfavorable instructional structures.
4. I know that I can motivate my students to participate in innovative projects.

Teachers' intrinsic needs were represented by three needs identified in Deci and Ryan's (1985) self-determination theory as relevant to human behavior: the need for autonomy (i.e., experiencing freedom in work decisions and execution), the need for competence (i.e., mastering work tasks), and the need for relatedness (i.e., feeling connected and supported by people at work). Teachers' intrinsic need satisfaction was measured using 21 of the items in Deci et al.'s (2001) Basic Need Satisfaction at Work Scale. Finally, teachers' instructional behaviors were measured using student ratings of teachers'

behavior across three factors: cognitive activation (e.g., “Our teacher sometimes lets us go astray in our work until we notice that something is wrong”), teacher-student relationship (e.g., “Our mathematics teacher sometimes upsets students”), and effective classroom management (e.g., “In mathematics our teacher always knows exactly what is going on in class”).

Holzberger, et al. (2014) found that both TSE and intrinsic need satisfaction to be significant predictors all three factors representing instructional behavior. The researchers also reported a significant interaction effect between intrinsic need satisfaction and TSE in models predicting the teacher–student relationships and classroom management factors of instructional behavior. The positive relationship between TSE and classroom management behaviors became stronger as intrinsic need satisfaction increased. The moderating effect of intrinsic need satisfaction on the relationship between TSE and teacher-student relationships was even more stark. At higher levels of intrinsic need satisfaction, TSE related positively to teacher–student relationships. However, when teachers reported lower intrinsic need satisfaction, the relationship between TSE and teacher–student relationships became negative. The researchers interpreted this interaction effect stating “when need satisfaction is low but teachers have high self-efficacy, students indicate a less positive teacher–student relationship” (p. 105).

Similar to what was demonstrated in Skaalvik and Skaalvik’s (2014) study, Holzberger et al.’s (2013) findings suggest that teachers’ behaviors are influenced by their TSE, and that teacher autonomy (which was one of the intrinsic needs of teachers

identified by the researchers) may also be an important determinant of teachers' behaviors. Holzberger et al.'s finding of a significant interaction between TSE and intrinsic need satisfaction provided evidence that the influence of TSE on teacher behaviors may depend on whether teachers' intrinsic needs are being met. Therefore teacher autonomy may not only impact teacher behaviors directly, but also moderate the relationship between TSE and teacher behaviors.

In their other study, Holzberger et al. (2013) used a longitudinal approach to examine the reciprocal effects of TSE on instructional quality and vice versa, thereby examining the causal nature of the relationship between the two constructs. TSE was measured using the four items from Schwarzer, et al.'s (1999) Teacher Self-Efficacy Scale that were discussed previously, and instructional quality was measured using both student-report and teacher self-report ratings of behavior across the three dimensions of cognitive activation, teacher-student relationship, and effective classroom management. Results provided evidence for TSE as a predictor of instructional quality, but only partially confirmed a causal effect of TSE on later instructional quality. Stronger evidence was found supporting the reverse effect of instructional quality on TSE. This suggests that teacher behavior may determine TSE more than TSE determines subsequent teacher behavior. Based on their results, the researchers recommended examining TSE as both a predictor and an outcome measure related to teacher behavior in future research.

Following on the mixed results from Holzberger, et al.'s (2013) examination of TSE as a causal predictor of instructional quality, Shi (2014) provided evidence that questioned the predictive capacity of TSE for Asian educators. Shi examined the

relationship between teachers' efficacy beliefs for teaching mathematics and teachers' mathematical instructional practices using data from the Trends of International Mathematics and Science Study (TIMSS) 2011 for teachers from five different Asian countries (Chinese Taipei, Hong Kong, Japan, Korea, and Singapore). TSE was conceptualized as a teachers' beliefs in their own ability to organize and execute their teaching, and TSE for teaching mathematics was measured by asking teachers to rate their confidence, using a 3-point scale, on the following five items:

1. answer students' questions about mathematics
2. show students a variety of problem solving strategies
3. provide challenging tasks for capable students
4. adapt my teaching to engage students' interest
5. help students appreciate the value of learning mathematics

Teachers' mathematical instructional practices were measured by asking teachers to indicate how often they engage in certain instructional practices using a 4-point scale ranging from "never" to "every or almost every lesson." The four items used to measure teachers' mathematical instructional practices are listed below.

1. summarize what students should have learned from the lesson
2. use questioning to elicit reasons and explanations
3. encourage all students to improve their performance
4. praise students for good effort

Shi's (2014) results indicated that teachers in each of the five Asian countries reported lower efficacy beliefs for teaching mathematics and compared to the

international average. Similarly, teachers in each of the five Asian countries reported lower engagement on the mathematical instructional practices measured compared to international averages. In the aggregate, TSE for teaching mathematics was found to be significantly related to instructional practices in all five Asian countries/regions. However, results were mixed when the relationships between individual TSE items and teachers' instructional practices were examined for teachers in each country. For example, none of the individual TSE items predicted instructional practices for teachers in Chinese Taipei, while for Korean teachers three of the five TSE items were able to individually predict instructional practices. Two TSE items were found predictive for teachers from Singapore and Hong Kong, respectively, and one TSE item was found predictive for Japanese teachers. The particular TSE items that were predictive of instructional practices were not consistent across countries. Overall, Shi (2014) found TSE to be an inconsistent predictor of teacher behavior, and suggested that the nature and influence of TSE may differ across cultural contexts.

Brown (2005) also examined the relationship between TSE and teachers' mathematical instructional practices and obtained results that questioned the predictive capability of TSE. Brown measured the TSE of 94 prekindergarten teachers using Tschannen-Moran and Woolfolk Hoy's (2001) Teacher Sense of Efficacy Scale, which measures TSE across the three factors of instruction, classroom management, and student engagement. Brown (2005) also measured the mathematics instructional practices of 20 of the participants using a modified version of Stonewater's (1993) Standards Observation Form (SOF) which was designed to document the extent to which observed

mathematics teaching meets and supports an effective classroom learning environment as defined by six standards: worthwhile mathematical tasks, teacher's role in discourse, student's role in discourse, how the teacher enhances the discourse with tools, the learning environment, and mathematics teacher's analysis of the teaching and learning. Observation of instructional practices occurred when children were actively engaged in mathematical activities with the teacher. Results of correlation analysis revealed no significant relationship between TSE and prekindergarten teachers' mathematical instructional practices as measured using the SOF. Therefore, Brown et al.'s (2005) study provided evidence that teacher behaviors are not influenced by TSE.

One final study did not examine the relationship between TSE and teacher behavior, but did examine the influence that peers' attributes have on teachers' efficacy beliefs. Siciliano (2016) noted a lack of research on the impact of peer attributes on TSE, and acknowledged that assuming the beliefs of teachers and their peers are independent is problematic. Therefore, Siciliano used a network autocorrelation model, which is able to account for non-independence in data, to examine the influence that peers' TSE had on teachers own efficacy beliefs. In addition to the autocorrelation approach, multi-level modeling was used to examine the impact of peer interaction on teachers' own efficacy beliefs.

Peer interaction was defined in terms of how often teachers' accessed peers for advice or knowledge and peers' willingness to share advice and knowledge. Skaalvik and Skaalvik's (2010) conceptualization of TSE as "individual teachers' beliefs in their own ability to plan, organize, and carry out activities that are required to attain given

education goals” (p. 1059) was adopted, and nine items from Tschannen-Moran and Woolfolk Hoy’s (2001) Teacher Sense of Efficacy Scale were used to measure TSE (three items from each of the TSES’s three factors: instruction, classroom management, and student engagement). Siciliano (2016) found both peer interaction and peer TSE to be significant predictors of teachers’ efficacy beliefs. The results of this study demonstrate the importance of examining the effects of peers’ characteristics when considering the TSE of teachers who work collaboratively.

Teacher self-efficacy in special education. Allinder (1995) examined the TSE of 19 elementary special educators using curriculum-based measurement (CBM) to inform mathematics instruction for students with learning disabilities, emotional disturbance, and mild intellectual disabilities. TSE was conceptualized as being comprised of two factors, personal efficacy and teaching efficacy, and measured using Gibson and Dembo’s (1984) Teacher Efficacy Scale. CBM was described as a type of formative assessment used to monitor students’ attainment of a given academic skill over time through direct and frequent measurement of the skill and graphic display of progress. Based on student progress, teachers modified student goals and instructional plans to support skill acquisition.

Allinder (1995) found special educators with high teaching efficacy set more ambitious goals for the number of math computations SWD would correctly complete. Allinder also found that both teaching efficacy and personal efficacy significantly predicted the number of goal changes special educators made, with higher TSE special educators increasing achievement goals more frequently in response to student learning.

Finally, the students of special educators with high personal efficacy performed more calculations correctly and showed a greater rate of improvement in math calculation than the students of special educators with low personal efficacy. Teaching efficacy, however, did not predict student mathematics performance or improvement. Overall, the results of this study provide evidence of a positive relationship between TSE and teacher behaviors. The relationship between TSE and student outcomes was not as strongly supported, based on the 2-factor conceptualization of TSE.

In their study examining preservice teachers' TSE and willingness to use research-based strategies, Wertheim and Leyser (2002) also conceptualized TSE as being comprised of personal efficacy and teaching efficacy. The researchers used the Hebrew version of Gibson and Dembo's (1984) Teacher Efficacy Scale (short form) to measure TSE across the two factors, and included seven additional items developed by Rich, Lev, and Fischer (1996) to measure TSE for enhancing social relationships. Based on the results of factor analysis, the additional seven social items were included in the personal efficacy and teaching efficacy factors.

The results of Wertheim and Leyser's (2002) study revealed a statistically significant positive relationship between preservice teachers' TSE and their reported willingness to adapt and individualize instruction for SWD in general education classes. Similarly, Brady and Woolfson (2008) and Woolfson and Brady (2009) found that high TSE elementary teachers considered the struggles of SWD more a matter of how they themselves delivered the curriculum, or the teaching methods they chose to employ, than a lack of ability on the part of SWD. Brady and Woolfson (2008) and Woolfson and

Brady (2009) measured TSE using Tschannen-Moran and Woolfolk Hoy's (2001) Teachers' Sense of Efficacy Scale (short form). No detail was provided on the teaching methods of the participating co-teachers, only that high TSE co-teachers reflected on their own teaching, rather than the learning challenges for SWD, when faced with issues of low achievement for SWD. Taken together, the results of these studies (Brady & Woolfson, 2008; Wertheim & Leyser, 2002; Woolfson & Brady, 2009) support connecting TSE to teacher behaviors.

De Neve et al. (2015) explored the predictive ability of several teaching variables, including TSE and teacher autonomy, on beginning elementary teachers' self-reported changes in the use of differentiated instruction. Like Brady and Woolfson (2008) and Woolfson and Brady (2009), De Neve et al. (2015) measured TSE using a revised version of Tschannen-Moran and Woolfolk Hoy's (2001) Teacher Sense of Efficacy Scale. Teacher autonomy was described as teachers' feelings regarding the freedom they have to: select their own teaching methods, strategies, and assessment activities; schedule the use of classroom time; and select student goals, and was measured using Pearson and Moomaw's (2006) Teacher Autonomy Scale.

Results from confirmatory factor analysis revealed that TSE and teacher autonomy had significant direct effects on self-reported changes in differentiated instruction practices. De Neve et al. (2015) reported that one additional variable, collective responsibility, had a significant indirect effect through TSE. The researchers defined collective responsibility as a joint responsibility to the collaborative group as opposed to teachers operating in isolation, and highlighted the importance of co-planning,

sharing of collaborative roles, and the importance of shared values and vision for teachers working in a collaborative team. Overall, the results from De Neve et al.'s (2015) study were consistent with previous studies (Holzberger et al., 2013; Skaalvik & Skaalvik, 2014) in suggesting that teachers' behaviors may be influenced by TSE and teacher autonomy.

Montgomery and Mirenda (2014) examined the relationship between general and special education teachers' TSE and their sentiments, attitudes and concerns about instructing students with developmental disabilities in general education classrooms at the elementary and middle school level. The researchers noted that developmental disabilities included: intellectual disabilities, autism spectrum disorder, and physical or multiple disabilities. TSE was measured using Sharma, Loreman, and Forlin's (2012) Teacher Efficacy for Inclusive Practices (TIEP) scale, which, similar to Tschannen-Moran and Woolfolk Hoy's (2001) Teacher Sense of Efficacy Scale, conceptualizes TSE as a teachers' belief in his or her own capabilities regarding inclusive instruction. The TIEP (Sharma et al., 2012) measures TSE across three factors: efficacy in using inclusive instruction, efficacy in collaboration, and efficacy in managing problem behavior.

Montgomery and Mirenda (2014) found that high TSE teachers reported more positive views on instructing students with developmental disabilities in general education classes, and indicated less concerns about teaching students with developmental disabilities in general education classes. Additionally, the researchers conducted a series of multiple regressions and determined that the efficacy in collaboration factor was the best predictor of general and special education teachers'

sentiments, attitudes and concerns about instructing students with developmental disabilities in general education classrooms.

Summary of research on teacher self-efficacy. Several studies found evidence that teacher behaviors were influenced by TSE (De Neve et al., 2015; Holzberger et al., 2014; Klassen & Tze, 2014; Muijs & Reynolds, 2002; Rimm-Kaufman & Sawyer, 2004; Ryan et al., 2015; Skaalvik & Skaalvik, 2014), while other studies provided conflicting results regarding the predictive nature of TSE (Brown, 2005; Holzberger et al., 2014; Shi, 2014). TSE was conceptualized and measured differently in different studies, however several studies (Brady & Woolfson, 2008; Brown, 2005; De Neve et al., 2015; Ryan et al., 2015; Siciliano, 2016; Woolfson & Brady, 2009) used Tschannen-Moran and Woolfolk Hoy's (2001) TSES, which measures teacher's efficacy beliefs across three factors: instruction, classroom management, and student engagement. Ryan et al. (2015) used exploratory factor analysis to examine the factor structure of the TSES, plus a newly developed factor (self-efficacy for managing peer relationships), and found evidence supporting the structural aspect of validity (Messick, 1995) for Tschannen-Moran and Woolfolk Hoy's (2001) TSES. Overall, previous research supports examining TSE as a potential factor impacting co-teachers' active involvement in instruction.

Several studies identified teacher autonomy as a construct related to both teacher behaviors and TSE (De Neve et al., 2015; Holzberger et al., 2014; Skaalvik & Skaalvik, 2014). It is possible that the relationship between teacher autonomy and instructional behaviors evidenced in these studies may be connected findings from co-teaching research indicating that a lack of parity in co-teaching teams results in special education

co-teachers being less actively involved in instruction (Bessette, 2008; Magiera et al., 2005; Mastropieri et al., 2005; Pearl & Miller, 2007; Rice & Zigmond, 2000; Zigmond & Matta, 2004). Skaalvik and Skaalvik (2014) connected teacher autonomy to the classroom experience stating, “[greater] autonomy implies that teachers are not instructed to use teaching methods that they are not comfortable with and which might require extra time for preparation” (p.70). Because general education co-teachers often take the lead for instruction in co-taught classes, special education co-teachers may need to be comfortable with teaching methods used by general educators to be actively involved in instruction. Therefore, special education co-teachers who share similar views and approaches to teaching with their general education co-teaching partners (personal compatibility), may be more likely to be actively involved in instruction in co-taught classes.

Finally, Siciliano (2016) provided evidence that teachers’ peers influence TSE in two ways. First, peers may serve as a resource for gaining knowledge that can increase TSE, and second, the efficacy beliefs of teachers’ peers may directly affect teachers’ own efficacy beliefs. For co-teachers, who can be viewed as peers that are assigned to work together in co-taught classes, peer influences may be particularly impactful. Therefore, Siciliano’s results support including interpersonal variables, such as personal compatibility, in models examining the TSE of co-teachers, and analyzing co-teachers’ data using methods that can model the effect of both teachers’ own TSE, and the TSE of their co-teaching partner, on outcome variables.

Teacher Self-Efficacy and Personal Compatibility

In his social cognitive theory, Bandura (1986, 1997, 2001) posits that human functioning results from interactions between personal (e.g., TSE), behavioral (e.g., active involvement in instruction), and social/environmental (e.g., personal compatibility) factors that influence individuals. It may be argued that personal compatibility represents a personal factor in Bandura's social cognitive theory. However, the definition of personal compatibility as the amount of similarity between co-teaching partners on beliefs and approaches to teaching as well as on personal characteristics (Dieker, 2001; McCormick, Noonan, Ogata, & Heck, 2001; Noonan et al., 2003; Pratt, 2014; Rice & Zigmond, 2000) suggests the influence of an outside source (the co-teaching partner). Indeed, one co-teacher may be assigned to work with multiple co-teaching partners who may subscribe to different beliefs and approaches to teaching. Therefore it is likely that a given co-teacher's reported personal compatibility would depend, in part, on the beliefs and characteristics of his or her co-teaching partner. Because a co-teacher's personal compatibility depends not only on his or her own beliefs and approaches to teaching, but on those of his or her co-teaching partner, one could argue that it is more appropriate to consider personal compatibility as a social/environmental factor than a personal factor.

According to Bandura (1997), the social environment is influential in how efficacy beliefs translate into actions.

“Perceived self-efficacy operates within a broad network of sociocultural influences. However, this analysis goes beyond the contextualist perspective in which people adapt their actions to suit the social contexts in which they happen

to find themselves. People are producers as well as products of social environments. In short, they have a hand in selecting and shaping their environmental context.” (1997; preface)

Bandura’s identification of the social context as a fundamental environmental factor influencing self-efficacy supports including personal compatibility between co-teaching partners, which prior co-teaching research has identified as critical to effective co-teaching (Buckley, 2005; Keefe & Moore, 2004; Pratt, 2014; Rice & Zigmond, 2000), as an additional variable in any model examining co-teachers’ TSE. Bandura (1997) gives special attention to interpersonal social environments pointing out that much social learning occurs between peers who tend to share similar interests and values. He also suggests that interpersonal relationships with like-minded peers “promote self-efficacy in directions of mutual interest, leaving other potentialities underdeveloped” (p. 173).

Bandura’s argument that self-efficacy can be influenced by interpersonal peer relationships was demonstrated by Siciliano (2016), who found teacher’s efficacy beliefs were positively related to measures of peers’ knowledge and advice providing. Bandura (1997) also explains that the relative influence exerted by the social conditions in the environment on personal factors such as TSE varies, and may be related to the socially conferred role or status of the individual within their social context. This implies that the relationship between TSE, personal compatibility, and active involvement in instruction may differ between general and special education co-teachers.

Summary

Co-teaching is a common service delivery model that high schools employ to satisfy legislative requirements that SWD be educated in the LRE while being provided access to high quality content instruction and special education services (EHA, 1975; IDEA, 2004; NCLB, 2002). Co-teaching literature has theorized that the potential of co-teaching rests on general and special education co-teachers combining their unique skill sets to enhance teaching approaches and instructional strategies for SWD in co-taught classes (Friend, Reising, & Cook, 1993; Kloo & Zigmond, 2008; Murawski & Lochner, 2011). However, some past co-teaching research indicates that high school special education co-teachers function as paraprofessionals who are less actively involved in instruction, while general education co-teachers deliver most of the classroom instruction using whole-group lecture and do not differentiate instruction based on the individual needs of SWD (Harbort et al., 2007; Keefe & Moore, 2004; Moin et al., 2009; Murawski, 2006; Rice & Zigmond, 2000; Scruggs et al., 2007).

Some co-teaching research that *has* found evidence of effective co-teaching, with both the general and special education co-teachers actively involved in instruction, describes co-teaching partners who are personally compatible and consistently in communication (De Neve et al., 2015; Pratt, 2014; van Hover et al., 2012). The need to examine the relationship between TSE, personal compatibility, and active involvement in instruction for general and special education co-teachers is based on research that indicates teacher self-efficacy (TSE) is predictive of engagement in instructional tasks (De Neve et al., 2015; Holzberger, Philipp, & Kunter, 2014; Klaasen & Tze, 2014; Muijs

& Reynolds, 2002; Rimm-Kaufman & Sawyer, 2004; Ryan et al., 2015; Skaalvik & Skaalvik, 2014), and that personal compatibility between co-teachers is critical to effective co-teaching (Buckley, 2005; Keefe & Moore, 2004; Pratt, 2014; Rice & Zigmond, 2000; Scruggs et al., 2007; van Hoven et al., 2012).

Research Questions

The purpose of the current study is to examine the TSE and personal compatibility of high school general and special education co-teachers, and to determine if TSE and personal compatibility have an effect on general and special education co-teachers' active involvement in instruction. Specifically, this study examined the degree to which personal compatibility moderates the relationship between TSE and active involvement in instruction for general and special education co-teachers.

1. Is there a significant difference between general and special education co-teachers on teacher self-efficacy (TSE), personal compatibility, and active involvement in instruction?
2. What is the relationship between general and special education co-teachers' TSE, personal compatibility, and active involvement in instruction?
 - a. Do TSE and personal compatibility predict general and special education co-teachers' active involvement in instruction?
 - b. Does personal compatibility moderate the relationship between TSE and active involvement in instruction for general and special education co-teachers?

Definition of Terms

Accommodations. Henley, Ramsey, and Algozzine (2009) define accommodations by stating, “Accommodations refer the actual teaching supports and services that the student may require to demonstrate what has been learned successfully. These include adjustments in the instruction of students, and approaches whereby the learning environment of the students is modified to promote learning. The basic curriculum is not changed” (p. 271). Accommodations that a student should be provided will be identified in that student’s Individualized Education Program (IEP). An example of an accommodation for a student with a disability in a general education class would be allowing the student to have additional time to complete tests.

Active involvement in instruction. Co-teachers’ active involvement in instruction is defined as how involved general and special education co-teachers are in specific co-teaching tasks before, during, and after instructional time, including: lesson planning, instruction, evaluation, making modifications, behavior management, and remediation (Fennick & Liddy, 2001; Hang & Rabren, 2009).

Autism. IDEA defines autism as a developmental disability significantly affecting verbal and nonverbal communication and social interaction, generally evident before age 3, that adversely affects a child’s educational performance. Other characteristics often associated with autism are engagement in repetitive activities and stereotyped movements, resistance to environmental change or change in daily routines, and unusual responses to sensory experiences. The term does not apply if a child’s educational performance is adversely affected primarily because the child has an

emotional disturbance (b)(4). (ii) A child who manifests the characteristics of “autism” after age 3 could be diagnosed as having “autism” if the criteria in paragraph (c)(1)(i) of this section are satisfied (34 C.F.R. § 300.8 (c) (1), 2006).

Co-taught class. A co-taught class is a class in which two teachers, a general education co-teacher and a special education co-teacher, deliver instruction to a mixed group of students with and without disabilities.

Co-teaching. Co-teaching is defined as one general educator and one special educator “delivering substantive instruction to a diverse, or blended, group of students in a single physical space” (Cook & Friend, 1995, p. 2).

Differentiated instruction. Differentiated instruction is defined as a pedagogical approach in which teachers challenge students of differing readiness levels and interests within the same classroom by varying the difficulty, amount of assistance, and the way in which students engage in instructional tasks (Tomlinson, 1999).

Emotional disability. IDEA defines an emotional disability as a condition exhibiting one or more of the following characteristics over a long period of time and to a marked degree that adversely affects a child's educational performance:

- (A) An inability to learn that cannot be explained by intellectual, sensory, or health factors.
- (B) An inability to build or maintain satisfactory interpersonal relationships with peers and teachers.
- (C) Inappropriate types of behavior or feelings under normal circumstances.
- (D) A general pervasive mood of unhappiness or depression.

(E) A tendency to develop physical symptoms or fears associated with personal or school problems.

(ii) Emotional disturbance includes schizophrenia. The term does not apply to children who are socially maladjusted, unless it is determined that they have an emotional disturbance under paragraph (c) (4) (i) of this section (34 C.F.R. § 300.8 (c) (4), 2006).

Highly-qualified general education teacher. According to NCLB, a highly-qualified general education teacher must: hold at least a bachelor's degree; possess full state certification or licensure; and demonstrate competency in the core academic subject area that they teach. The term "core academic subject" includes: English, reading or language arts, mathematics, science, foreign languages, civics and government, economics, arts, history, and geography. Highly-qualified general education teachers can demonstrate subject area competency through college-level coursework or by passing a state-developed test of subject-specific. [Section 9101(11)].

Highly-qualified special education teacher. According to IDEA, a highly-qualified special educator must: hold at least a bachelor's degree; possess full state certification or licensure as a special education teacher; and not have had special education certification or licensure requirements waived on an emergency, temporary, or provisional basis. Highly-qualified special educators participating in an alternative route to special education certification program must: receive high-quality professional development that is sustained, intensive, and classroom-focused before and while teaching; participate in an intensive supervision or teacher mentoring program; and demonstrates satisfactory progress toward full state certification.

Individualized Education Program (IEP). According to IDEA, a student who is determined eligible to receive special education services through a referral and evaluation process must be provided with an Individualized Education Program (IEP). The IEP must include information about the student and the educational program designed to meet his or her needs, including any accommodations or modifications to curriculum or assessment (34 C.F.R. § 300.320 (a) (11) (6), 2006) .

Individualized instruction. Individualized instruction is defined as instruction in which the individual student's characteristics, and not the prescribed academic content, provide the basis for instructional decisions (Hallahan, Kauffman, & Pullen, 2009).

Modifications. Henley et al. (2009) define modifications by stating, "Modifications refer to changes made to curriculum expectations in order to meet the needs of the student. Generally, modifications are made when the expectations are beyond the student's level of ability" (p. 271). An example of a modification for a student with a disability in a general education class would be requiring the student to only answer the more basic questions on a test. In this example, assessment of the student with a disability would not cover the same curricular expectations that other students in the class are assessed on.

Other health impairment. IDEA defines other health impairment as having limited strength, vitality, or alertness, including a heightened alertness to environmental stimuli, that results in limited alertness with respect to the educational environment, that (i) is due to chronic or acute health problems such as asthma, attention deficit disorder or attention deficit hyperactivity disorder, diabetes, epilepsy, a heart condition, hemophilia,

lead poisoning, leukemia, nephritis, rheumatic fever, sickle cell anemia, and Tourette syndrome; and (ii) adversely affects a child's educational performance (34 C.F.R. § 300.8 (c) (9), 2006).

Paraprofessional. Friend and Cook (2007) define paraprofessionals as “[assisting] teachers in many instructional and clerical tasks, but the support they provide is not co-teaching. [...] Generally, [paraprofessionals’] work is directed by teachers, and they are not directly accountable for students’ instruction. (p. 1)

Parity. Friend and Cook (2007) define parity between general and special education co-teachers as a situation in which “each professional’s instructional contribution is equally valued. This implies that teachers share power – neither makes key decisions alone, neither directs the other. Instead, co-teachers collaborate to make decisions, divide responsibilities to be efficient, and share accountability for their students’ learning” (p. 2).

Personal compatibility. The personal compatibility between general and special education co-teachers is defined as the degree to which co-teaching partners perceive themselves as similar regarding beliefs and approaches to teaching as well as on personal characteristics (Dieker, 2001; McCormick et al., 2001; Noonan et al., 2003; Pratt, 2014; Rice & Zigmond, 2000).

Solo-taught class. A solo-taught class is a class in which only one teacher delivers instruction to a group of students. One general education teacher may deliver instruction to a group of students without disabilities or to a mixed group of students with

and without disabilities. One special education teacher may deliver instruction to a group of only SWD.

Special education. IDEA defines special education as specially designed instruction, at no cost to the parents, to meet the unique needs of a child with a disability (34 C.F.R. § 300.39, 2006).

Specific learning disability. IDEA defines a specific learning disability as a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, that may manifest itself in an imperfect ability to listen, think, speak, read, write, spell, or to do mathematical calculations (34 C.F.R. § 300.8 (c) (10), 2006).

Speech or language impairment. IDEA defines speech or language impairment as a communication disorder, such as stuttering, impaired articulation, a language impairment, or a voice impairment, that adversely affects a child's educational performance (34 C.F.R. § 300.8 (c) (11), 2006).

Teacher self-efficacy. Teacher self-efficacy is defined as teachers' beliefs about their own ability to deliver instruction to their students, including students considered difficult to teach (Bandura, 1997; Tschannen-Moran & Woolfolk Hoy, 2001).

Chapter Two

This chapter includes two literature reviews. The first literature review is about research on co-teaching at the high school level, and the second literature review is about research on teacher self-efficacy (TSE) of practicing high school teachers. Both literature reviews include research on teachers of students with high-incidence disabilities (SWD) who are accessing the general education curriculum including students with: learning disabilities (LD), other health impairment (OHI), speech or language impairment (SLI), emotional disturbance(ED), or autism. Approximately 96% of all SWD that receive 80% or more of their education in general education classrooms are eligible for special education services under one of the aforementioned disability categories: LD, OHI, SLI, ED, or autism (U.S. Department of Education, 2011).

Both literature reviews also only include studies done at the high school level. The high school grades (9-12) represent a unique context for educating SWD in a general education curriculum that reflects a greater emphasis on content-area knowledge, requires that students possess independent study skills along with sufficient prerequisite content knowledge, maintains a faster pace of instruction, and seeks to develop critical thinking and problem-solving skills while at the same time prioritizing performance on high-stakes tests (Deshler, et al., 2001; Mastropieri & Scruggs, 2001). Both students and special educators have expressed apprehension over the more complex and demanding content delivered to students at the high school level (Akos & Galassi, 2004; Moin et al., 2009). Additionally, TSE research has found differences in the efficacy beliefs of

teachers at the elementary, middle and high school levels with teachers in the higher grades showing lower TSE (Fives & Buehl, 2009; Klassen et al., 2009; Ryan et al., 2015; Wolters & Daugherty, 2007). Therefore, while chapter one included research done at the elementary and middle school levels, the literature reviews in presented in this chapter have been confined to research done at the high school level.

Each literature review begins with a description of the search procedures used to identify relevant studies, including data bases searched, keywords used, and inclusion and exclusion criteria applied. Next, descriptions of the identified research studies and their results are presented. Finally, a synthesis of the research findings is presented.

Co-Teaching Literature Search Procedures

For co-teaching research, the following databases were searched: Academic Search Complete, AP PsychNet, Education Full Text, Education Research Complete, ERIC, and Social Sciences Index. Only research published in peer-reviewed journals was considered. Each database was searched individually using the following keywords: co-teaching, high school, secondary, special education, and disabilities. Additionally, the subject terms “interdisciplinary teams in education” and “teaching teams” were subject terms that the following databases provided through their thesaurus tools for co-teaching: Academic Search Complete, Education Full Text, and Education Research Complete databases.

Three fields were employed for each search, one dedicated to co-teaching, one to the high school level, and the third to special education, so that articles were required to

be relevant on all three levels in order to be included for initial consideration. The initial search yielded 125 articles.

The abstracts for all 125 articles were examined to determine if inclusion criteria was met. In many cases review of the method section was also necessary in order to determine the sample population. The criteria for the inclusion of studies for this literature review were as follows: (a) focused on the topic of co-teaching, (b) involved practicing teachers of students with high-incidence disabilities (this includes only general and special educators) participating in the general curriculum at the high school level (grades 9-12), and (c) represented empirical studies. Quantitative studies that included high school teachers along with elementary and/or middle school teachers in their participant population, but did not disaggregate to provide specific results for high school teachers, were not considered to have met the inclusion criteria for this literature review. Similarly, quantitative studies that included both preservice and practicing teachers in their participant population, but did not disaggregate to provide specific results for practicing teachers, were not considered to have met the inclusion criteria for this literature review. For qualitative studies, greater than 50% of participants had to be practicing high school teachers in order for a study to be considered as meeting the inclusion criteria. A total of nine studies from the initial pool of 125 met the inclusion criteria.

Challenges in Co-Teaching

Five studies included results focused on challenges encountered by co-teachers (Keefe & Moore, 2004; Moin et al., 2009; Murawski, 2006; Pratt, 2014; van Hover et al., 2012). Five subtopics were identified within the overall topic of challenges to co-teaching, including: student ability levels, administrator support, content knowledge of the special educator, differentiation of instruction and the general education co-teacher, and preparation for co-teaching.

Student ability levels. Two studies focused on the challenge that student ability levels present for co-teachers in high school co-taught classes (Murawski, 2006; van Hover et al., 2012). Van Hover et al. (2012) completed a case study of one exemplary 9th grade World History I co-teaching team working in a high-stakes testing context. The researchers considered the co-teaching team exemplary because the co-teachers had established an effective working relationship in which both co-teachers were actively involved in instruction, collaboratively facilitating student access to the World History I curriculum. In interviews, the co-teachers reported that the students in the co-taught class had very little background knowledge regarding World History I content, and as a group, could be described as "... 'lower level,' struggling learners from widely varied backgrounds, with different reading levels, and attendance problems" (p. 276). The co-teachers also reported high levels of disrespectful behavior exhibited by students in their co-taught class. No distinction was made between students with and without disabilities, so it cannot be determined whether the co-teachers viewed either group as having greater academic or behavioral concerns than the other.

Van Hover et al. (2012) reported that the co-teaching team communicated that the academic and behavioral challenges with students in the co-taught class impacted the co-teachers' pedagogical approaches. The co-teaching team also communicated experiencing a learning curve regarding their need to implement more structured activities, both when delivering instruction and setting up classroom management procedures. Both co-teachers shared the belief that gains in experience structuring lessons and activities coincided with better engagement and learning outcomes for students. The special education co-teacher also noted that her increased confidence with the curriculum content to her increased ability to provide instructional supports responsive to students' learning needs. It is important to note that, although teacher self-efficacy (TSE) was not identified for examination by Van Hover et al. specifically, the results from this study support the notion that a relationship exists between what a co-teacher believes himself or herself to be capable of and active involvement in instruction.

In the second study related to the challenge of student ability-levels in high school co-taught classes, Murawski (2006) compared the reading and writing skills of students with and without learning disabilities across four service-delivery settings: general education, special education, co-teaching, and "mainstreaming." In the setting that Murawski referred to as "mainstreaming," students with and without learning disabilities were taught by one general educator. The general educator collaborated with the special educator outside of class, but the special educator did not provide in-class support. This setting will be hereafter referred to as the solo-taught mixed setting. In contrast, the co-taught setting included both a general educator and a special educator working together to

deliver instruction to students with and without learning disabilities in the same physical space for the entire class period. The third and fourth classes were a solo-taught general education class and a solo-taught class special education class.

Murawski (2006) used the Raven Matrices test, which she described as “a nationally standardized aptitude measure” (p. 232), to examine differences in IQ among students with and without learning disabilities across the various service-delivery settings (solo-taught general education; solo-taught special education; solo-taught mixed; co-taught). Murawski also compared the mean IQ of classes that included students with learning disabilities to the mean IQ of classes which did not contain students with learning disabilities. Significant differences in mean IQ were found between the solo-taught general education class and both the solo-taught mixed and solo-taught special education classes. However, no significant difference was found between the IQ of students in the solo-taught general education class and the students in the co-taught class. When service-delivery setting was removed, and students with and without learning disabilities were compared without regard to setting, students with learning disabilities averaged significantly lower scores on IQ than students without disabilities.

In summary, Van Hover et al. (2012) and Murawski (2006) identified student ability levels as a challenge facing general and special educators in co-taught classes. The impact academic and behavioral challenges of co-taught students might have on co-teachers' TSE was not explored, specifically. However, Van Hover et al.'s (2012) study suggests that increased confidence with instruction, classroom management, and student

engagement may be related to co-teachers' active involvement in instruction and ability to support the diverse, and challenging, learning needs of students in co-taught classes.

Administrator support. Four studies included findings that identified administrative support as a challenge faced by co-teachers (Keefe & Moore, 2004; Moin et al., 2009; Pratt, 2014; van Hover et al., 2012). Administrative support was seen as representing challenges to co-teaching that ultimately fell under the authority of school principals and included two main subtopics. The two main subtopics were: time set aside for co-planning, and creation and preservation of the co-teaching team.

Time set aside for planning. Two studies focused on the challenge of a lack of time set aside by administrators for co-planning (Keefe & Moore, 2004; Moin et al., 2009). Both sets of researchers reported that while co-teachers perceived co-planning time to be an important factor in developing successful co-teaching teams, the co-teachers also communicated that their administrators did not provide adequate time for co-planning.

Moin et al. (2009) interviewed ten general educators and nine special educators representing ten co-teaching pairs. The interview questions were designed to gain an understanding of co-teachers' perceptions of co-teaching, including the benefits, drawbacks, and areas for improvement in co-taught high school science classes. All nineteen co-teachers reported that administrators had provided no scheduled co-planning time, which was one of the most significant barriers to co-teaching. While a few co-teaching teams communicated that they found time for informal planning sessions during lunch or after school, they also reported that informal planning was not enough to prepare

to deliver high quality science instruction. Moreover, the researchers reported that the special education co-teachers reported feeling like outsiders in the co-taught class due, in part, to a lack of co-planning time. One special education co-teacher stated that “...there are times when I’ll go in and I won’t know what’s being planned, or what’s being done for the day” (p. 692).

Keefe and Moore (2004) also found that the lack of scheduled co-planning time presented a challenge for co-teaching. The researchers interviewed three general education teachers, four special education teachers, and one head special education teacher, all of whom were currently co-teaching or had co-taught in the past, to explore the nature of collaboration within co-teaching teams. The researchers reported that most of the co-teachers noted that finding time for co-planning was a challenge. One general education co-teacher stated, “...we were planning on the fly most of the time. We talked after school. A lot of times we talked at lunch” (p. 82). The researchers reported that the co-teachers were frustrated by not having enough time for co-planning. One special education co-teacher explained, “But all this is so hard, trying to get it in the time because even with us, with our team meetings, we did not really have much time to work on curriculum” (p. 82).

Overall, these two studies (Keefe & Moore, 2004; Moin et al., 2009) found that co-teachers perceived a lack of scheduled co-planning time to be a challenge to co-teaching. Furthermore, Moin et al. (2009) reported that special education co-teachers communicated that the lack of co-planning time contributed to the special education co-teachers feeling less a part of the co-taught class and cut off from curricular decision-

making. As co-planning is one aspect of active involvement in instruction, it seems that administrator support, in the form of scheduled co-planning time, would be one factor impacting active involvement in instruction, particularly for special education co-teachers.

Creation and preservation of the co-teaching team. Three studies focused on the challenge of how administrators created and preserved co-teaching teams (Keefe & Moore, 2004; Moin et al., 2009; Pratt, 2014). Creation of the co-teaching team represents the method by which the general and special educators were identified and partnered together. Preservation of the co-teaching team involved administrators allowing the same co-teaching pair to remain intact over the course of several years. Two sets of researchers found that allowing co-teachers to remain together over several years was a factor that the co-teachers communicated as important to effective co-teaching (Moin et al., 2009; Pratt, 2014). However, results regarding the creation of co-teaching teams were mixed, with two studies advocating that teachers be given a voice in creation of co-teaching teams (Keefe & Moore, 2004; Moin et al., 2009), and one study suggesting that how co-teaching teams are created is of less consequence (Pratt, 2014).

Moin et al. (2009) interviewed nineteen high school science general and special education co-teachers, and asked the co-teachers about the creation and preservation of their co-teaching teams. All nineteen co-teachers reported that they had co-taught with different co-teaching partners in the previous year and that they would rather work with the same co-teaching partners for several years. The general and special education co-teachers also pointed out that they were not allowed any input on creation of co-teaching

teams. One special education co-teacher explained, “I believe it [co-teaching] was the State’s idea because we were told we had to have inclusion classes to meet the full requirements of the IEP [Individual Education Plan] and we were told we didn’t have any input whatsoever” (pg. 692).

The co-teachers Keefe and Moore (2004) interviewed also recommended allowing prospective co-teachers to give input into selecting with whom they would like to be paired. Keefe and Moore reported that the school did not have a consistent method for selecting co-teaching teams, and that often co-teachers did not know each other prior to co-teaching. One general education co-teacher explained, “...she came in new and they paired her with me. I had never met her before” (p. 81). Another general educator shared, “...and now when they bring new people in it’s just here, you’re working with so-and-so, and they don’t have a clue what their job is” (p. 81).

Pratt (2014) gathered data from five co-teaching pairs through the use of focus group interviews, interpersonal behavior questionnaires, classroom observations, and individual interviews. The co-teachers reported having begun co-teaching partnerships through: self-initiation, request, or expectation. Pratt reported that teachers who entered into a new co-teaching relationship, regardless of how it was created, experienced feelings ranging from hesitation to anticipation. Unlike the findings from Moin et al. (2009) and Keefe and Moore (2004), Pratt (2014) reported that co-teachers expressed that feelings of anxiety were more related to prior experience with co-teaching, or lack thereof, than to how much participation they had in the creation of their co-teaching partnership. While Pratt found the mode by which co-teachers were partnered not

impactful, she did report that co-teachers needed time to develop an effective co-teaching relationship. An effective co-teaching relationship, which Pratt described as “a relationship where roles and conversations are fluid and seamless, rather than superficial or stilted” (p. 8), required co-teachers to spend time together and was dependent upon the co-teachers’ personal characteristics.

The three studies in this section provide mixed results regarding the importance of how co-teaching teams are created (Keefe & Moore, 2004; Moin et al., 2009; Pratt, 2014). Both studies that addressed the preservation of co-teaching teams affirmed the importance of preserving co-teaching pairs over several years (Moin et al., 2009; Pratt, 2014). Pratt (2014) emphasized that developing an effective co-teaching relationship, where co-teachers are able to coordinate their instructional contributions during lessons and classroom activities, takes time.

Content knowledge of the special educator. Three studies identified the content knowledge of special education co-teachers as a challenge to co-teaching (Keefe & Moore, 2004; Moin et al., 2009; van Hover et al., 2012). One study focused on science content (Moin et al., 2009), one on World History I content (van Hover et al., 2012), and one study did not report the content areas of the participating co-teachers (Keefe & Moore, 2004). Two studies reported that the special educator lacked sufficient content knowledge, which contributed to challenges with parity in the co-teaching relationship (Keefe & Moore, 2004; Moin et al., 2009). In one study, the special educator began her co-teaching assignment without sufficient content knowledge, but was able to develop a

sufficient understanding of the World History I content, and in turn take a more active role in instruction, by her second year co-teaching (van Hover et al., 2012).

One of the major themes that emerged from Moin et al.'s (2009) interviews of high school science general and special education co-teachers was that special education co-teachers lacked science content knowledge. The researchers reported that "Except in one case, the [special education co-teachers] had no prior science knowledge" (p. 693). The special education co-teachers' lack of science content knowledge was described as a critical factor by both general and special education co-teachers, not only having an impact on the quality of the co-taught instruction, but also resulting in the special education co-teacher feeling like an outsider. One special education co-teacher raised concerns about how general education co-teachers viewed special education co-teachers in light of having less content knowledge, stating that "we are looked on as stupid by most of the [general education co-teachers...] if they have to step out [...the general education co-teachers] put a paper in our hands and expect us to carry on with the same style and know all the answers [...] I haven't seen that [science content] since I was in High School" (p. 693).

Keefe and Moore (2004) conducted semi-structured interviews with eight general and special education co-teachers (subject area was not reported), and found that the special education co-teachers' lack of content knowledge limited the role that they were able to play in the co-taught class. One general education co-teacher even went so far to state, "I don't even know why she's here, quite frankly. She's a nice person, the kids like her, but I don't understand the point of having her in my classroom" (p. 83). Some of the

special education co-teachers reported being treated as paraprofessionals, and one special education co-teacher even reported being expected to make coffee. Both general and special education co-teachers emphasized the importance of content knowledge to being an effective co-teacher at the high school level. One general education co-teacher described special education co-teachers who lack content knowledge as having a deleterious effect on the co-taught class, stating that, "...[my special education co-teacher] was more of a hindrance than a help in the room because it was another person who didn't know her material" (p. 84).

Van Hover et al. (2012) completed an in-depth case study of one pair of high school World History I co-teachers over the course of one academic year. The special education co-teacher communicated initially facing a challenge with the World History I content when she was assigned to her co-teaching partner in the middle of the previous school year. The researchers reported that "[the special education co-teacher] did feel that she faced some challenges walking in mid-year. The curriculum was already established, she felt behind in terms of her World History I content knowledge, and she felt that students did not see her as an equal co-teacher" (p. 273). However, the special education co-teacher also shared that she placed a high priority on mastering the World History I content and was able to make substantial gains in terms of content knowledge. The special education co-teacher stated, "...you have to learn the content in order to be a teacher in the high school... you can master strategies, but what do you do with the strategies if you don't know the content?" (p. 279). Mastery of the curriculum content allowed the special education co-teacher to be actively involved in instruction in the co-

taught class, assisting in delivering new content, and infusing strategy instruction into daily lessons.

Overall, all three studies reported that when special education co-teachers are placed in content classes for which they lack the content knowledge, the result is they are limited with how much they can be actively involved in instruction (Keefe & Moore, 2004; Moin et al., 2009; van Hover et al., 2012). Moin et al. (2009) and Keefe and Moore (2004) reported negative perceptions general and special education co-teachers had of co-teaching when special education co-teachers lacked content knowledge. Conversely, the special education co-teacher in van Hover et al.'s (2012) study was described as acquiring a sufficient level of content knowledge which allowed the special educator to be more actively involved in instruction in the co-taught class.

Differentiation of instruction and the general educator. Four studies included findings related to the amount of differentiated instruction observed in co-taught classes (Harbort et al., 2007; Moin et al., 2009; Murawski, 2006; Zigmond, 2006). In all four studies, a lack of differentiated instruction occurred in settings where instruction was dominated by the general education co-teacher and either the one teach, one observe, or one teach one assist, model of co-teaching was employed.

Moin et al. (2009) interviewed and observed nineteen high school science co-teaching teams over 53 class sessions to better understand how general and special education co-teachers deliver instruction to students with and without disabilities. Despite finding that 72% of science lessons involved language-based instruction, the researchers stated that they did not observe any curricular adaptations implemented by

the co-teachers to support the language-based learning needs of students with learning disabilities. This finding is particularly troubling given prior research that indicates that students with learning disabilities experience challenges with expressive and receptive language, phonological processing, processing speed, and verbal working memory (Flanagan, Ortiz, Alfonso, & Dynda, 2006; Johnson, Humphrey, Mellard, Woods, & Swanson, 2010; Swanson, 2009). Co-teachers were found to lower expectations for students' written work, which the researchers posited "might be seen as an acknowledgment of the writing difficulties of LD students," (p. 687) rather than differentiate instruction to meet the language-based learning needs of students with learning disabilities. However, the researchers also reported that general education co-teachers were not provided with sufficient co-teaching professional development, which may explain some of the reason that no curricular adaptations were apparent in the high school co-taught science classes. Special education co-teachers were described as lacking the content knowledge to be more actively involved in instruction, which may also explain the lack of curricular adaptations. When asked about making curricular adaptations for SWD, one general education co-teacher stated, "Not really as far as adapting teaching, no. We don't. We kind of do the same thing."

Zigmond (2006) observed eight pairs of high school social studies co-teachers, and documented the behaviors of the co-teachers and their students during instruction. Like Moin et al. (2009), Zigmond (2006) also posited that the co-teachers may have opted to reduce literacy tasks rather than provide the support needed to facilitate students' acquisition of essential reading and writing skills. Instruction in the co-taught classes

was reported to be lecture-based, with the general education co-teacher almost exclusively leading instruction. The special education co-teachers were described as not actively involved in instruction. Zigmond stated, “Instead of providing strategy instruction and scaffolding students’ work with text, special education social studies co-teachers spent a lot of classroom time standing around, not interacting with students, and only occasionally providing a substantive contribution to the ongoing lecture or discussion” (p. 266). Zigmond concluded that the instruction provided in the co-taught social studies classes was inadequate to address the literacy needs of SWD.

Harbort et al. (2007) used momentary time sampling to examine the way that two high school science co-teaching teams delivered instruction in the co-taught class. Video-taped lessons were observed using an observation coding form to document co-teachers’ behaviors at 30-second intervals. A total of 225 minutes of video-taped lesson time was observed, which represented 45 minutes each from five 90-minute lessons randomly selected from a total of 15 video-taped lessons that were recorded over a three week period.

Harbort et al. (2007) reported that instruction in the co-taught classes relied heavily on large-group instruction delivered by the general education co-teacher who taught using lecture format. The researchers concluded that it was unlikely that differentiated instruction was being planned for and implemented in these co-taught classes based on the predominance of large-group lecture-based instruction. The researchers stated, “these results suggest a less than effective model for supporting [SWD] in general education classrooms and maximizing personnel resources, particularly

the expertise of the special education teachers” (p. 21-22). Harbort et al.’s conclusion that general education co-teachers dominated instruction and did not incorporate the expertise of special education co-teachers echoes Bessette’s (2008) findings that capable special education co-teachers were effectively excluded from active involvement in instruction despite both co-teachers believing that the special education co-teacher was capable of making a positive contribution to instruction. Taken together, these results provide rationale for examining whether the relationship between co-teachers’ capability beliefs and active involvement in instruction may be impacted by the personal compatibility between the co-teaching partners.

Murawski (2006) compared the instruction provided to students with and without learning disabilities across four service delivery-settings: solo-taught general education, solo-taught special education, solo-taught mixed, and co-taught. Specifically, Murawski sought to examine the difference in instruction resulting from the addition of the special education co-teacher to the co-taught class compared to instruction in the solo-taught classes. The main difference found between the co-taught and solo-taught classes was that having a second teacher in the room allowed one co-teacher, which Murawski noted was usually the special education co-teacher, to circulate and help with questions or assignments.

Murawski (2006) observed little difference between co-taught and solo-taught classes with regard to curriculum, instruction, behavior management, and assessment. In fact, Murawski found that, rather than facilitating differentiation of instruction, the addition of the extra teacher in co-taught classes seemed to result in the general and

special education co-teacher increasing the amount of time spent on non-instructional activities. Both the general and special education co-teachers were observed spending a larger percentage of time on activities that did not involve the students (usually grading) than they did when teaching in their respective solo-taught classes. Either teacher was only observed individualizing instruction during 5% of class time. Murawski concluded that, “The results of this study... do not appear to support the hypothesis that teachers in the co-taught setting use an array of instructional techniques different than their peers in the other settings” (p. 240).

In summary, all four studies in this section found a lack of differentiated instruction in co-taught classes. Two studies concluded that, based on perceptions of students’ ability, co-teachers may have opted to lower expectations for students’ work, rather than increase their own active involvement in the types of instructional activities that would support students’ learning needs (Moin et al., 2009; Zigmond, 2006). A reduction in meaningful instructional activities resulting from co-teachers’ perceptions of student ability levels illustrates the proposed relationship between teacher self-efficacy (TSE) and active involvement in instruction. Co-teachers with lower TSE, who perceive themselves as less capable of procuring positive outcomes for students they deem challenging, may be less actively involved in instruction.

Preparation for co-teaching. Four studies reported preparation for co-teaching as a challenge that co-teachers face (Keefe & Moore, 2004; Moin et al., 2009; Pratt, 2014; van Hover et al., 2012). Preparation for co-teaching included college or university

teacher preparation programs that featured co-teaching as a whole course or as part of a course, and also included school systems' professional development on co-teaching.

Moin et al. (2009) reported that all nineteen high school science general and special education co-teachers interviewed stated they had received no formal training for co-teaching, and only a few co-teachers noted that they had attended a brief professional development. Both general and special education co-teachers communicated a specific concern with the lack of co-teaching professional development designed for co-teaching teams. The researchers also reported that not having access to professional development as a team put both co-teachers at a disadvantage. The researchers stated, "Lack of coteaching training in pairs affected [the special education co-teachers'] knowledge of science content and [general education co-teachers'] awareness of special-education curricular adaptations" (p. 692-693).

Likewise, Keefe and Moore (2004) interviewed eight general and special education co-teachers and found that the co-teachers did not feel prepared for co-teaching. Special education co-teachers reported a lack of preparation in the general education curriculum, while many general education co-teachers stated that they had received no preparation regarding students with disabilities. The researchers reported that one general educator who did have a course focused on teaching students with disabilities described the course as "not useful."

Pratt's (2014) study examining how effective secondary general and special education co-teachers found solutions for common co-teaching challenges included interviews with five co-teaching pairs. Pratt reported that the general and special

education co-teachers noted the importance of professional development, but emphasized that simply providing co-teachers with professional development opportunities is not enough. Pratt reported that “[the co-teachers’ stated professional development needed to be individualized to their content or interpersonal relationships” (p. 9). Pratt reported that the co-teachers took responsibility for their own professional growth by seeking resources and materials on their own in order to improve their teaching, and their use differentiated instruction in particular.

Van Hover et al. (2012) examined the university-based preparation and school system professional development that one World History I co-teaching team had been exposed to prior to co-teaching. Both co-teachers reported that their university coursework had not adequately prepared them for co-teaching. The general education co-teacher could not recall any coursework, readings, or assignments directly related to co-teaching in his university experience, and the special education co-teacher shared that the course she took on collaborative teaching focused more on how to work with paraprofessionals. Both co-teachers did, however, participate in collaborative teaching in their student-teaching field placements. The general education co-teacher reported using the “one-teach, one assist” model, and described his co-teaching experience as positive. The special education co-teacher described her experience as negative, having been assigned to a general educator who viewed special education co-teachers as paraprofessionals. The special education co-teacher shared that this particular general educator’s classroom management was so poor that the field experience had to be cut short.

Regarding school system professional development, van Hover et al. (2012) reported that both co-teachers had been assigned a beginning teacher mentor who observed and met with them regularly. When the special education co-teacher was switched into the co-taught class midway through the year, her mentor met with both co-teachers to give them practical advice including guidance on establishing roles. The co-teaching team was able to establish ground rules for communication and divide up responsibilities for daily lessons. In addition to the mentoring, all collaborative teams in the school received professional development on different collaborative models. This intensive weeklong professional development included information on determining roles and other tips for effective collaborative teaching. The co-teachers reported that the professional development they participated in together provided an opportunity to discuss what their collaborative relationship would look like, as well as to spend time together developing curriculum.

Overall, all four studies reported both general and special education co-teachers communicated lack of preparation for co-teaching as a challenge (Keefe & Moore, 2004; Moin et al., 2009; Pratt, 2014; van Hover et al., 2012). Keefe and Moore (2004) reported that special education co-teachers felt unprepared in the general education curriculum and general education co-teachers felt unprepared to work with SWD. It is important to note that, while Keefe and Moore did not identify teacher self-efficacy (TSE) specifically for examination in their study, the co-teachers lack of confidence in their ability to work with SWD and with the curriculum content, respectively, coincided with a lack of parity in co-teaching relationships and the minimal role of special education co-teachers in

instruction. Moin et al. (2009) connected special education co-teachers' challenges with content knowledge and general education co-teachers' challenges with curricular adaptations for SWD to not having access to professional development as a team. Pratt (2014) reported that co-teachers desired that professional development offerings be structured to facilitate the development of co-teachers' interpersonal relationships. Van Hover et al. (2012) identified student-teaching field placements as a source of co-teaching preparation, but noted the negative experience of the special education co-teacher who had been assigned to a general educator who viewed special education co-teachers as paraprofessionals. These findings related to the relationship between co-teaching partners (Moin et al., 2009; Pratt, 2014; van Hover et al., 2012) provide rationale for examining personal compatibility as a factor related to co-teachers' active involvement in instruction.

Roles in Co-Teaching

Six studies included findings that focused on the roles of general and special education co-teachers in the co-taught class (Harbort et al., 2007; Keefe & Moore, 2004; King-Sears et al., 2014; Moin et al., 2009; Murawski, 2006; van Hover et al., 2012). Four of the studies found that general education co-teachers were mostly in charge of instruction, while special education co-teachers took on roles resembling paraprofessionals (Harbort et al., 2007; Keefe & Moore, 2004; Moin et al., 2009; Murawski, 2006). Two studies found that while the general education co-teacher took the lead for presenting content, both co-teachers were actively involved in instruction in the co-taught class (King-Sears et al., 2014; van Hover et al., 2012).

Keefe and Moore (2004) interviewed three general education teachers, four special education teachers, and one head special education teacher, all of whom were currently co-teaching or had co-taught in the past, regarding the roles and responsibilities of general and special educators in the co-taught classroom. Based on data from the semi-structured interview, the researchers concluded that “Most teams did settle into a division of roles that involved the general education teacher taking responsibility for the curriculum, planning, and large group instruction with the special education teachers helping individual students and designing modifications” (p. 83). General and special education co-teachers did not view the division of responsibilities in co-taught classes as equal, but rather as a situation where the general education co-teacher was in charge of the class while the special education co-teacher took on the role of a paraprofessional. The researchers reported that both general and special education co-teachers attributed some of the imbalance in parity to a lack of content knowledge on the part of the special educator. The general education co-teachers did appreciate the special educators’ help with making modifications for struggling students with and without disabilities. However, in general, the general and special education co-teachers interviewed did not perceive an added benefit to co-teaching. Both general and special education co-teachers communicated that the students viewed the special education co-teacher as a paraprofessional. One special education co-teacher stated, “I focus a lot on my kids, but no one in the classroom knows who I am really... every once in a while I might teach a lesson but for the most part I just help the teacher with whatever is going on” (p. 83).

Moin et al. (2009) observed ten high school science co-teaching teams over 53 class sessions to examine the roles and responsibilities of general and special education co-teachers delivering instruction to students with and without disabilities. Based on the observational data, Moin et al. reported that the general education co-teachers were the “dominant voice” in the co-taught science classes they observed, while the special education co-teachers took on the role of paraprofessionals. The researchers reported that “For the most part, in the observed classes, the [special education co-teacher] was drifting around the room, redirecting students, doing clerical work, or just observing the lesson. Only for a small proportion of the time was the [special education co-teacher] observed in an instructional role” (p. 694).

Specific tasks that Moin et al. (2009) observed the special education co-teachers engaging in included: taking notes and helping students take their own notes, reading the textbook for students or helping them find information in the text, and offering one-on-one tutoring when students needed it. At times, the special education co-teachers played a facilitating role during whole-group instruction by asking clarifying questions or requesting additional practice for concepts that students found difficult. When the class was involved in laboratory activities the role of the special education co-teacher was “to deliver equipment and materials, assist students recording observations, using equipment, and boosting confidence in the students” (p. 688).

Overall, Moin et al. (2009) found that general education co-teachers lead instruction in co-taught classes while special education co-teachers operated as paraprofessionals. The special education co-teachers were often observed not actively

involved in instruction. The diminished role of the special education co-teachers was observed both during delivery of instruction and in laboratory activities as well.

In the third study related to the roles of general and special education co-teachers in co-taught classes, Murawski (2006) observed the instructional tasks that general and special education co-teachers in two co-taught English classes engaged in. Based on observational data Murawski concluded that “the predominate role of the special educator appeared to be that of an assistant to the general education teacher - even in the class in which much more parity in instruction was observed” (p. 240). The general education co-teacher was described as in control of the content and method of instruction (e.g., lecture, small group work, individual work), and was observed presenting content nearly four times as often as the special education co-teacher. The most commonly observed co-teaching model was “one-teach one-assist,” with the special educator co-teacher primarily assigned as the drifter. The researchers also noted that both co-teachers tended to engage in non-instructional tasks while the other co-teacher was teaching rather than remaining actively involved in instruction.

In the fourth study related to co-teaching roles, Harbort et al. (2007) used momentary time sampling to examine the roles of general and special education co-teachers in two high school science co-teaching teams. Two researchers observed five randomly selected video-taped lessons from a total of fifteen video-taped lessons that were recorded over a three week period, and used an observation coding form to document co-teaching roles (e.g., presenting instruction, responding to students, or monitoring students) at 30-second intervals.

Harbort et al. (2007) reported that “regular education teachers primarily assumed the teaching role and the special education teachers assumed the assistant role” (p. 21). This lack of parity, the researchers reported, was consistent across both co-teaching teams despite the amount of experience co-teachers had with co-teaching. The researchers reported that presenting content was the activity that the general education co-teachers engaged in most frequently (29.93% of intervals), while special education co-teachers presented content in less than 1% of intervals. Special education co-teachers were most frequently observed monitoring (45.24%), while general education co-teachers were observed monitoring in only 5% of intervals. The researchers offered the following definition for monitoring: “[Monitoring] was scored if a teacher stood or sat while watching students. Teachers sometimes made gestures to students who were off-task (e.g., finger to lips, hand on shoulder, standing beside desk)” (p. 18). Monitoring activities did not include managing behavior. Managing behavior was coded as a separate activity, and was scored by observers when “a teacher was engaged in discussing proper conduct with students, talking to specific student(s) who misbehaved, or talking individually with a student who had not followed instructions or rules. It was also scored if a teacher moved within close proximity to a student who was misbehaving” (p. 18). General education co-teachers were observed managing behavior fifteen times, and special education co-teachers four times.

In addition to being the primary deliverers of instruction, Harbort et al. (2007) reported that general education co-teachers controlled much of the non-interaction instructional tasks in co-taught classes. Non-interaction instructional tasks included:

taking attendance, checking and entering grades, preparing demonstrations, and writing pertinent information on the board for student consumption. Special education co-teachers primarily contributed to instruction through responding to individual students. Responding to individual students did not equate to individualized instruction, rather it included any one-on-one interaction with a student.

Harbort et al. (2007) scored an interval “no interaction” if a co-teacher was observed “not interacting with any other participant in the room and not engaged in instructional preparation (e.g., watching the Channel One, the school TV station, or sitting at desk in back of the room reading material unrelated to classroom instruction)” (p. 18). Special education co-teachers were observed engaged in no interaction in 8% of intervals versus 2% for general education co-teachers. Special education co-teachers were also observed to be absent from the room (13%) more often than general educators (10%). Being absent from the room meant that co-teachers were present in class that day, but exited the room and were not present in a given interval. The operational definition for “absent” did not clarify whether co-teachers were out of the room performing class-related tasks, as opposed to personal or unrelated activities.

Overall, Harbort et al. (2007) found that general education co-teachers primarily lead instruction in co-taught classes while special education co-teachers assumed roles resembling paraprofessionals. In fact, general education co-teachers presented content in 29.93% of intervals, while special education co-teachers presented content in less than 1% of intervals. Special education co-teachers were most frequently observed monitoring, which involved standing or sitting while watching students and sometimes

making gestures to students who were off-task. General education co-teachers, in addition to being in charge of presenting content, also addressed more student behavior concerns and took care of most non-interaction instructional tasks related to running the co-taught class.

In the fifth study related to co-teaching roles, King Sears et al. (2014) observed one co-teaching pair during instruction, and surveyed both co-teachers and their students, to examine the roles of the general educator and special educator when delivering new content in a high school science co-taught class. Observation of instruction involved the researchers documenting co-teachers' roles during instruction (e.g., presenting new content, questioning, responding to students' questions) exactly at the end of each five-second interval in the four video-recorded sessions. In this study, the co-teachers chose when to start and stop the video-recorder for each instructional session, therefore determining what was recorded for observational analysis.

King-Sears et al. (2014) observed presenting content as the activity that both co-teachers engaged in most frequently. The general education co-teacher was observed presenting content in 49.0% of intervals, and the special education co-teacher was observed presenting content in 18.1% of intervals. The researchers observed no instances of the co-teachers managing behavior or monitoring, and almost no non-content-related conversations were observed. Non-interaction instructional tasks (taking attendance, checking and entering grades, preparing demonstrations, and writing pertinent information on the board for student consumption) were also observed infrequently. Both co-teachers were observed responding to students and questioning at similar frequencies,

although the special education co-teacher was credited with responding to students and engaging in questioning slightly more frequently than the general education co-teacher. Overall, the observational results suggest some lack of parity within the co-teaching team because the general education co-teacher delivered over twice as much instruction than the special education co-teacher. Additionally, the general education co-teacher was observed engaged in 68% of total interactions compared to 32% for the special education co-teacher.

King-Sears et al. (2014) also provided a summary of the instructional behaviors observed, identifying either the special education co-teacher or the general education co-teacher (or both) as the person primarily or solely engaged in each activity. The general education co-teacher was the one primarily or solely observed engaging in the following activities: reviewing at the beginning of the session, demonstrating new content, giving directions, and summarizing. The special education co-teacher was the one primarily or solely engaged in using prompts and reading the textbook. Both co-teachers were equally credited with providing analogies and relevant examples as well as responding to student questions. Overall, the researchers reported somewhat mixed results regarding the parity in roles and responsibilities between the general education co-teacher and special education co-teacher. The general education co-teacher was identified as “clearly the teacher primarily responsible for presenting content” (p. 669), but the special education co-teacher also presented new content at times and engaged in assisting individuals and small groups by “reviewing content, providing prompts, answering questions, clarifying with examples or analogies, and summarizing” (p. 669). The researchers also noted that,

in addition to the “one-teach, one-assist” model, the co-teaching team also engaged in “team teaching.” The researchers described team-teaching as both co-teachers delivering instruction interactively with each co-teacher conducting about half of the instruction for the whole class, and the other co-teacher supplementing instruction when not in the lead role.

The results from King-Sears et al.’s (2014) teacher surveys revealed similar information to the observational data regarding the roles of the general and special education co-teachers in the co-taught class. While both co-teachers indicated agreement that they had an effective co-teaching relationship in the co-teaching questionnaire, lack of parity in roles and responsibilities based on observational data was also evident. On the co-teaching questionnaire, both co-teachers marked “disagree” to the item stating that the special educator was primarily the lead for instruction. Also, when asked directly about parity for shared leadership, the general education co-teacher indicated strong agreement (average rating of 3.25 on items using a 4-point Likert scale ranging from strongly disagree to strongly agree) while the special education co-teacher provided an average rating of 2.5, which was between disagree and agree. Overall, the evidence from the teacher surveys suggests that some lack of parity existed within the co-teaching team, and that the special educator did not lead instruction in the co-taught class.

King-Sears et al. (2014) also surveyed seven SWD regarding their experiences with the co-teachers. The results from King-Sears et al.’s student surveys were somewhat mixed regarding parity between the two co-teachers. Almost half of the students (43%) identified the general education co-teacher as in charge of lessons, while

an equal 43% indicated that both co-teachers were in charge of lessons. A majority of students indicated that it was the general education co-teacher who was responsible for planning instruction (86%) and grading (71%). However, most students (86%) also reported that teaching was divided in half, and the same amount (86%) claimed that both co-teachers explain things most of the time. With regard to the model of co-teaching that occurred most often in the co-taught class, 86% of the students indicated team teaching, while 14% indicated one-teach one-assist.

Overall, King-Sears et al. (2014) observed that both co-teachers presented content but that the general education co-teacher presented content more often (49.0% of intervals) than the special education co-teachers (18.1% of intervals). Based on the observational data, the general education co-teacher was credited with being the primary co-teacher to demonstrate and review content, giving directions, and summarize, while the special education co-teacher was credited with being the primary co-teacher to use prompts and read the textbook. Student responses to survey questions reflected more parity than the observational and teacher survey data, but still indicated that the general education co-teacher took the lead in the co-taught class.

In the sixth and final study related to co-teaching roles, van Hover et al. (2012) used observation, interviews, and curricular materials to describe one exemplary World History I co-teaching team delivering instruction in a school that emphasized preparing students for improved performance on high-stakes tests. The observed co-teaching team was identified as an exemplary team because each co-teacher was actively involved in instruction, although the co-teachers often took responsibility for different aspects of the

lesson. According to observation and interview data, the general education co-teacher was the one who developed and taught curriculum content, while the special education co-teacher “created explicit cognitive-based strategy instruction designed to help struggling learners remember key facts, comprehend text, and understand concepts” (p. 279). Specifically, the researchers reported observing the special education co-teacher providing students with strategies for: processing and responding to prompts, note-taking, underlining/highlighting and emphasizing key information, as well as using mnemonic strategies to support memorization.

Although initially less capable with the World History I content, the special education co-teacher did possess a background in reading strategies. The researchers reported that the special education co-teacher took over responsibility for class readings, which facilitated the special education co-teacher’s active involvement in instructional tasks. Despite her ability to provide specialized skill instruction, the special education co-teacher also prioritized mastering the World History I content. In fact, the special education co-teacher was reported to have made substantial gains with the curriculum content. The special education co-teacher’s increased confidence with the curriculum coincided with increased involvement in instruction. Both co-teachers rejected the idea that the general education co-teacher had to be in charge of the content, and that strategy instruction was solely the responsibility of the special education co-teacher.

Van Hover et al. (2012) provided several examples of the two co-teachers facilitating instructional activities together. Both co-teachers primed students’ background knowledge prior to instruction by talking about what the students already

knew and addressing misconceptions. When the general education co-teacher was lecturing the special education co-teacher was drifting to support individual student needs and manage student engagement. The researchers noted that the special education co-teacher would also interject details or explanations into lectures that supplemented instruction. Both co-teachers shared a pedagogical presence in the classroom, and the researchers reported that it was evident that the students viewed both co-teachers equally. Van Hover et al. stated “The students in the class clearly viewed both as “the teacher,” interacting with and asking questions of [the general education co-teacher] and [the special education co-teacher], equally” (p. 270).

Overall, van Hover et al. (2012) concluded that the co-teachers in this study had developed an effective co-teaching partnership which did not resemble the typical one-teach one-assist model of co-teaching. The researchers characterized this co-teaching team as exemplary because both co-teachers were actively involved in instruction. The general and special education co-teacher worked in tandem to deliver instruction to students by capitalizing on each co-teachers’ unique skill set.

In summary, four studies revealed a lack of parity in co-taught classes with the general education co-teachers leading instruction, while the special education co-teachers were less actively involved in instruction (Harbort et al., 2007; Keefe & Moore, 2004; Moin et al., 2009; Murawski, 2006). Two studies found evidence that, although general and special education co-teachers often filled different roles, special education co-teachers were actively involved in instruction (King-Sears et al., 2014; van Hover et al., 2012). Each of the co-teachers in the two co-teaching pairs participating in these studies

communicated enjoying an effective co-teaching relationship with their partner (King-Sears et al., 2014; van Hover et al., 2012). Specifically, van Hover et al. (2012) highlighted the pedagogical success that two highly compatible and efficacious co-teachers were able to have, giving special attention to the contributions of the special education co-teacher as she gained confidence with the curriculum content.

Instruction in Co-Taught Classes

Six studies included findings that described the type of instruction that took place in co-taught classes (Harbort et al., 2007; King-Sears et al., 2014; Moin et al., 2009; Murawski, 2006; van Hover et al., 2012; Zigmond, 2006). The type of instruction examined in these studies includes the mode of instruction (e.g., whole group, activity-based, individual work) as well as specific instructional strategies and activities that the co-teachers engaged in while delivering instruction to co-taught classes. Two studies found that co-teaching partners collaborated to provide enhanced instructional opportunities that met the learning needs of their students in the co-taught class (King-Sears et al., 2014; van Hover, et al., 2012). Four studies, however, found that the instruction in co-taught classes was not different from what occurs in solo-taught settings, and that the active involvement of the special education co-teachers in instruction was minimal (Harbort et al., 2007; Moin et al., 2009; Murawski, 2006; Zigmond, 2006).

Harbort et al. (2007) used momentary time sampling to observe the type of instruction delivered by two high school science co-teaching teams. The momentary time sampling procedure involved two researchers observing video-taped lessons and using an observation coding form to document co-teachers' behaviors, including the mode of

instruction (large group, small group, individual) at 30-second intervals. In this study, “individual” meant a co-teacher working with one student, “small group” meant a co-teacher working with two to six students, and “large group” meant a co-teacher working with more than six students.

Harbort et al. (2007) reported that “The regular education teachers in this study primarily utilized teacher directed instruction in which the teacher stands and orally presents information to students, questions students, allows for student responses, provides guided practice, and assigns independent practice” (p. 18). Small-group instruction involved a co-teacher clarifying or re-teaching material to a group of two to six students after initial instruction. However, observation of either co-teacher clarifying or re-teaching material to small groups of students was rarely observed. Additionally, the researchers concluded that it is “unlikely that differentiated instruction, a highly effective instructional format, is being planned for and implemented” (p. 21) in the co-taught classes they observed. Overall, the researchers found that special education co-teachers were minimally involved in instruction in co-taught classes, and that co-teaching did not seem to result in instruction that was markedly different that could be provided by one general education teacher working alone.

In the second study, Murawski (2006) observed three general education English teachers and one special education teacher within four different service-delivery settings (solo-taught general education, solo-taught special education, solo-taught mixed, and co-teaching) in order to document the actions of the general and special educator engaged in co-teaching and compare them with the actions observed in solo-taught classes. The

solo-taught general education class was taught by one general education teacher only and included no students identified as having a disability. The solo-taught special education class was taught by the special education teacher only and included only students with learning disabilities. Both the solo-taught mixed and co-co-taught settings included students with and without learning disabilities. In the co-taught class, the general educator and the special educator worked together to deliver instruction in the same physical space. In the solo-taught mixed class the special educator collaborated with the general educator outside of class, but did not provide in-class support.

Murawski (2006) reported that “In all four conditions, both segregated and inclusive in nature, teachers spent the vast majority of the time using a large-group format” (p. 240). The method of instruction in the co-taught classes consisted of lectures, along with small group and individual work, which also was the case for the other three service-delivery settings. The main instructional difference that was reported between the co-taught class and the solo-taught classes was that in the co-taught class, one co-teacher was able to circulate and help students with questions or assignments while the other co-teacher was leading instruction. It was not noted how often the co-teachers assisted SWD compared to students without disabilities. Overall, Murawski found lecture-based large-group instruction to be the most common mode of instruction in the co-taught class, and reported that instruction in the co-taught class was not different from what occurred in solo-taught classes.

In the third study related to instruction in co-taught classes, Moin et al. interviewed and observed ten co-teaching teams across 53 lessons to find out whether the

science instruction delivered in co-taught classes represented an improvement over solo-taught classes in meeting the needs of students with learning disabilities. During observations, the researchers wrote one free narrative paragraph at every five-minute interval focused on what the teachers and students were doing, the organization of the class, and the materials that were being used. The final codes used for analyzing the narrative data included activity codes and group codes. Activity codes included: direct instruction, laboratory investigations, reading and writing tasks, games, diagramming, and problem solving. Codes for the type of group the students were organized in while participating in the activity included: whole class, small group (students working in groups of 2-6 individuals), and individual work. The researchers did not report whether all small groups included students with and without learning disabilities.

Moin et al. (2009) found that whole-class direct instruction was the most common activity in the co-taught science classes, and that in 91% of direct instruction lessons content was delivered by the general education co-teacher using lecture format. The second most common type of classroom activity identified by Moin et al., accounting for 30% of total class time, were reading and writing tasks that students worked on either in small groups or individually. The researchers described these tasks as mostly short answer or fill-in-the-blank responses where students looked up information in the textbook and copied it onto a worksheet. Moin et al. (2009) reported that group work accounted for about one-fifth of total instructional time (20.4%). The researchers noted that this amount of group work was comparable to prior research that found students in general education solo-taught classes participated in group work about one to two times

per week. Laboratory work occurred in 13% of the lessons observed, which the researchers noted was below the percentage recommended by the California State Board of Education and the National Science Teachers Association (NSTA).

Overall, Moin et al. (2009) found instruction in the co-taught science classes to be similar to the instruction in solo-taught classes. Large-group instruction, delivered by the general education co-teacher using lecture format, was the most common mode of instruction observed. The researchers also reported that the amount of laboratory work in the co-taught classes was below recommended levels and similar to what occurs in solo-taught classes.

In the fourth study focusing on instruction in co-taught classes, Zigmond (2006) explored the reading and writing demands of eight co-taught social studies classes in five different high schools. Zigmond trained observers to use a narrative observation protocol to document teacher and student behaviors in five-minute intervals. Every five minutes, the observers described what roles each of the co-teachers took in the co-taught classes, what the students were doing, and what was written on the blackboard. Analysis of the observational notes focused specifically on the reading and writing assignments given to all students in the co-taught classes. Reading was observed in 39.2% of observed intervals and writing in 25.6% of intervals. Zigmond reported that “Social studies in these high schools was taught mainly through lecture, discussion, and Q&A” (p. 264). The researchers did not note the frequency with which instruction was delivered by general education co-teachers or special education co-teachers, but did report that special education co-teachers were not actively involved in instruction.

Despite Zigmond's (2006) expectation of observing "text-rich environments, extended reading and writing assignments given to students, and both the special education co-teacher and the general education social studies teacher actively working to help students cope with the complex reading and writing demands" (p. 264), Zigmond found students not engaged with print at all in 20.5 out of 34 hours of instruction (about 60%). When observed, reading tasks most often involved students reading single words, short phrases, or single sentences from the chalkboard or from teacher-generated handouts. Students were rarely observed reading authoritative sources like newspaper articles, magazine articles, or the textbook. Students were observed involved in writing even less frequently than was the case for reading. Most writing tasks involved students taking notes or filling in missing words or phrases on a lecture outline or handout.

Overall, Zigmond (2006) found that instruction in the social studies co-taught classes was mainly lecture-based, and that the special education co-teachers played a limited role in instruction. Zigmond also reported a lack of rigor in reading and writing tasks. Instead of observing both general and special education co-teachers actively involved in helping students handle the complex reading and writing tasks, Zigmond found students not engaged with print at all in 20.5 out of 34 hours of instruction.

In the fifth study on instruction in co-taught classes, King-Sears et al. (2014) examined the instructional activities of one pair of high school science co-teachers when delivering new content to their students with and without disabilities. The researchers used momentary time sampling along with a modified version of Harbort et al.'s (2007) observation coding system, but with a focus on examining the type of instruction

delivered by general and special education co-teacher when presenting new content in the co-taught class. The co-teachers chose when to start and stop the video-recorder, and therefore determined what was recorded for observational analyses. Four sessions with an average of fourteen minutes per session and a range of 8.5 to 18.5 minutes were video-recorded and analyzed for the mode of instruction (e.g., large group, small group, individual) at five-second intervals. In this study, codes were created for co-teachers interacting with a: single student (one student), small group (two to six students), and large group (more than six students). Codes were also created to indicate that a co-teacher was interacting with the other co-teacher, not interacting with any other participant in the room, or that a co-teacher was out of the range of the video camera.

King-Sears et al. (2014) reported that that whole group instruction was the predominant arrangement when either co-teacher was teaching something new (97.6%). However, the researchers pointed out that the way content is delivered may be more important than group arrangement. Both co-teachers were observed employing many elements of effective instruction and differentiation, such as use of visuals, analogies, relevant examples, and an emphasis on vocabulary.

Three of the four class sessions that King-Sears et al. (2014) observed via video-recording were described in detail in the article. All three lessons began with a review of previously-learned content that related to what was to be taught in the upcoming lesson. The co-teaching team used questioning, prompts, analogies, and writing on the board to engage students and emphasize important points, as well as to evaluate students' background knowledge. The researchers reported frequent use of visuals during the

lesson noting that the general educator often communicated content while drawing or referring to a diagram. During delivery of new content, the special educator provided prompts when students struggled to answer questions and offered different definitions of key terms when students struggled with the science vocabulary. Lessons ended with a summary of important points and an opportunity for the students to engage in an independent activity that reinforced the new content. The researchers reported that in the video-taped lessons observed, the co-teachers used modeling and visuals to prepare students to engage in independent work.

Overall, King-Sears et al. (2014) reported that that whole group instruction was the predominant arrangement for delivering new content. Both general and special education co-teachers were described as actively involved in instruction, and both co-teachers were observed delivering new content. Additionally, both co-teachers used questioning, prompts, visuals, analogies, modeling, and writing on the board to engage students during instruction.

In the sixth and final study on instruction in co-taught classes, van Hover et al. (2012) used observation, interviews, and curricular materials to examine the specific instructional strategies and activities that one exemplary high school co-teaching team employed to deliver history instruction to students with and without disabilities. The researchers noted that the selected co-teaching team was exemplary “especially in coordinating their pedagogical performance within the classroom” (p. 268), and that 100% of this co-teaching team’s students (with and without disabilities) passed the high-stakes end-of-course State test.

Van Hover et al. (2012) described instruction in the World History I co-taught class as following a consistent and highly structured pattern. Class began with a “do-now” warm-up activity intended to activate prior knowledge, followed by a lecture, then a reading, and finally an extension activity. The researchers noted that students spent very little time working with partners or in groups. Instruction was focused on content that the co-teachers anticipated would appear on the Virginia Standards of Learning (SOL) end-of-course examination. The co-teaching team emphasized the importance of the SOL exam and engaged in test preparation throughout the year including teaching the students test-taking strategies. Both co-teachers were observed to use explicit strategy instruction and repeatedly exposed students to key events, people, and terms they needed to know. The researchers stated, “[The general and special education co-teachers] explicitly taught a number of learning strategies and scaffolds that would help students remember testable content (note-taking sheets, map work, readings, mnemonic strategies, repeated interaction with key events/people/terms)” (p. 270). Additionally, the special education co-teacher provided instruction on foundational skills, such as reading comprehension and study skills, into daily lessons. She explicitly taught and modeled a number of learning strategies including using mnemonics and highlighting passages in order to help students remember key facts, comprehend text, and understand concepts.

In summary, when examining the type of instruction delivered in high school co-taught classes, four studies concluded that co-teaching did not result in instruction that was markedly different than what occurs in solo-taught settings. Two studies did, however, provide evidence of enhanced instruction (King-Sears et al., 2014; van Hover et

al, 2012). Van Hover et al. (2012) described a pair of co-teachers who were able to combine their unique skill sets to provide enhanced instruction as evidenced by: explicit strategy instruction, scaffolded instruction, mnemonic strategies for memorization and recall, reading comprehension strategies, and study skills. King-Sears et al. (2014) reported observing both co-teachers delivering new content and engaging in the use of questioning, prompts, visuals, analogies, and modeling during instruction.

Effectiveness of Co-Teaching

Five studies directly examined the effectiveness of co-teaching (Keefe & Moore, 2004; King-Sears et al., 2014; Leafstedt et al., 2007; Moin et al., 2009; Murawski, 2006). One study examined the effectiveness of co-teaching using a direct measure of student outcomes as well as information from observation and interviews (Murawski, 2006). The other four studies made determinations of the effectiveness of co-teaching solely based on student and teacher perceptions and observational data (Keefe & Moore, 2004; King-Sears et al., 2014; Leafstedt et al., 2007; Moin et al., 2009).

Murawski (2006) used a pretest–post-test group design to compare the academic outcomes of students with and without learning disabilities on reading and writing in four service-delivery settings: solo-taught general education, solo-taught special education, solo-taught mixed, and co-taught. The solo-taught general education class included no students identified as having a learning disability and the solo-taught special education class included only students with learning disabilities. The solo-taught mixed and co-taught classes included students with and without learning disabilities. In the co-taught class, a general educator and a special educator worked together to deliver instruction to

students with and without learning disabilities in the same physical space, while in the solo-taught mixed class only a general educator was present. No other disability category other than learning disability was mentioned.

Murawski (2006) employed analysis of covariance (ANCOVA) to compare the reading and writing post-test scores of students with learning disabilities across the three service-delivery settings (solo-taught special education, solo-taught mixed, and co-taught) while controlling for verbal IQ as measured by the Raven Progressive Matrices test. No significant differences were found for students with disabilities across the three service-delivery settings (the same was true for students without disabilities). Thus, according to this analysis, co-teaching did not represent a statistically significant improvement over solo-taught classes for the reading and writing achievement of students with learning disabilities.

The researchers also included a comparison of first- and second-quarter grade averages to offer another measure of student outcomes. Murawski reported that students in the solo-taught general education setting dropped from a B+ class average in the first quarter to a B- in the second quarter. The class average for students in the solo-taught special education setting increased from a C to a C+ in that same time period. Students in the co-taught (C+) and solo-taught mixed (C) settings maintained the same class averages. The researchers also disaggregated results of students with learning disabilities and found that the overall grade average for students with learning disabilities in the co-taught setting remained the same (C) from the first to the second quarter, while the overall grade average for the students with learning disabilities in the solo-taught mixed

setting decreased from a C- to a D+. Students without learning disabilities in the co-taught setting maintained their overall grade average (B) from the first to the second quarter, while students without disabilities in the solo-taught mixed setting went from a C to a C+ in that same time period. In summary, analysis of class grade averages indicated that co-teaching had a positive benefit for the students with learning disabilities who saw their grade averages increase from quarter 1 to quarter two, as compared to students with learning disabilities in the solo-taught class who saw their grade averages decrease between quarter 1 and quarter 2.

In addition to the quantitative data, Murawski (2006) included observational and interview data to examine the effectiveness of co-teaching. Observational data revealed little evidence that instruction improved with the addition of the special education co-teacher in the co-taught setting. One observed strength of the co-taught setting was that almost no time had to be spent managing student behavior. On the other hand, Murawski reported that time spent on non-instructional activities was especially evident in the co-taught setting. The general education co-teachers were observed engaged in activities that did not involve students approximately 32.5% of the time, and special education co-teachers 46.5% of the time.

Finally, Murawski (2006) interviewed all four participating teachers and a sample of students in each service-delivery setting. The student interview data was more positive regarding the effectiveness of co-teaching. Students reported valuing having two teachers in “difficult” classes and preferred to be in general education classes with support (co-teaching). However, the student interview data also indicated that the

instruction techniques used in co-taught classes did not differ from those used in solo-taught classes. The teacher interview data indicated a higher level of quality for classroom discussions and activities in the co-taught classes. The teacher interview data also revealed that co-teachers enjoyed having another teacher in the room.

Overall, Murawski's (2006) study found that providing students with two teachers in a co-taught class did not produce statistically significant improvement for students with and without learning disabilities on reading and writing outcomes as measured by standardized tests. However, Murawski argued that while post-test scores did not show improved learning for students in the co-teaching setting, overall class grades did, as students with learning disabilities in the co-taught class maintained their average grade from the first grading period to the second, while students with learning disabilities in the solo-taught mixed setting saw their average grade fall. Teacher and student interview data suggested that co-teaching provided some improvement over solo-taught settings. However, observational data revealed that co-teaching did not represent an improvement over the instruction provided in co-taught classes. In fact, the active involvement of both co-teachers in instruction seemed to decrease somewhat in the co-taught class, as the presence of a co-teaching partner resulted in each co-teacher engaging in non-instructional tasks more frequently than was observed in solo-taught settings.

In the second study examining the effectiveness of co-teaching, Leafstedt et al. (2007) conducted focus group interviews with ten students with learning disabilities from two different high schools to gain the students' perspective on co-teaching. The researcher found that students with learning disabilities preferred receiving instruction in

a pull-out special education only setting as opposed to the co-taught classroom. These students reported that they preferred the type and pace of instruction in the special education setting, pointing out that they needed “to have the work broken down, explained more slowly, explained in different ways, and to have a smaller amount of work to complete” (p. 180). Students with learning disabilities also reported appreciating the smaller class size of the special education-only setting, which presented less distractions and greater access to support than they experienced in the larger co-taught class. The researchers found that students with learning disabilities did not feel that the extra teacher in the co-taught class made up for the effectiveness of the separate and smaller special education classroom.

Leafstedt et al. (2007) identified access to special education services as a primary theme that emerged from the focus group interviews. From the interview data, 45 comments made by students with learning disabilities were coded as related to access to special education services in the co-taught class which was the largest number of comments assigned to any one code. Access to special education services included issues related to accessing the special educator and specialized instruction. Most student comments revealed that students with learning disabilities sought help outside of the co-taught classroom due to a perceived lack of support from the general and special education co-teachers. While students with learning disabilities appreciated and preferred the instructional style of the special education co-teacher, they noted that the special educator did less teaching, and taught differently, in the co-taught class, which limited the students’ access to specialized instruction. Furthermore, the students with

learning disabilities communicated that in the co-taught class, the special educator had to help all the students, which they felt resulted in less individual attention. The researchers reported “[students with learning disabilities] were sharing the special education teacher with the general education students yet they did not have equal access to the general education teacher, either” (p. 180).

Leafstedt et al. (2007) reported that access to accommodations was another concern voiced by students with learning disabilities. Students with learning disabilities reported that accommodations were less available in the co-taught class than in special education classes, and that general education co-teachers often provided accommodations based on how much the general education co-teachers perceived students with learning disabilities were struggling, rather than following what was written in the students’ Individualized Education Program (IEP). One student stated, “Some of my teachers don’t even let me go and take my tests in [the special education classroom] anymore, because I get such good grades and I score too highly. But then once I start to slack off a little bit, then they’ll let me go” (p. 181).

Leafstedt et al. (2007) reported that students with learning disabilities were clear in communicating that the special education co-teacher taught differently than the general education co-teacher, and that the special educator’s instruction was preferred. However, the students with learning disabilities also reported that the special education co-teacher provided more differentiation of instruction in the special education-only environment than they did in the co-taught class. The researchers reported that students with learning disabilities “felt better able to learn and understand instructional materials when taught

using differentiated, individualized techniques that they typically did not encounter in their [co-taught] classrooms. Students [with learning disabilities], at least those in this interview, believed there were instructional differences between the general education and special education teachers and settings and that the special education teachers as well as the special education settings were more effective for meeting their needs” (p. 180-181).

Leafstedt et al. (2007) also asked the students with learning disabilities about their perceptions of the social benefit of participating in co-taught classes. Much of what the students communicated about the social benefit of being in the co-taught class had to do with what they believed the perceptions of their non-disabled peers were. Results were mixed. Students with learning disabilities in one school communicated that they felt a stigma in the co-taught class and tried to avoid drawing attention to themselves. Students with learning disabilities in the other school reported that their non-disabled peers wished they had access to the extra support special education students received.

Overall, the students with learning disabilities interviewed by Leafstedt et al. (2007) communicated that being in a co-taught class, even when the special education co-teacher was delivering the instruction, did not work for them. The students with learning disabilities did, however, view the instruction provided in the special education only setting as beneficial. The students emphasized that in the special education only setting, the special educator was able to teach fewer students, change the pace of the lesson, and teach in a different manner than was possible in the co-taught class. In the co-taught class, the special educator was not as actively involved in instruction, which the students

with learning disabilities saw as a negative of being in the co-taught class. The interview data contained no explanation as to why the special education co-teachers, who were described as efficacious with instruction when teaching on their own, evidenced decreased involvement in instruction in co-taught classes. Nevertheless, the students interviewed communicated that co-teaching was not effective in meeting their learning needs, and emphasized the reduced role of the special educator in instruction in the co-taught class.

In the third study examining the effectiveness of co-teaching, Moin et al. (2009) observed ten science co-teaching teams across 53 lessons in order to determine whether science instruction in co-taught classes represented an improvement over solo-taught classes in meeting the needs of students with learning disabilities. Enhanced science instruction for students with learning disabilities was described as consisting of more lab work, more group work, and less language-based instruction, and this was the criteria by which the researchers measured the effectiveness of co-teaching. The researchers concluded that “even when the [special education co-teacher] was included in the classroom the kind of instruction that students received, heavily based on language skills and students mostly working outside of small groups, was not markedly different from instruction in the solo-taught class and only a slight improvement over pull out programs. The full merits of a two-teacher model were not realized” (p. 694).

Moin et al. (2009) found laboratory work to be the dominant activity in 13% of the lessons observed. The researchers stated that 13% of class time devoted to lab work did not represent effective instruction, noting that the California State Board of Education

as well as the NSTA called for between 20 to 25% of science class time to be devoted to lab investigations (CA State Board of Education, 2004; NSTA, 2004). The researchers reported that the amount time students spent working in groups (about 20%) was similar to what occurs in regular solo-taught classes. They also reported that effective use of curricular adaptations was not observed in the co-taught classes. Finally, evidence of improved effectiveness in the co-taught class with regard to language-based instruction was not observed. Despite the authors' premise that science instruction should be less reliant on language-based instruction, 72% of lessons were language-based. In this regard, the researchers noted that lessons in co-taught classes represented only a slight improvement over instruction in solo-taught classes. The researchers also questioned the overall quality of instruction in co-taught classes pointing out that the lessons relied heavily on "rote" learning and that "students were almost never expected to find out knowledge on their own" (p. 695).

Overall, Moin et al. (2009) found that the addition of the special education co-teacher in co-taught science classes did not result in more lab work, more group work, or less language-based instruction, which is what the researchers expected would result from effective science co-teaching. The researchers also found the rigor of instructional activities lacking and reported that they observed no effective use of curricular adaptations. Moin et al. concluded that the potential of the co-teaching service delivery model was not realized in the co-taught science classes they observed.

In the fourth study examining the effectiveness of co-teaching, King-Sears et al. (2014) explored co-teachers and students' perceptions of their co-teaching experience in

one high school Earth Science co-taught class. The researchers observed video-recorded portions of science lessons and conducted teacher and student surveys that included questions related to the effectiveness of co-teaching. Both co-teachers indicated strong agreement (ratings of 3.83 and 3.92 on a 4-point Likert scale ranging from strongly disagree to strongly agree) that their co-teaching relationship was positive and effective. Likewise, the students indicated that both teachers enjoyed teaching the class and felt comfortable sharing responsibilities (14.3% agreed; 85.7% strongly agreed). The students also identified behavior management as a perceived benefit in the co-taught science class, with 71.4% of students indicating that behavior is better with two teachers in the class. Based on observation of video-recorded session, the researchers reported that co-teachers exhibited several effective teaching behaviors including use of visuals, questioning, prompts, and analogies. However, the researchers also noted a variety of other effective practices that the co-teaching team could have been implemented, including keyword or pegword mnemonics, structured inquiry techniques, and peer-assisted learning.

Several questions on King-Sears et al.'s (2014) student survey related directly to students' perception about their learning in the co-taught class. 100% of the students either agreed or strongly agreed that they learned more with two teachers in the class, enjoyed having two teachers, and were exposed to a greater variety of instruction with two teachers as opposed to having only one teacher in the class. Furthermore, most students strongly disagreed (42.9%) or disagreed (42.9%) that it is hard to have two teachers at the same time or that having two teachers can be confusing. Most student

responses to co-teaching were positive, but there was some disagreement. While 71.4% of students indicated that they would prefer to have two teachers in all of their classes, 28.6% disagreed. Likewise, 28.6% of students stated that they would rather learn with only one teacher in the classroom.

Overall, King-Sears et al. (2014) concluded that, contrary to Leafstedt et al.'s (2007) findings, the students in this co-taught class generally did feel that their learning needs were being met, and that students were satisfied with their access to both general and special education co-teachers, with 71.4% indicating that they could ask either teacher for help. The students also indicated that they perceived better behavior in the co-taught class. Finally, both co-teachers and students reported that the co-teachers had a positive relationship in which both co-teachers felt comfortable sharing responsibilities in the co-taught class.

In the fifth and final study examining the effectiveness of co-teaching, Keefe and Moore (2004) used semi-structured interviews to explore eight general and special education co-teachers' perceptions of co-teaching. One of the themes that emerged from the interview data was, "outcomes for students and teachers." The researchers reported that co-teachers communicated both positive and negative perceptions of co-teaching outcomes. Negative comments included the idea that adding the special education co-teacher to the class did not add value to instruction. One general education co-teacher communicated not understanding the point of having the special education co-teacher in the class, and another general education co-teacher presented the special educator as a hindrance to instruction. However, general education co-teachers communicated valuing

the special education co-teachers explaining the nature of disabilities and recommending modifications. The researchers shared that modifications were not just for students with disabilities, stating that “Sometimes the special education teacher helped make modifications for any students who were struggling and this was seen as a benefit of co-teaching” (p. 84).

Keefe and Moore (2004) also reported on the co-teachers’ perceptions of the benefits of co-teaching specific to SWD. The researchers reported that removal of the stigma of being in special education, and the personal growth SWD experienced in the co-taught class, were two benefits that SWD gained from being in a co-taught class. One general education co-teacher characterized the participation of SWDs in co-taught classes as, “an incredible opportunity for [students with disabilities] to realize, especially at the junior/senior level, when they can take on responsibilities, get things completed, and for their work, to not have asterisks after it” (p. 85). There were also improvements in academic progress noted when SWDs were enrolled in co-taught classes. One special education co-teacher shared, “I had two classes of 11th graders and I did one class on my own and took one class in hers, inclusion, and I really saw a big difference in the way those kids in the inclusion class functioned. They learned a lot more. What they produced was a lot higher level” (p. 85). While these benefits to co-teaching were lauded, special education co-teachers emphasized that it was important to assess the effectiveness of co-teaching at the individual student level. The special education co-teachers cautioned that some students with disabilities needed more help than was available in the larger co-taught classes.

Overall, the results of Keefe and Moore's (2004) study were mixed regarding the effectiveness of co-teaching. The co-teachers generally reported positive outcomes for students. However, the way in which the co-teachers themselves perceived the nature of their co-teaching team was highly variable. One general education co-teacher stated, "...it was just very pleasant, happy, and a great experience. For me as a teacher and for those students" (p. 86), while a special education co-teacher provided a very different view stating, "This sounds terrible, but don't do it (co-teach) unless you're absolutely sure what you're getting into" (p.86). The researchers reported that the nature of co-teaching relationships determined whether or not the co-teachers' valued participating in co-teaching.

In summary, the five studies in this section provided mixed results regarding the effectiveness of co-teaching (Keefe & Moore, 2004; King-Sears et al., 2014; Leafstedt et al., 2007; Moin et al., 2009; Murawski, 2006). Murawski (2006) used two separate measures, a test of reading and writing skills and students' quarter grades, to directly compare the outcomes of students with and without learning disabilities in co-taught versus solo-taught classes. The two analyses provided conflicting results. Analysis of the reading and writing test scores did not show improved performance for students in the co-taught class, while analysis of quarter grades showed that students with learning disabilities achieved higher marks than their counterparts in solo-taught classes. One study found co-teaching to be effective in meeting students' learning needs and minimizing classroom management concerns (King-Sears et al., 2014), while two studies found co-teaching failed to represent an improvement over solo-taught instruction

(Leafstedt et al., 2007; Moin et al., 2009). In fact, students with learning disabilities interviewed by Leafstedt et al. (2007) perceived instruction in co-taught classes to be less effective than instruction in solo-taught special education classes. Finally, Keefe and Moore (2004) obtained mixed views of the effectiveness of co-teaching from interviewing co-teachers. As to why co-teaching did not consistently represent an improvement in instruction, the research seems to indicate that, at times the special education co-teacher, or both the general and special education co-teacher, became less actively involved in instruction and failed to provide instructional adaptations or enhancement for their students (Leafstedt et al., 2007; Moin et al., 2009; Murawski, 2006).

Personal Compatibility

Three studies identified the relationship, or personal compatibility, between co-teachers as critical to effectiveness of co-teaching (Keefe & Moore, 2004; Pratt, 2014; van Hover et al., 2012). Personal compatibility was described in terms of co-teachers' sharing similar beliefs and approaches to teaching as well as personal and professional characteristics. Two studies concluded that personal compatibility facilitated co-teachers developing interdependent relationships where each co-teacher was equally involved in instruction in the co-taught class (Pratt, 2014; van Hover et al., 2012).

Pratt (2014) used focus group and individual interviews, classroom observations, and interpersonal behavior questionnaires to explore how five pairs of exemplary co-teachers overcame challenges to co-teaching in order to develop effective co-teaching teams. The research questions that guided Pratt's study asked how co-teachers addressed

differences in philosophical perspectives of general and special education and attitudes toward inclusion. The research questions also asked how co-teachers resolved interpersonal conflicts. Personal compatibility was found to be a prerequisite for an effective co-teaching relationship, and was described both in terms of teachers sharing similar perspectives, and using their own unique areas of expertise in a complementary fashion. Pratt reported the expertise of general education co-teachers to be in content and discipline-specific instructional techniques, while the special education co-teachers had expertise in providing strategies that made content accessible for SWDs. Communication was also identified as a key factor connected to the personal compatibility between co-teachers.

Pratt (2014) used a grounded theory approach to develop the theory of “Achieving Symbiosis,” which she described as the process co-teachers go through to develop “a relationship where roles and conversations are fluid and seamless, rather than superficial or stilted” (p. 8). One of the main factors in achieving symbiosis was identified as the personal compatibility between co-teachers. Pratt stated that “Teachers were compatible by having similar perspectives or by using individual strengths to complement each another.” Interview data from one of the special education co-teachers emphasized the importance of co-teachers working with “the same goal in mind” (p.5). Other factors in achieving symbiosis were co-teachers’ personal attributes and interpersonal skills, including: background, life stage, gender, personality, communication style, and conflict style.

Pratt (2014) reported that “The interpersonal behavior questionnaire revealed teachers believed they could use their strengths to balance out each other’s weaker areas in the dimensions of control, openness, and inclusion” (p. 8). However, Pratt also reported that the co-teachers generally agreed that it was more beneficial to have similar philosophies, especially in views on inclusion. Differences in learning philosophy and classroom management, also presented as areas where agreement was necessary, were reported as challenges that co-teachers in this study worked to overcome. Specifically, general and special education co-teachers had to come to an agreement on expectations for students including what would be considered as acceptable demonstration of proficiency or success with academic content. The idea of whether expectations should be consistent for all students, or based on individual student needs, was another consideration. One special education co-teacher stated that “special educators come with ‘the idea that fair is not always equal’ which can be a different viewpoint than their general education colleague” (p. 8). Compromise was identified as an important factor in co-teachers successfully finding common ground, but it was also noted that coming to an agreement should not always be a matter of compromising. One special education co-teacher explained, “It’s like any other relationship, you’re going to have to be willing to change, you cannot be so hard knocked and locked that your style is right... I have adapted a lot and it’s made me a better teacher” (p. 9). Specific areas where teachers reported having to come to a common understanding included classroom management and grading, as well as setting time aside for collaborative planning.

In instances where philosophical differences occurred, Pratt (2014) stated that co-teachers could “use specific strategies, such as having open communication and finding common ground, to resolve differences in philosophies or perspectives of learning” (p. 10-11). The co-teachers emphasized that maintaining an atmosphere of respect and trust that allowed co-teaching partners to feel comfortable sharing their opinions and feelings was paramount to effective communication. The ability to engage in open conversations, where both teachers remained open-minded and listened to each other’s ideas without discrediting the other person, allowed these co-teaching pairs to negotiate differences in views toward accommodations or standards, classroom management styles, and expectations for student performance.

Pratt (2014) noted that differences in communication or conflict style did exist between co-teachers, and in these cases the co-teachers focused on gaining a better understanding of their partner’s perspective. Communication was viewed as student-focused, and criticism was not to be taken personally but used to enhance instruction. One general education co-teacher explained, “I would say try not to be easily offended. try not to let your feelings get hurt in the whole process, because it’s not a personal process, it’s not about you, it’s about the kids, and so like at no point if Louise is like “I didn’t like that lesson”, I would never, ever internalize that or be like well Louise doesn’t like me or she is saying that I wasn’t smart enough to do this or that. But I would just take it as okay that’s not what the kids need” (p. 9-10). The researchers also reported that co-teachers used communication to encourage each other by verbally acknowledging the good things their partner did to help students and by voicing their support for their

partner's handling of situations such as student behavior. Finally, Pratt reported that co-teachers engaged in less formal communication. Communicating with each other about personal interests and experiences outside of school was another way that the co-teachers built effective relationships.

Overall, Pratt (2014) found that the personal compatibility between co-teachers was a critical determinant of the effectiveness of co-teaching. Pratt described personal compatibility as co-teachers sharing similar perspectives on teaching and using complementary skill sets to work together with “the same goal in mind” (p. 5). General education co-teachers were credited with expertise in content and special education co-teachers with expertise in strategies that made content accessible for SWDs. Differences between co-teaching partners with regard to learning philosophy, classroom management, and views on inclusion were reported as challenges, and the need for co-teachers to agree on the academic expectations for students was emphasized as critical.

Van Hover et al. (2012) also found personal compatibility to be an important factor in developing an effective co-teaching relationship based on their in-depth case study of one co-teaching team that the researchers considered exemplary for their ability to “[coordinate] their pedagogical performance within the classroom”(p. 268) with each co-teacher being equally involved in instruction. The researchers concluded that this pair of co-teachers had developed a positive and productive co-teaching relationship based on a “complex confluence of interacting factors” (p. 270) including personal compatibility. Van Hover et al. described personal compatibility mostly in terms of shared philosophies and common goals between the two co-teachers.

Van Hover et al. (2012) reported that while the two co-teachers viewed the curriculum and their expectations for student outcomes in slightly different ways, they did share a common mission, which was to prepare all students for success on the end-of-course test World History I State assessment. The co-teachers communicated the importance of having the same general philosophy on how the class should be run, emphasizing a shared approach to the delivery of content and classroom management. The co-teachers in Van Hover et al.'s study attributed their success in developing an effective and balanced co-teaching relationship to personal compatibility. The researchers reported that "[the co-teachers] described themselves as a "success story" in terms of developing a professional relationship based on respect and trust. They attributed this to similar backgrounds, compatible personalities and teaching styles, and a basic mantra of "let's just respect each other as professionals" (p. 271).

Keefe and Moore (2004) highlighted the importance of personal compatibility between co-teachers in a qualitative study of general and special education co-teachers in one suburban high school. The researchers reported that the relationship between the co-teachers appeared to be the most important factor in how effective the co-teachers viewed co-teaching and their desire to continue co-teaching. One special education co-teacher stated, "In my opinion, the most important thing for an inclusion program to work is how well the teachers get along" (p. 82). The researchers emphasized that communication was important to the development of positive relationships between co-teaching partners but also concluded that administrators must take care in selecting teachers to work with one another in co-teaching teams. Finally, Keefe and Moore reported that "The co-

teachers recommended talking about specific issues such as roles, grading, modification, and classroom discipline as those areas could become areas of conflict” (p. 87).

In summary, all three studies identified personal compatibility between co-teachers as an important factor impacting co-teachers (Keefe & Moore, 2004; Pratt, 2014; van Hover et al., 2012) and two studies linked personal compatibility to co-teachers’ active involvement instruction (Pratt, 2014; van Hover et al., 2012). Personal compatibility was described both in terms of co-teachers’ using their own unique skill sets in a complementary fashion, and co-teachers sharing similar beliefs and approaches to teaching as well as personal and professional characteristics. Pratt (2014) found that, although co-teachers found value in their varied expertise, co-teachers also believed that having similar philosophies on teaching was necessary. Specific areas that co-teachers expressed the need for consensus included views on: inclusion, classroom management, academic expectations for students, and how students learn.

Summary of Co-Teaching Research

The research on co-teaching at the high school level provides mixed results on the effectiveness of co-teaching as a service delivery model (Keefe & Moore, 2004; King-Sears et al., 2014; Leafstedt et al., 2007; Moin et al., 2009; Murawski, 2006). However, what does seem clear is that a lack of parity often exists within co-teaching teams, and that the general education co-teacher takes charge of instruction while the special education co-teacher is less actively involved in instruction (Harbort et al., 2007; Keefe & Moore, 2004; Moin et al., 2009; Murawski, 2006). The one teach, one assist or one teach, one observe model of co-teaching, with instruction delivered primarily by the

general education co-teacher through large-group lectures, was most frequently employed in co-taught classes (Harbort et al., 2007; King-Sears et al., 2014; Moin et al., 2009; Murawski, 2006; Zigmond, 2006). Special education co-teachers were often described as taking on the role of a paraprofessional (Harbort et al., 2007; Keefe & Moore, 2004; Moin et al., 2009; Murawski, 2006), and the underutilization of the special education co-teacher may be connected to the finding that, in several cases, differentiation of instruction occurred rarely or not at all (Harbort et al., 2007; Moin et al., 2009; Murawski, 2006; Zigmond, 2006).

The potential of co-teaching comes from general educators with knowledge and skill in subject-area content working together with special educators who are able to adapt and enhance instruction to meet the individual needs of SWD (Friend et al., 1993; Kloo & Zigmond, 2008; Murawski & Lochner, 2011). If co-teaching teams consist of two highly-qualified (IDEA, 2004; NCLB, 2002) co-teachers, then why have researchers consistently found a lack of parity in co-teaching teams, and that the addition of the special education co-teacher in co-taught classes does not result in an increase in differentiated instruction? Some of the issue of parity may be related to the personal compatibility between co-teaching partners. Keefe and Moore (2004) emphasized that the relationship between the co-teachers determined the effectiveness of co-teaching, and Pratt (2014) and van Hover et al. (2012) identified personal compatibility as facilitating co-teachers being equally involved in instruction in the co-taught class. Pratt (2014) described personal compatibility as co-teachers' sharing similar beliefs and approaches to

teaching, and using their complementary skill sets to work together toward a common goal.

The skill sets of general and special education co-teachers were also reported as impacting parity and instruction in co-taught classes in three studies (Keefe & Moore, 2004; Moin et al., 2009; van Hover et al., 2012). In two studies, researchers reported that special education co-teachers' lack of content knowledge limited the role they played in the co-taught classes (Keefe & Moore, 2004; Moin et al., 2009). In another study, the active involvement of the special education co-teacher was linked to that co-teacher's skill in differentiating instruction and to the special education co-teacher's increased confidence with the World History I curriculum content (van Hover et al., 2012). General education co-teachers, although in most cases in charge of instruction, were reported as lacking skills and knowledge on differentiating instruction. General education co-teachers communicated feeling unprepared for teaching SWD, and special education co-teachers communicated being unprepared to teach high school subject-area content (Keefe & Moore, 2004; Moin et al., 2009; van Hover et al., 2012).

Special Education Teacher Self-Efficacy Literature Review

Co-teaching relies on combining the skill sets of the general and special education co-teachers to deliver specially designed instruction to meet the learning needs of students with and without disabilities. However, some research indicates that general and special education co-teachers do not feel prepared to meet the diverse learning needs of students in co-taught classes (Keefe & Moore, 2004; Moin et al., 2009; van Hover et al., 2012), and indeed research indicates instruction in co-taught classes is often not different

from what is provided in solo-taught general education classes (Harbort et al., 2007; Moin et al., 2009; Murawski, 2006; Zigmond, 2006). Co-teachers' beliefs about their capabilities of teaching students with and without disabilities in co-taught classrooms may be a factor that is related to how actively involved co-teachers are in tasks related to delivering instruction to students with diverse learning needs in co-taught classes. Teacher self-efficacy (TSE) is a construct that represents teachers' beliefs about their capabilities to teach students, including those they may find difficult to teach (Tschannen-Moran & Woolfolk Hoy, 2001) and is the subject of the second literature review.

Special Education Teacher Self-Efficacy Literature Search Procedures

The following databases were searched for relevant research: Academic Search Complete, AP PsychNet, Education Full Text, Education Research Complete, ERIC, and Social Sciences Index. Only research published in peer-reviewed journals was considered. Each database was searched individually using the following keywords: teacher self-efficacy, teacher efficacy, special education, disabilities, co-teaching, mainstreaming, and inclusion.

Additionally, subject terms suggested by each particular database (using a thesaurus or term-finder engine) as preferred identifiers for the given keywords were used to search. These terms included: Self-efficacy in teachers, Mainstreaming (Educational), Team teaching method, Children with disabilities – Disabilities, Education, Inclusive education, Interdisciplinary teams in education, Mainstreaming in special education, Mainstreaming in special education – Evaluation, Mainstreaming in special education –

Research, Special education, Teaching teams, Teaching teams – Evaluation, and Teaching teams – Research. The search terms were suggested by the database, so only search terms that were relevant for a particular database were used in that search. Two fields were employed for each search, one dedicated to teacher self-efficacy and the other students with disabilities, so that articles were required to meet both criteria in order to be examined for further consideration. This initial search yielded 154 articles.

The abstracts for all 154 articles were examined to determine if inclusion criteria was met. In many cases, review of the method section was necessary in order to determine the sample population. The criteria for the inclusion of studies for this literature review were as follows: (a) focused on the topic of teacher-self efficacy (TSE), (b) involved practicing teachers (this includes both general and special educators) of SWD participating in the general curriculum at the high school level (grades 9-12), and (c) represented empirical studies. Several studies included teachers at the high school level, but did not focus specifically on teachers of SWD and were excluded from this literature review. Studies that did include high school teachers in their participant population, but did not disaggregate to provide specific results for high school teachers, were not considered to have met the inclusion criteria for this literature review. Also, several studies included both practicing and pre-service teachers in the participant population. Studies that included both practicing and pre-service teachers, but did not disaggregate to provide specific results for practicing teachers, were not considered to have met the inclusion criteria for this literature review. A total of five studies from the initial pool of 154 met the inclusion criteria. It should be noted that several studies were

excluded from this literature review because they did not focus specifically on high school teachers or disaggregate results for this population. The results from relevant studies of elementary and middle school teachers excluded from this review of literature were discussed in chapter 1. Similarly, studies that did not focus specifically on teachers of SWD, or disaggregate results for this population, were excluded from this literature review. Relevant articles that were excluded from this literature review were, likewise, discussed in chapter 1. Finally, several studies were found to be practitioner articles that did not represent empirical research. Practitioner articles not representing empirical research were excluded from this literature review.

Professional Development and Teacher Self-Efficacy

Two studies explored professional development and TSE (Aschenbrener, Garton, & Ross, 2010; Dixon, Yssel, McConnell, & Hardin, 2014). Dixon et al. (2014) examined the impact that amount of professional development (in hours) on differentiating instruction had on the TSE of high school teachers. Aschenbrener et al. (2010) examined the effect of TSE and the quality and amount of professional development and pre-service teacher preparation on teachers' perceived success working with SWDs.

Dixon et al. (2014) conducted a study to determine whether TSE could predict high school mathematics teachers' willingness to differentiate instruction. The second research question in Dixon et al.'s study, however, asked whether participation in professional development focused on differentiating instruction is predictive of TSE. The researchers surveyed 41 teachers, including ten high school teachers who taught students with and without disabilities in general education classrooms. No distinction was made

between general and special education teachers. Participating teachers taught classes that included SWD in various content areas, but no information on the percent or disability category of SWD was provided. Dixon et al. hypothesized that teachers' amount of professional development hours in differentiating instruction would be predictive of TSE.

In order to measure TSE, Dixon et al. (2014) had teachers respond to two scales: Tschannen-Moran and Woolfolk Hoy's (2001) Teacher Sense of Efficacy Scale (TSES) and Woolfolk and Hoy's (1990) Teacher Efficacy Scale. Dixon et al. (2014) chose Tschannen-Moran and Woolfolk Hoy's (2001) TSES "because the subscales are relevant to the issues of differentiation... the TSES moves beyond previous measures (e.g., Gibson & Dembo, 1984) to capture a wider range of teaching tasks" (p. 8). Tschannen-Moran & Woolfolk Hoy's (2001) TSES measures TSE with 24 items using a 9-point scale ranging from "none at all" to "a great deal." Dixon et al. (2014) did not provide a rationale for including Woolfolk Hoy and Hoy's (1990) Teacher Efficacy Scale as a second measure of TSE.

In order to measure participation in professional development focused on differentiating of instruction, Dixon et al. (2014) asked teachers the following questions:

- What types of students are in your class(es)? Teachers were to check all that applied from the following list: high ability, average or grade level, below average, and/or identified for special services.

- When did you attend professional development on differentiating instruction?

Choices included the following: this year, the last 5 years, in a teacher preparation program, or none.

- How many hours of professional development have you attended on Differentiating Instruction? Choices included the following: 1-2 hrs, 3-5 hrs, 5-10 hrs, and more than 10 hrs.

The researchers used predictive discriminant analysis to determine whether participation in professional development predicted TSE. The researchers found that the discriminant function for the TSES and TES predicting professional development group (i.e., the number of professional development hours, 1-2, 3-5, 6-10, and 10+ hrs, that teachers reported) was significant ($\lambda = .764$, $F(6) = .508$, $p = .006$), and accounted for 86.8% explained variance. These results suggest that greater participation in professional development focused on differentiating instruction is positively associated with general and special educators' TSE.

Aschenbrener et al., (2010) took a quantitative approach to examine the impact that TSE, professional development, and pre-service teacher preparation have on the perceived success of early-career (five years of experience or less) high school agriculture education teachers' working with SWD. The researchers measured both teachers' amount of professional development and teachers' perceptions of the quality of their pre-service teacher preparation. Eighty one early-career agriculture education teachers working with SWD made up the participant sample.

The researchers used a revised version of Brownell and Pajares' (1999) scale, Working with Diverse Students: The General Educator's Perspective, removing only demographic questions not relevant to the study. The scale was broken down into five subscales, including: quality of preservice teacher preparation, participation in

professional development focused on SWD, administrator support, TSE for working with SWD, and self-perceived success for working with SWD. Participants were administered the questionnaire through an on-line survey tool.

Aschenbrener et al. (2010) asked early career agriculture teachers to assess the quality of their preservice teacher preparation regarding working with SWDs by responding to four items measured on a 6-point scale ranging from “disagree” (1) to “agree” (6). The four items asked teachers to indicate their level of agreement that teacher preparation had prepared them concerning:

- Knowledge of different needs of students with disabilities.
- Ability to adapt curriculum for students with disabilities.
- Ability to adapt instruction for students with disabilities.
- Ability to manage behavior difficulties of students with disabilities.

TSE was measured using eleven items that used the stem: “Considering your current instructional situation and teaching responsibilities, how much can you do to...” The teachers responded items with a 6-point scale ranging from “nothing” (1) to “a great deal” (6). The eleven items measuring TSE included teachers’ beliefs about their capabilities regarding:

- Manage disruptive behavior in the classroom.
- Get children to follow classroom rules.
- Prevent problem behavior on school grounds.
- Help special education students learn in a regular classroom.

- Reach students with the most learning problems.
- Reach students with the most behavior problems.
- Overcome the influence of environment on learning and behavior problems.
- Individualize learning for students with learning problems.
- Keep students with learning problems on task with difficult assignments.
- Individualize learning for students with behavior problems.
- Keep students with behavior problems on task with difficult assignments.

Self-perceived success toward teaching SWD was measured using four items a 6-point scale ranging from “disagree” (1) to “agree” (6). The stem used to measure the items was not provided in the article. The four items used to measure teachers’ self-perceived success toward teaching SWD included:

- Successfully taught students with learning problems.
- Successfully included special education students.
- Successfully worked with special education teachers to include students with disabilities in my classes.
- Successfully taught behavior problem students.

Aschenbrener et al. (2010) used hierarchical regression analysis to test the impact of teacher preparation and administrator support on perceived success teaching SWDs, and then to test whether TSE could explain additional variance in self-perceived success of teaching SWDs controlling for pre-service teacher preparation, administrative support, and participation in professional development. Pre-service teacher preparation, administrative support, and participation in professional development were entered

together in the first block and accounted for 13% of the variance in self-perceived success. However, none of the block 1 variables (teacher preparation; administrative support; in-service participation) achieved a statistically significant beta weight. The addition of TSE in the second block explained an additional 14% of the variance beyond the contribution of teacher preparation, administrator support, and in-service participation ($\beta = .46, p < .05; \Delta r^2 = .14$). Therefore, Aschenbrener et al. concluded that TSE was predictive of co-teachers' self-perceived success of teaching SWDs. The set of variables representing pre-service teacher preparation, administrative support, and participation in professional development did not explain a significant amount of variance in self-perceived success. The relationship that Aschenbrener et al. found between TSE and perceived success will be discussed further in another section.

Overall, the two studies present mixed results regarding the importance of professional development on teacher's beliefs regarding teaching SWD. Dixon et al. (2014) found that high school mathematics teachers who participated in more hours of professional development focused on differentiating instruction indicated higher levels of TSE. Aschenbrener et al. (2010) did not test whether participation in professional development was related to TSE. The researchers did, however, find that early-career agriculture education teachers' TSE was predictive of their perceived success in working with SWD, while the teachers' participation in professional development was not.

Collaboration and Teacher Self-Efficacy

Two studies focused on the relationship between TSE and collaboration (Rimpola, 2014; Ross, McKeiver, & Hogaboam-Gray, 1997). Rimpola (2014) took a

quantitative approach, examining the impact of scheduled collaborative planning on the TSE of high school mathematics co-teachers, while Ross et al.'s (1997) qualitative design explored how collaboration influenced the recovery of TSE for high school teachers involved in a new educational reform initiative. Both sets of researchers maintained that collaboration is able to impact TSE.

Rimpola (2014) used both quantitative survey data and interview data to examine the relationship between TSE and the amount of pre-schedule co-planning time in teachers' schedules. Quantitative data were collected from 92 high school mathematics co-teachers (77 general education co-teachers and fifteen special education co-teachers). Rimpola's study addressed the following research questions:

- Is there a significant difference in the TSE of general education co-teachers among the varied lengths of collaborative planning time?
- Is there a significant difference in the TSE of special education co-teachers among the varied lengths of collaborative planning time?
- Is there a significant difference in mathematics teaching efficacy of general education co-teachers among the varied lengths of collaborative planning time?
- Is there a significant difference in mathematics teaching efficacy of special education co-teachers among the varied lengths of collaborative planning time?

Rimpola (2014) used two instruments to measure the self-efficacy beliefs of high school mathematics co-teachers. The first was Tschannen-Moran and Woolfolk Hoy's (2001) Teacher Self-Efficacy Scale (TSES), which consists of 24 items across three factors (Instruction, Classroom Management, and Student Engagement) measured on a 9-

point scale ranging from “none at all” to “a great deal.” The second TSE instrument was Enochs, Smith, and Huinker’s (2000) Mathematics Teaching Efficacy Belief Instrument (MTEBI), which consists of 21 items across two factors (Personal Mathematics Teaching Efficacy and Mathematics Teaching Outcome Expectancy) measured on a 5-point scale using the anchors “strongly agree,” “agree,” “uncertain,” “disagree,” and “strongly disagree.” The MTEBI was developed by modifying Gibson and Dembo’s (1984) Teacher Efficacy Scale to make items specific to a mathematics teaching context, but retaining the conceptualization of TSE as represented by personal efficacy and teaching efficacy. Co-teachers responded to the instruments using a commercial online tool. Co-teachers were also asked questions regarding their collaborative teaching practices and experiences, and one item asked co-teachers to indicate the amount of collaborative planning time built into their schedule per week.

Rimpola (2014) used analysis of variance (ANOVA) to examine whether significant differences in the TSE of the general and special education co-teachers existed across levels of weekly collaborative planning times. The researchers did not identify the levels of weekly collaborative planning times used in the ANOVA analysis. Results revealed no significant differences in the general education co-teachers’ overall TSE as measured by Tschannen-Moran and Woolfolk Hoy’s (2001) TSES across collaborative planning times ($F(6, 70) = 1.031, p > .05$). Differences on the three factor scores (Instruction, Classroom Management, and Student Engagement) were also considered, but no significant differences were found (Student Engagement: $F(6,70) = 1.307, p > .05$; Instructional Strategies: $F(6,70) = .883, p > .05$; Classroom Management: $F(6,70) = .465,$

$p > .05$). Statistical results were not provided for special education co-teachers, but the researchers stated that “[the findings] were also true for special education teachers” (p. 47).

Rimpola (2014) also found no significant differences in the general education co-teachers’ overall mathematics teaching efficacy as measured by Enochs et al.’s (2000) MTEBI across collaborative planning times ($F(6,70) = .417, p > .05$). Differences on the two factor scores (Personal Mathematics Teaching Efficacy and Mathematics Teaching Outcome Expectancy) were also considered, but no significant differences were found (Personal Mathematics Teaching Efficacy: $F(6,70) = .937, p > .05$; Mathematics Teaching Outcome Expectancy: $F(6,70) = .250, p > .05$). This time, statistical results were provided for the special education co-teachers. No significant differences were found in the special education co-teachers’ overall mathematics teaching efficacy across collaborative planning times ($F(5,9) = .993, p > .05$), nor were significant differences found on the subscale scores (Personal Math Teaching Efficacy: ($F(5,9) = 1.482, p > .05$; Mathematics Teaching Outcome Expectancy: $F(5,9) = .924, p > .05$).

Rimpola (2014) surveyed the co-teachers regarding their collaborative teaching practices and experiences which yielded additional information on collaborative planning. Only 40% of the participating co-teachers indicated that they had collaborative planning time built into their schedule during the week. Of the participants who did not have collaborative planning time built into their schedule, 60% indicated that they still collaborate with their co-teacher and perform instructional practices related to co-teaching. Approximately 70% of all participants indicated that they perform instructional

practices with their co-teaching partner, including co-planning lessons, regardless of whether or not they are provided a scheduled planning time. Rimpola used these results to explain the non-significant results from the ANOVA tests that analyzed differences in TSE across levels of weekly collaborative planning times. Rimpola stated that “Having scheduled planning times may not be a major concern for co-teachers such that it impacts their [TSE]. The reason for this may be that co-teachers find time to plan together regardless of whether they have a scheduled planning time built into the master schedule or not” (p. 49-50).

Finally, Rimpola (2014) interviewed three co-teaching teams to gain a better understanding of the quantitative results. Co-teacher responses to the follow-up interview questions revealed that co-teachers found time outside of school hours to collaborate and that the personal relationship between co-teachers could facilitate collaboration. One special education co-teacher explained:

“Unfortunately, we do not have the same planning. But because we have such a great relationship whenever she’s on planning she’ll come by and see me or whenever I have planning I’ll go by and see her. And we discuss a couple of students at a time. Because we work so well together there have been times... she has called me at home to discuss some strategies we could possibly implement for some students or for the entire class. So we don’t necessarily have a common planning time but we do make sure that we do get some time to discuss” (p. 48).

Both general and special education co-teachers communicated that co-planning was important and that while they were willing to meet with their co-teachers for co-planning, not having a scheduled co-planning time presented challenges.

Overall, Rimpola's (2014) findings do not show that being provided scheduled collaborative planning time has an effect on the TSE of general and special education co-teachers. However, this finding does not necessarily mean that collaborative planning does not impact TSE. Survey and interview data suggested that co-teachers find time to plan together regardless of whether they have a scheduled planning time built into the master schedule or not. Notably, the researchers found that co-teachers who have good interpersonal relationships engage in collaborative planning outside of the regular workday. The importance of good interpersonal relationships between co-teachers supports the inclusion of personal compatibility in the current study's model examining the TSE of general and special education co-teachers.

Ross et al. (1997) interviewed and observed four exemplary 9th grade mathematics teachers in Ontario, Canada over one school year as they implemented de-streaming, an educational reform initiative that eliminated the practice of grouping students into homogeneous classes based on ability. Peer and administrator nominations were used to identify four teachers who had participated in professional development to prepare for de-streaming, and whom peers and administrators viewed as effective. Prior to de-streaming, three types of ninth-grade mathematics classes existed: advanced (university bound), general (graduating to employment or further non-university training), and basic (special needs). No detail was provided to describe special needs

students. The purpose of Ross et al.'s (1997) qualitative research was to identify the factors that contributed to teachers regaining TSE that was lost as a result of implementing the new educational reform initiative. The researchers defined TSE as “the extent to which a teacher anticipates that he or she will be able to bring about student learning” (p. 284), and identified the three research questions:

1. Will teachers' expectations about their ability to bring about student learning (TSE) decline when they attempt to implement de-streaming?
2. If so, will teachers recover their confidence?
3. If there is a recovery of TSE, what factors were associated with the resurgence?

Ross et al. (1997) reported that, initially, implementing the de-streaming reform initiative reduced the TSE of the participating teachers. The researchers reported that participating teachers' TSE declined when de-streaming was implemented “because the teachers were less certain about the consequences of their actions” (p. 292). However, the researchers also reported that “as teachers worked through the problems of implementing de-streaming, their [TSE] rebounded” (p. 293). Although Ross et al. found the most powerful factor in the recovery of TSE was teachers seeing evidence that their teaching methods were resulting in student learning, the researchers also found that “Organizational culture factors, particularly high levels of teacher collaboration, also contributed to the rebound of [TSE]” (p. 293).

Ross et al. (1997) found collaboration impacted TSE in several ways, including providing a positive social environment that increased teachers' beliefs in their ability to be successful. The researchers reported that collaboration “created a climate that

legitimated help seeking, joint problem solving, and instructional experimentation” (p. 293). The researchers also reported that positive feedback from peers increased TSE. Ross et al. reported that one teacher who had initially had difficulty finding a supportive colleague benefitted from collaboration once she began to work with another teacher with similar views. No detail was provided to describe the nature of the similar views. Other teachers communicated that collaboration provided emotional support. Overall, the researchers reported that collaboration could compensate for lack of experience, “either experience or collegial support was sufficient” (p. 293).

Overall, the two studies provide mixed results regarding the relationship between collaboration and TSE. Results from Rimpola’s (2014) quantitative analysis revealed no relationship between amount of scheduled co-planning time and co-teachers’ TSE. However, interview data suggested that co-teachers often found time to collaborate outside of scheduled co-planning time, which Rimpola suggested may explain why a significant relationship between scheduled co-planning time and TSE was not achieved. Ross et al.’s (1997) qualitative research identified collaboration as an important source of teachers’ efficacy beliefs because it fostered a positive and supportive social environment. Ross et al. also indicated that teachers sharing similar beliefs (personal compatibility) facilitated collaboration.

Teacher Self-Efficacy and Other Teacher Outcomes

Three studies examined TSE as a predictor for various outcome variables (Aschenbrener et al., 2010; Dixon et al., 2014; Viel-Ruma, Houchins, Jolivette, & Benson, 2010). Aschenbrener et al. (2010) examined TSE as predictor of self-perceived

success for teaching SWDs, and Viel-Ruma (2010) examined TSE as a predictor of job satisfaction. Dixon et al. (2014) examined TSE as a predictor of differentiating instruction.

Aschenbrener et al. (2010) conducted a study to measure the effect of TSE on early-career high school agriculture education teachers' self-perceived success of working with SWDs while controlling for pre-service teacher preparation, administrative support, and participation in professional development. Early-career teachers were defined as teachers with five years of experience or less. Eighty one out of the total 123 early-career agriculture teachers in the state of Missouri (66% response rate) participated in the study. Using hierarchical multiple linear regression the researchers found that TSE did explain a significant amount of variance in teachers' self-perceived success, up and above the effects of teacher preparation, administrative support, and in-service participation ($\beta = .46, p < .05; \Delta r^2 = .14$). The researchers used a revised version of Brownell and Pajares' (1999) scale, *Working with Diverse Students: The General Educator's Perspective*, removing only demographic questions not relevant to the study. Participants were administered the questionnaire through an on-line survey tool.

One of Aschenbrener et al.'s (2010) research objectives was to determine the TSE of early career agriculture teachers toward working with SWDs. The TSE subscale from Brownell and Pajares' (1999) *Working with Diverse Students: The General Educator's Perspective* scale asked teachers to respond to 11 items using a 6-point scale ranging from "nothing" (1) to "a great deal" (6). The 11 items in the TSE subscale ask teachers about their efficacy beliefs for managing the learning and behavior of SWD. The average

summated score for the TSE of early agriculture teachers' was 4.31 ($SD = .72$).

Aschenbrener et al. concluded that "It appears teachers have a moderate level of confidence in their ability to teach students with special needs, as indicated by their self-efficacy" (p. 13). The item that the teachers indicated the highest self-efficacy for was "manage disruptive behavior in the classroom" ($M = 4.84$, $SD = .89$). A mean score of 4.84 indicates that teachers were close to believing that they could do a great deal to manage disruptive behavior in the classroom. Conversely, the item that the teachers indicated the lowest self-efficacy for was "keep students with behavior problems on task with difficult assignments" ($M = 3.94$, $SD = 1.10$). A score of 3.94 meant that teachers were closer to believing that they could do a great deal to keep students with behavior problems on task with difficult assignments versus teachers feeling they could do nothing. It should be noted that the researchers did not provide reliability information for the data, but instead stated that the scale itself had been validated in previous studies.

Another of Aschenbrener et al.'s (2010) research objectives was to describe the self-perceived success of early career high school agriculture teachers in terms of teaching SWD. The self-perceived success subscale from Brownell and Pajares' (1999) Working with Diverse Students: The General Educator's Perspective scale asked teachers to respond to 4 items using a 6-point scale ranging from "disagree" (1) to "agree" (6). The four items that measured self-perceived success in teaching SWDs included:

- Successfully taught students with learning problems.
- Successfully included special education students.

- Successfully worked with special education teachers to include students with disabilities in my classes.
- Successfully taught behavior problem students.

The average summated score for early agriculture teachers' self-perceived success for teaching SWDs was 4.72 ($SD = .90$). The mean score for self-perceived success was higher and included slightly more variability than the means score for TSE.

Aschenbrener et al. concluded that “[Similar to TSE], teachers suggest moderate levels of success instructing [SWDs]” (p. 13). The self-perceived success item that had the highest response score was “successfully taught students with learning problems,” ($M = 4.85$, $SD = 1.01$). Conversely, item that had the lowest response score was “successfully taught behavior problem students” ($M = 4.58$, $SD = 1.27$). It is important to note that early career agriculture teachers indicated less success for the item that required working together with special education colleagues to include SWD in classes ($M = 4.62$, $SD = 1.24$) than for the similar item in which referred to the individual teacher alone (successfully included special education students: $M = 4.84$, $SD = 1.16$). Although not tested for statistical significance, the difference between these two items illustrates why research on teachers working together collaboratively may be wise to include examination of relationship-based variables such as personal compatibility.

Overall, Aschenbrener et al. (2010) found that TSE, and not pre-service teacher preparation, administrative support, or participation in professional development, was predicted early-career high school agriculture education teachers' perceived success for working with SWD. The researchers concluded that the teachers had a moderate level of

confidence in their ability to teach SWD, and that the teachers enjoyed a similar, although slightly higher, level of perceived success in teaching SWD. The teachers' responses to two items on the self-perceived success subscale indicated that teachers perceived less success when working with special education colleagues to teach SWD than when working alone, which supports examining the personal compatibility between collaborating teachers when conducting a study on teachers who work together to teach SWD.

Dixon et al. (2014) conducted a study to determine whether teachers who express higher TSE differentiate instruction more in their classrooms than lower TSE teachers. The researchers surveyed 41 teachers including ten high school teachers teaching various content classes. All participating teachers taught classes that included both students with and without disabilities, but details on the percent of SWD or disability categories of these students were not provided. Dixon et al. hypothesized that higher TSE would be associated with greater levels of differentiating instruction.

In order to measure TSE, Dixon et al. (2014) had teachers respond to two scales: Tschannen-Moran and Woolfolk Hoy's (2001) Teacher Sense of Efficacy Scale (TSES) and Woolfolk and Hoy's (1990) Teacher Efficacy Scale (TES). The researchers noted choosing Tschannen-Moran and Woolfolk Hoy's (2001) TSES as a measure of TSE for its ability to capture a wide range of teaching tasks including tasks relevant to differentiating instruction. The TSES consists of 24 items that measure TSE across three factors (instruction, classroom management, and student engagement) using a 9-point scale ranging from "none at all" to "a great deal." The TES (Woolfolk & Hoy, 1990)

consists of 22 items that measure TSE across two factors (personal efficacy and teaching efficacy) using a 6-point scale ranging from “strongly disagree” to “strongly agree.” The researchers provided no information on the reliability of the data obtained using these scales, nor did they provide descriptive statistics for scale or subscale scores.

In order to measure differentiation of instruction, Dixon et al. (2014) asked teachers to respond to the item: How often do you differentiate in your classroom? Teachers were given the following response options: daily for each subject taught, daily for more than one subject but not all, daily for one subject, occasionally—less than once a week, and never. The researchers used linear regression to find out whether higher TSE would be associated with greater levels of differentiating instruction. The researchers found that both the TSES and TES summated scores significantly predicted differentiation (TSES: $\beta = .365$, $p = .043$; TES: $\beta = .583$, $p = .001$). The researchers also examined whether scores from the TSES’s three subscales (instruction, classroom management, and student engagement) could be used to predict differentiated instruction using stepwise multiple regression. The results indicated that the only subscale score that significantly predicted differentiation was Instruction ($\beta = .467$, $r^2 = .218$, $p = .008$). Classroom management ($\beta = -.246$, $p = .251$) and student engagement ($\beta = -.099$, $p = .728$) were unrelated to differentiation when taking into account the variance explained by instruction. The researchers also used stepwise multiple regression to determine the predictive strength of the TES’s two subscales (personal efficacy and teaching Efficacy). Personal efficacy was the only subscale score that significantly predicted differentiation ($\beta = .547$, $r^2 = .299$, $p = .001$). Teaching efficacy ($\beta = -.258$, $p = .098$) was unrelated to

differentiation when taking into account the variance explained by personal efficacy. Overall, Dixon et al. (2014) concluded that “Our study confirmed our beliefs that differentiation is associated with greater efficacy beliefs” (p. 125).

Viel-Ruma et al. (2010) conducted a study to examine the relationship between special education teachers’ TSE, collective efficacy, and job satisfaction. Viel-Ruma et al. relied on Bandura (1997) and Goddard (2001) to describe collective efficacy as teachers’ beliefs that the school staff as a whole can be successful in effecting desired student outcomes. Viel-Ruma et al. (2010) also examined how differences in TSE, collective efficacy, and job satisfaction relate to (a) teaching level (elementary, middle, and high school), (b) instructional setting (self-contained, resource, or inclusion), and (c) certification type (highly qualified at the cognitive level, consultative, and emergency or nonrenewable). All 104 special educators in one school district were sent survey packets, and 70 (68% response rate) returned completed surveys. Of the respondents, 34% were elementary school special education teachers, 22% were middle school special education teachers, and 44% were high school special education teachers.

Viel-Ruma et al. (2010) distinguished between TSE and collective efficacy explaining that collective efficacy refers to beliefs about the capabilities of the group, while TSE refers to beliefs about the capabilities of the individual. Gibson and Dembo’s (1984) Teacher Efficacy Scale (TES) was used to measure TSE and Goddard, Hoy, and Woolfolk Hoy’s (2000) Collective Efficacy Scale (CES) was used to measure collective efficacy. The CES consists of 21 items such as: “Teachers in this school really believe every child can learn” and “Our students come to school ready to learn.” To measure job

satisfaction, Viel-Ruma et al. (2010) had teachers respond to the Brayfield-Rothe Index of Job Satisfaction (Brayfield & Rothe, 1951) which consists of 18 items including questions such as: "I feel fairly satisfied with my job" and "I find real enjoyment in my work." All three instruments used a 5-point Likert-type scale ranging from "totally disagree" (1) to "totally agree" (5). Special education teachers were also asked to respond to five demographic questions regarding years of experience, current teaching assignments, level of education, and certification type.

Viel-Ruma et al. (2010) examined the relationship between teacher self-efficacy, collective efficacy, and job satisfaction using bivariate Pearson correlation coefficients. A significant relationship was found between job satisfaction and teacher self-efficacy ($r = .292, p = .014$) and between teacher self-efficacy and collective efficacy ($r = .345, p = .003$). The correlation between collective efficacy and job satisfaction, however, was not significant. Multiple regression was used to examine whether TSE and collective efficacy could predict job satisfaction. The regression model was significant ($F(2, 67) = 3.332, p < .05$) and explained 6.3% of the variance in job satisfaction. However, only TSE achieved a significant beta weight. Next, Viel-Ruma et al. (2010) ran a one-way multi-variate analysis of variance (MANOVA) to examine differences in the level of TSE, collective efficacy, and job satisfaction across: instructional settings, teaching level, and certification type. No significant effects were found, indicating that group differences did not exist on TSE, collective efficacy, or job satisfaction.

Summary of Teacher Self-Efficacy Research

To date, very little research has been conducted on the teacher self-efficacy (TSE) of practicing high school teachers of SWD. No studies have examined the TSE of high school general and special education co-teachers. This is despite findings from research on general education teachers that demonstrates TSE is predictive of teachers' engagement in instructional tasks (De Neve et al., 2015; Muijs & Reynolds, 2002; Ryan et al., 2015; Skaalvik & Skaalvik, 2014).

Only one study examined the relationship between TSE and active involvement in instruction for high school mathematics teachers teaching students with and without disabilities (Dixon et al., 2014). The researchers reported that mathematics teachers' who had participated in professional development on differentiating instruction evidenced greater TSE, and that teachers with greater TSE differentiated instruction more in their classrooms than teachers with lower TSE. Aschenbrener et al. (2010) presented a similar finding, connecting high school early-career agriculture education teachers' TSE to their perceived success in teaching SWD. Ross et al. (1997) reported that collaboration impacts TSE through creating a positive and supportive social environment, which may also be impacted by the degree to which teachers hold similar views on teaching. This finding is important because it provides evidence of the impact of the collaborative social environment on TSE while also indicating that the personal compatibility between collaborating teachers is part of that social environment. Overall, more research is needed to examine the TSE of high school general and special educators working within

the context of a co-teaching relationship, and the effect that TSE has on high school co-teachers' active involvement in instruction.

Chapter Three

This chapter presents the research design used to answer the two research questions. The research questions, selection and recruitment of participants, and data collection procedures are described. Information regarding the nature and psychometric properties of the instruments used in data collection are also provided. Finally, this chapter identifies and describes the data analysis procedures used to answer the two research questions.

Research Questions

1. Is there a significant difference between general and special education co-teachers on teacher self-efficacy (TSE), personal compatibility, and active involvement in instruction?
2. What is the relationship between general and special education co-teachers' TSE, personal compatibility, and active involvement in instruction?
 - a. Do TSE and personal compatibility predict general and special education co-teachers' active involvement in instruction?
 - b. Does personal compatibility moderate the relationship between TSE and active involvement in instruction for general and special education co-teachers?

Recruitment

Institutional Review Board (IRB) approval was obtained from George Mason University and from two public school districts prior to the recruitment of high school general and special education co-teachers. In addition to school-based recruitment, the researcher also created a post on the Council for Exceptional Children's (CEC) message board (<http://community.cec.sped.org/home>), as per George Mason University IRB approval, to recruit high school general and special education co-teachers from the organization's members who read and responded to the post.

After each school district's research approval was obtained, representatives from the school districts were contacted via e-mail. The school district representatives contacted high school principals for permission to recruit high school co-teachers in their respective schools. In most cases, the high school principals provided the researcher with contact information for the special education department chairs, who would facilitate recruitment. In some cases, the school district representative provided the researcher with contact information for the special education department chair directly.

Once contacted by the researcher, most special education department chairs or school district representative provided a list of general and special education co-teachers, and their email addresses so that the researcher could recruit co-teachers directly via email. In some cases, special education department chairs facilitated recruitment of co-teachers themselves by obtaining recruitment materials from the researcher, and then contacting co-teachers via email to alert them about the opportunity to participate in the research. There were two inclusion criteria for participation in this study. First, only general and special education co-teachers who were co-teaching a high school grade

(grades 9, 10, 11, or 12) were sought. Second, high school co-teaching teams had to consist of one general education teacher and one special education teacher who were both assigned to the same class for the entirety of the class period.

General and special education co-teachers identified through school-based recruitment were recruited to participate in the research via email. Recruitment emails provided a brief introduction to the research and a link to the electronic survey. General and special education co-teachers recruited through the Council for Exceptional Children's (CEC) message board were provided a brief introduction to the research and a link to the electronic survey within the message board post. The electronic survey included an electronic Co-teacher Informed Consent Form, which outlined the purpose of the research and what participation in the research entailed. Co-teachers provided their informed consent by clicking the button that represented the statement, "I have read this form and agree to participate in the study." Co-teachers were also provided the option of receiving a paper Co-teacher Informed Consent Form to sign, but no co-teachers requested this option. After agreeing to participate, co-teachers were asked to respond to demographic items and the scales for teacher self-efficacy (TSE), personal compatibility, and active involvement in instruction, which are described later in this chapter.

In order to obtain data from intact co-teaching teams, and because co-teachers may be assigned to more than one co-teaching team in a given school year, participating co-teachers were asked to identify all of their current co-teaching partners by providing their names and email addresses at the beginning of the electronic survey. The electronic survey was designed to randomly select a single co-teaching partner as the designated co-

teaching partner for the participant to consider when responding to items on the TSE, personal compatibility, and active involvement in instruction scales. For co-teachers who reported only being assigned to one co-teaching team, the electronic survey selected the one co-teaching partner from that team as the designated co-teaching partner. The electronic survey was also designed to populate the name of the designated co-teaching partner in subsequent parts of the survey, including the directions for each scale, to remind participants to respond to all items by considering their experience working in the co-taught class with the designated co-teaching partner. For example, the directions for the active involvement in instruction scale stated, “Indicate your level of active involvement in the following tasks when you are co-teaching with your designated co-teaching partner. Your designated co-teaching partner is *Name*.”

Once the first co-teacher in a co-teaching pair completed the electronic survey, the electronic survey was designed to automatically send out an invitation email, with a custom electronic survey link, to the randomly selected designated co-teaching partner to obtain data from both members of the co-teaching team. The custom electronic survey was automatically populated with the first co-teacher’s name so that the new recipient was directed to respond to all items considering his or her experience co-teaching with the co-teaching partner who had already completed a survey (the recipient, just like the original participant, may be assigned to more than one co-teaching team in a given school year). In this way, the researcher was able to recruit both members of intact co-teaching teams if the new recipient completed the electronic survey.

Participants

Demographics of co-teachers. A total of 127 high school co-teachers responded to the electronic survey, providing data for 56 intact co-teaching dyads. All of the participants were current co-teachers at the high school level (grades 9–12). About 2% of the participants’ ages were between 20 and 25 years, 18% between 26 and 30 years, 17% between 31 and 35 years, 16% between 36 and 40 years, 16% between 41 and 45 years, 14% between 46 and 50 years, 7% between 51 and 55 years, and 9% 56 years and over. Approximately 74% of participants were female, and the majority of participants were Caucasian (81%). Other races with which participants identified included: African-American (5%), Asian-American (3%), Hispanic (2%), Middle Eastern (<1%), and 2% identified as multi-racial (refer to Table 1 for a summary of participants’ demographics). An additional 6% did not wish to respond to the item on racial identity. Table 1 displays demographic information for all co-teachers as well as disaggregated demographic information for general and special education co-teachers.

Table 1

Co-teacher Demographics

	All Co-teachers	General Education Co-teachers	Special Education Co-teachers
Gender			
Female	74%	74%	74%
Male	26%	26%	26%
Age			
20 - 25 years	2%	3%	0%
26 - 30 years	18%	15%	21%
31 - 35 years	17%	20%	15%

36 - 40 years	16%	20%	14%
41 - 45 years	16%	16%	17%
46 - 50 years	14%	15%	14%
51 - 55 years	7%	5%	8%
56 years and over	9%	5%	12%
Ethnicity			
African-American	5%	7%	3%
Asian-American	3%	3%	3%
Caucasian	81%	84%	79%
Hispanic	2%	0%	5%
Middle Eastern	<1%	2%	0%
Multiracial	2%	2%	3%
Did not Wish to Respond	6%	3%	8%

About 21% of the participants indicated that a bachelor's degree was their highest level of education. Disaggregated data revealed that about 16% of general education co-teachers held a bachelor's degree, compared to 29% for special education co-teachers. About 72% of participants indicated that a master's degree was their highest level of education. Disaggregated data revealed that about 79% of general education co-teachers held a master's degree, compared to 64% for special education co-teachers. However, a greater percentage of special education co-teachers (8%) attained education beyond a master's degree than general education co-teachers (5%).

Almost all of the participants were fully certified to teach (89%), while the remaining 11% were working toward full certification. Disaggregated data revealed that about 97% of general education co-teachers were fully certified to teach compared to

82% for special education co-teachers. About 3% of general education co-teachers and 18% of special education co-teachers, were working toward full certification. Similarly, most participants indicated that they were considered highly qualified in their given field per No Child Left Behind requirements (81%). About 90% of general education co-teachers reported as highly qualified, compared to 73% for special education co-teachers. About 2% of general education co-teachers and 21% of special education co-teachers reported as not highly qualified. About 8% of general education co-teachers and 6% of special education co-teachers indicated they were not sure of their highly qualified status.

About 17% of the participants were beginning teachers with between 1 and 3 years of teaching experience. Approximately 22% of the participants had 4 to 7 years of teaching experience, 19% had 8 to 12 years of teaching experience, 17% had 13 to 18 years of teaching experience, and 24% had over 18 years of teaching experience. Disaggregated data revealed that a larger percentage of special education co-teachers (26%) were beginning teachers with 1 to 3 years of teaching experience, compared to 8% of general education co-teachers. A larger percentage of special education co-teachers (43%) were veteran teachers with 13 years or more years of teaching experience, compared to 37% of general education co-teachers.

Data were also gathered regarding the number of years each participant had experience as a general or special education co-teacher. About 28% of the participants were beginning co-teachers within their first three years of co-teaching. Approximately 28% of the participants had 4 to 7 years of co-teaching experience, 24% of the participants had 8 to 12 years of co-teaching experience, 14% of the participants had 13

to 18 years of co-teaching experience, and 7% had over 18 years of co-teaching experience. Disaggregated data revealed that a similar percentage of general education co-teachers (26%) and special education co-teachers (29%) were beginning co-teachers with 1 to 3 years of experience co-teaching. However, a larger percentage of special education co-teachers (27%) were veteran co-teachers with 13 or more years of teaching experience, compared to 15% of general education co-teachers. Table 2 displays information on participating co-teachers' education and work experience.

Table 2

Co-teachers' Education and Experience

		All Co-teachers	General Education Co-teachers	Special Education Co-teachers
Highest Level of Education				
	Bachelor's Degree	21%	16%	29%
	Master's Degree	72%	79%	64%
	Beyond Master's Degree	6%	5%	8%
Certification				
	Fully Certified	89%	97%	82%
	Working Toward Certification	11%	3%	18%
Highly Qualified Status				
	Highly Qualified	81%	90%	73%
	Not Highly Qualified	12%	2%	21%
	Not Sure	7%	8%	6%
Years of Teaching Experience				

Years of Co-teaching Experience	1 to 3 years	17%	8%	26%
	4 to 7 years	22%	26%	18%
	8 to 12 years	19%	25%	14%
	13 to 18 years	17%	16%	17%
	over 18 years	24%	21%	26%
	No Response	2%	3%	0%
	1 to 3 years	28%	26%	29%
	4 to 7 years	28%	33%	23%
	8 to 12 years	24%	26%	21%
	13 to 18 years	14%	10%	18%
	over 18 years	7%	5%	9%

Demographics of the co-teaching dyads. NCLB (2002) identifies the following as core academic subjects: English, reading or language arts, mathematics, science, foreign languages, civics and government, economics, arts, history, and geography [Section 9101(11)]. The fifty-six intact co-teaching pairs from which data were collected represented the following core subject areas: English (25%), history (27%), mathematics (21%), and science (27%). All co-teaching pairs taught students with and without disabilities in their co-taught classes. The co-teachers were asked to report the disability categories students in their co-taught classes represented. All of the co-teaching pairs reported teaching students with learning disabilities in their co-taught classes. Approximately 95% of co-teaching pairs reported teaching students with emotional disabilities, 89% students with autism, 96% other health impairment, 86% speech or

language impairment. Another 20% reported teaching students with other disabilities including: vision impairment, hearing impairment, and physical disabilities. All co-teaching pairs reported teaching students from more than one disability category in their co-taught classes, and 79% reported teaching students from five different disability categories in their co-taught classes.

The fifty-six intact co-teaching pairs also represented all four grade levels (9-12), and in many cases co-teaching pairs taught students from more than one grade-level in their co-taught classes: 9th grade (50%); 10th grade (59%); 11th grade (64%) ; 12th grade (52%); more than one grade-level (63%). About 46% of the co-teaching pairs reported being in their first year of co-teaching together. About 27% of co-teaching pairs were in their second or third year co-teaching together, 17% in their fourth to seventh year together, and 10% had spent 8 or more years co-teaching together. Data were also gathered on the number of class periods co-teachers were assigned to co-teach together in the current school year. About 21% of the co-teaching pairs reported that they were assigned to co-teach together for only one period in the current school year. About 41% of the co-teaching pairs reported that they were assigned to co-teach together for two periods, 27% for three periods, and 5% for four periods. Only one co-teaching pair reported being assigned to co-teach together for five class periods during the current school year, and no co-teaching pairs reported being assigned to co-teach together from more than five class periods. Table 3 displays information on the intact co-teaching pairs that participated in the current study.

Table 3

Demographics of Co-teaching Dyads

	Percent of Co-teaching dyads
Years Co-teaching Together	
First year	46%
2 to 3 years	27%
4 to 7 years	17%
8 or more years	10%
Number of Class Periods Co-teaching Together	
1 class period	21%
2 class periods	41%
3 class periods	27%
4 class periods	5%
5 class periods	2%
Subjects Taught	
English	25%
History	27%
Math	21%
Science	27%
Grade-levels Taught	
9th grade	50%
10th grade	59%
11th grade	64%
12th grade	52%
Multiple Grade-levels	63%

Disability Categories
Taught

Autism	89%
Emotional Disabilities	95%
Learning Disabilities	100%
Other Health Impairment	96%
Speech or Language Impairment	86%
Other	20%

Demographics of the school districts. One hundred and nineteen of the 127 co-teacher participants (including 55 of the 56 intact co-teaching pairs) were recruited from eight schools in two school districts in the mid-Atlantic United States (hereafter referred to as School District 1 and School District 2). Demographic information for these two school districts was obtained from the school districts' websites. Eight participants (including one intact co-teaching pair) were recruited using the CEC message board (<http://community.cec.sped.org/home>), and represented four different schools and school districts. Demographic information for the four school districts represented by the participants recruited using the CEC message board was not obtained for the following reasons. In the case of one school district, the name given for the school district was not accurate, and in two other cases, complete demographic information was not publicly available. Demographic information for one of the four school districts represented by the participants recruited using the CEC message board was available, but is not reported

because only one co-teacher responded and data for an intact co-teaching pair were not acquired.

School District 1 represents a large suburban county in a large metropolitan area. The school district contains 22 high schools and three secondary schools (grades 7-12), not including alternative or special education high schools, which were not targeted in the current study because they do not offer co-taught classes taught by one general educator and one special educator. A total of 50,780 students are enrolled at the high school level in this school district, and 92.9% of high school students graduate in four years. Out of the total student population in this school district, 13.8% receive special education services, 17.2% receive English for speakers of other languages (ESOL) services, and 28.2% receive free or reduced-priced lunches. The racial composition of students in this school district is as follows: African American (10.2%); American Indian (0.3%); Asian American (19.4%), Hispanic (24.6%); Multiracial (5.0%); White (40.4%). Ninety co-teachers from six high schools in this school district participated in the current study.

School District 2 represents a large suburban/rural county on the outskirts of a large metropolitan area. The school district contains fifteen high schools that serve a total of 22,078 students, and 95.87% of high school students graduate in four years. Out of the total student population in this school district, 11.68% receive special education services, 12.82% receive services for English language learners (ELL), and 18.01% receive free or reduced-priced lunches. The racial composition of students in this school district is as follows: African American (6.73%); American Indian/Alaskan Native (< 1.0%); Asian (19.53%), Hispanic (16.74%); Multiracial (5.14%); Native

Hawaiian/Pacific Islander (< 1.0%); White (51.31%). Twenty-nine teachers from two high schools in this school district participated in the current study.

Table 4

Demographics of School Districts

	School District 1	School District 2
Number of Students Enrolled in High School	50,780	22,078
Number of High Schools in School District	25	15
Number of High Schools Participating in the Current Study	6	2
Percentage of Students Graduated in Four Years	92.90%	95.87%
Percentage of Students Receiving Special Education Services	13.80%	11.68%
Percentage of Students Receiving Services for English Language Learners	17.20%	12.82%
Percentage of Students Receiving Free or Reduced-priced Lunches	28.20%	18.01%
Student ethnicity		
African-American	10.20%	6.73%
American Indian	0.30%	<1.0%
Asian-American	19.40%	19.53%
Hispanic	24.60%	16.74%
Multiracial	5.00%	5.14%
White	40.40%	51.31%

Instruments

The three instruments used in the current study were: 1) Tschannen-Moran and Woolfolk Hoy's Teacher Sense of Efficacy Scale (2001); 2) Noonan et al.'s Co-Teacher Relationships Scale (2003); 3) and a co-teachers' active involvement in instruction scale adapted from Fennick and Liddy's (2001) perceptions of teachers' responsibilities subscale (all three scales are in Appendix C). Additionally, demographic items were used to obtain information such as: years of experience co-teaching, subject area, and personal information to describe the participants. Once participants agreed to participate in the research on the electronic Co-teacher Informed Consent Form (Appendix B), the participants were asked to respond first to the demographic items, and then to the scale on active involvement in instruction, teacher self-efficacy, and personal compatibility, in that order. After completing the personal compatibility scale, participants were asked to submit their responses electronically by clicking on "submit," at which point they concluded participation in the research. Each of the instruments is further described in the next sections.

Teacher Sense of Efficacy Scale (TSES). Tschannen-Moran and Woolfolk Hoy's (2001) Teacher Sense of Efficacy Scale (TSES; Appendix C) long-form was used to measure co-teachers' competency-based beliefs on the following factors: instruction, classroom management, and student engagement. The TSES was developed based on Bandura's unpublished teacher self-efficacy scale, but with an expanded list of teacher competencies (Tschannen-Moran & Woolfolk Hoy, 2001). The long form of the TSES consists of 24 items total, with 8 items representing each factor. An example of an item

is “How much can you do to adjust your lessons to the proper level for individual students?” All items are measured using a 9-point scale with the following anchors: 1 = nothing; 3 = very little; 5 = some influence; 7 = quite a bit; and 9 = a great deal.

In their original validation study, Tschannen-Moran and Woolfolk Hoy (2001) used principal-axis factoring with varimax rotation to extract three factors: instruction, classroom management, and student engagement. These three factors accounted for 54% of the variance in the long form. Initial validation of the TSES long form by Tschannen-Moran and Woolfolk Hoy yielded alpha reliabilities ranging from 0.87 to 0.91 for the three factors, and inter-correlations between the three factors ranged from .58 to .70. The moderate positive correlations between the three factors, as well as the high internal consistency of the items making up each factor, support treating instruction, classroom management, and student engagement as three independent factors that all measure the construct of TSE.

Klassen et al. (2009) examined the structural validity of Tschannen-Moran and Woolfolk Hoy’s (2001) Teachers’ Sense of Efficacy Scale (TSES) short form with a sample of 1,212 teachers from five different countries (Canada, Cyprus, Korea, Singapore, and the United States) teaching in elementary, middle, and secondary schools. Using multi-group confirmatory factor analysis, the researchers confirmed the three-factor structure of the TSES, and found evidence for measurement invariance across groups of teachers by country and by level (elementary, middle, and secondary school). Cronbach alpha reliability coefficients were provided for each of the three TSE factors (instruction, student engagement, and classroom management) for teachers in each

country and ranged from .71 to .94. Klassen et al. (2009) also examined the bivariate correlations between TSE (composite and individual factor scores) and job satisfaction for teachers in each country. Across the five countries TSE displayed a significant positive correlation with job satisfaction, with very little difference in the magnitude of the relationship across teachers in different countries. The researchers concluded that the three-factor TSES is an appropriate measure of TSE across teachers of various grade levels as well as use with teachers from internationally diverse geographic locations.

Fives and Buehl (2010) examined the factor structure of Tschannen-Moran and Woolfolk Hoy's (2001) TSES short and long forms with a sample of 270 preservice teachers and 102 practicing teachers teaching in elementary, middle, and secondary schools. Using exploratory factor analysis, the researchers found the three-factor structure of the TSES to be appropriate for practicing teachers, while a single-factor solution was most appropriate for preservice teachers. The researchers calculated the Cronbach alpha reliability using the practicing teachers' data for each of the three TSE factors (instruction, classroom management, and student engagement) on both the long and short form TSE, and the reliability ranged from .74 to .93. The researchers also compared the TSE of teachers at various levels of teaching experience (preservice, 1-2 years, 3-5 years, 6-10 years, more than 10 years), and across teaching level (elementary, middle, and high school). The results indicated that teachers with greater years of teaching experience reported higher TSE, and elementary teachers reported higher TSE than middle and high school teachers. Overall, the researchers concluded that the three-

factor TSES, both long and short form, is an appropriate measure of TSE for practicing teachers.

Ryan et al. (2015) also examined the factor structure of the TSES (long form), with an added factor measuring teachers' perceived efficacy for managing student peer relationships. The researchers conducted an exploratory factor analysis with data from 101 upper-elementary and middle school teachers (grades 5-7), which resulted in the extraction of four factors representing the three original TSES factors (instruction, classroom management, and student engagement) and the newly developed teacher self-efficacy for managing peer relationships factor. The researchers did drop one item, assisting families, from the student engagement factor due to weak factor loading and issues with cross-loading. Cronbach alpha reliability was calculated for all four extracted factors (instruction, student engagement, classroom management, and student relationships), and ranged from .87 to .93. Like the previous studies, Ryan et al. also compared the TSE of teachers across grade level (elementary and middle school), and found that elementary teachers reported higher TSE for classroom management and managing peer relationships than middle school teachers. The results of this study support the three-factor structure of the TSES (long form) as an appropriate measure of TSE.

Co-Teacher Relationship Scale (CRS). Personal compatibility was measured using Noonan et al.'s (2003) Co-Teacher Relationship Scale (CRS; Appendix C). To develop the scale, Noonan et al. generated 39 items representing professional or personal qualities associated with co-teaching, based on a review of the literature. The original 31

items were hypothesized to represent three categories: personality traits (e.g., listener, problem-solver, leader); beliefs and approaches (e.g., beliefs about how children learn, how to manage inappropriate behavior); and personal/professional characteristics (e.g., confidence as an educator, approaches to educational planning, ability to be supportive to colleagues and other staff). During pilot testing, the researchers subjected the 39 items to factor analysis, and results from the factor analysis supported the extraction of one strong factor containing 19 items. The 19 retained items from the one extracted factor included items originally categorized as representing beliefs and approaches to teaching and personal professional characteristics. No items from the personality traits category loaded strongly enough on the one extracted factor to be retained. The researchers reported an internal consistency reliability coefficient of .90 for the 19 items using pilot study data, but did not provide any information to describe the pilot study sample.

On the CRS, co-teachers respond to 19 statements by indicating the extent to which they believe they are the same or different from their co-teaching partner regarding beliefs and approaches to teaching (Part 1 = 10 items) and personal and professional characteristics (Part 2 = 9 items). On items representing Part 1 co-teachers are asked to report the extent to which they perceive themselves as the same or different from their co-teaching partner on beliefs regarding: what the curriculum for students should be, how to adapt and individualize activities, and teacher roles and responsibilities. On items representing Part 2 co-teachers are asked to report the extent to which they perceive themselves as the same or different from their co-teaching partner on personal and professional characteristics including: approaches to educational planning, flexibility in

dealing with unforeseen events, and ability to be supportive of colleagues and other staff. On all 19 items teachers responded using a 5-point scale ranging from 1 (extremely different) to 5 for (the same as my co-teacher).

In their original validation study, Noonan et al. (2003) compared responses on the CRS of 10 pairs of general and special education early childhood co-teachers to the responses that their supervisors reported on the CRS. Although some differences were found between the responses of the co-teachers and their supervisors, the researchers concluded that the scale was generally reliable based on an examination of the sources of error variance. Noonan et al. reported that the items themselves represented a small source of error (10% and 6% respectively for the two groups of respondents, co-teachers and supervisors). However, based on the limited sample size (20 co-teachers in ten co-teaching pairs and two supervisors), the researchers suggested viewing the results of the validation study as exploratory.

Two additional studies were identified that used the CRS to measure the similarity between co-teaching partners on beliefs and approaches to teaching and personal and professional characteristics (Cramer & Nevin, 2006; Malian & McRae, 2010). As part of a mixed methods study, Cramer and Nevin (2006) surveyed 46 co-teachers at the elementary, middle, and high school level using the CRS. The researchers reported descriptive statistics for individual items to identify beliefs or characteristics for which co-teachers reported higher and lower similarities. Open-ended interviews with a subset of co-teachers provided some explanation about these co-teachers' responses to certain survey items. However, no reliability information for the data generated by the CRS in

this study was reported. Similarly, Malian and McRae (2010) surveyed 290 co-teachers at the elementary, middle, and high school level using the CRS to compare responses of general and special education co-teachers. Again, results were described per item and no reliability information was provided.

For the current study, two sets of revisions were made to Noonan et al.'s (2003) CRS. First, three original items referred to “children” or “young children,” so these items were revised to refer instead to “students.” For example, the item “Beliefs about what the curriculum for young children should be” from the original scale was revised to read “Beliefs about what the curriculum for students should be.” Second, one original item used the term “inclusion” which was replaced with language specific to co-teaching. Table 5 shows all original items in Noonan et al.'s scale that were revised for use in the current study.

Table 5

Original and Revised Items from the Co-teacher Relationship Scale (CRS; Noonan et al., 2003)

Original Item	Revised Item
Views regarding how to structure children's activities	Views regarding how to structure students' activities
Beliefs about what the curriculum for young children should be	Beliefs about what the curriculum for students should be
Beliefs about how children learn	Beliefs about how students learn
Beliefs about inclusion	Beliefs about students with disabilities participating in co-taught classes

Note. Bolded phrases indicate content that was revised within items.

Perceptions of co-teachers' responsibilities subscale. Co-teachers' active involvement in instruction was measured using a revised version of Fennick and Liddy's (2001) perceptions of co-teachers' responsibilities subscale (Appendix C). The original subscale consisted of 29 items reflecting four categories of co-teaching tasks (planning, instruction, evaluation, and behavior management). Initial validation by Fennick and Liddy (2001) yielded alpha reliabilities ranging from .68 to .91 for the four categories of co-teacher tasks. On all 19 items teachers were asked to indicate which member of their co-teaching team was more responsible for particular co-teaching tasks using a 5-point scale (1 = special education responsibility; 2 = mostly special education responsibility; 3 = joint responsibility of special education and general education; 4 = mostly general education responsibility; 5 = general education responsibility).

Three types of revisions were made to Fennick and Liddy's (2001) perceptions of co-teachers' responsibilities subscale for use in the current study. First, three items were removed because the items did not pertain directly to delivering instruction in high school co-taught classes. The three items removed were:

- Suggest goals and objectives for the IEP
- Attend IEP meetings
- Instruct para-educators and interpreters

Next, two items from the original scale represented considerable overlap with each other because the items referred to working with behavior problems and monitoring

behavior, so they were reduced to a single item. The item “Monitor behavior of special education students” was removed and the item “Work with behavior problems of special education students” was retained. Additionally, the term “special education students” was changed to “students with disabilities” in agreement with the American Psychological Association’s (2010) recommendation to use person-first vocabulary.

Finally, two items focused on delivering individual instruction to students, but also stipulated that students be taken out of the class.

- Take special education students out for separate help
- Take any students needing help out of the class

These two items were revised so that the provision of individual instruction was retained, but the stipulation that help occur outside of the classroom was removed. Further the term “special education students” found in the first item was changed to “students with disabilities.” The terms “special education students” and “students with disabilities” are used interchangeably in the original scale. In the revised scale, the term “students with disabilities” was used exclusively based on the APA (2010) recommendation to use person-first vocabulary. A total of six items were revised to use the phrase “students with disabilities” in place of “special education students.” Similarly, one original item contained the term “collaborative class,” which was changed to “co-taught class.” Table 6 shows all revised items from Fennick and Liddy’s (2001) scale.

Table 6

Original and Revised Items for the Perceptions of Co-teachers’ Responsibilities Subscale (Fennick & Liddy, 2001)

Original Item	Revised Item
Take special education students out for separate help	Provide students with disabilities one-on-one instruction
Suggest goals & objectives for the IEP	Item Removed
Take any students needing help out of the class	Provide any students needing help one-on-one instruction
Adapt lessons, materials for special education students	Adapt lessons, materials for students with disabilities
Work with special education students in the collaborative class	Work with students with disabilities in the co-taught class
Monitor progress of students with disabilities	Item Retained without Revision
Know strengths and weaknesses of special education students	Know strengths and weaknesses of students with disabilities
Work with behavior problems of special education students	Work with behavior problems of students with disabilities
Attend IEP meetings	Item Removed
Work directly with students with disabilities for most of the class time	Item Retained without Revision
Instruct para-educators and interpreters	Item Removed

Finally, the original measurement scale from Fennick and Liddy's (2001) perceptions of co-teachers' responsibilities subscale was altered for use in the current study. Using Fennick and Liddy's 5-point scale, co-teachers indicated which type of co-teacher, general education or special education, is "responsible for" the co-teaching tasks identified in items. For the current study, the scale of measurement was changed to measure co-teachers' involvement in co-teaching tasks. In the revised scale, co-teachers

were asked to indicate how involved they are in co-teaching tasks using a 5-point scale ranging from 1 (not involved at all) to 5 (very involved).

Content validity of the revised active involvement in instruction scale. The revised active involvement in instruction scale was distributed to four professors who are experts in co-teaching and five doctoral students who were also engaged in co-teaching research for feedback concerning content validity. Four professors and three doctoral students from California, Florida, Pennsylvania, and Virginia agreed to serve as expert reviewers and provide content validity feedback. The four professors had experience both as K-12 co-teachers (2 special education co-teachers; 2 general and special education co-teachers) and co-teaching researchers (4 to 18+ years each). A total of seven expert reviewers (4 professors and 3 doctoral students) provided content validity feedback regarding the revised active involvement in instruction scale.

Expert reviewers were asked to provide information on each scale item in two ways. First, expert reviewers were asked to rate the relevance of each item to instruction in co-taught classes using a four-point scale (“not at all relevant” to “extremely relevant”). Second, expert reviewers were asked to provide any recommendations they had for revising each item. Expert reviewers were also asked to identify any additional items or instructional tasks that they believed needed to be added to the scale and any other general feedback to improve the scale.

A majority of reviewers (4 out of 7) rated the item “work directly with students for most of the class time” as “not at all relevant” or “somewhat relevant,” therefore this item was removed from the scale. Feedback from expert reviewers included three

general directives: 1) revise wording of items for consistency and to align with stem; 2) ensure parallel items exist for students with disabilities and students without disabilities; 3) operationalize ambiguous terms (e.g., “work with”). One item “work with students with disabilities in the co-taught class” was described as ambiguous, and the wording for this item was revised to reflect the specific task of implementing accommodations with students with disabilities, based on the recommendation of one of the experts. Additionally, a majority of reviewers (4 out of 7) recommended that communication with parents was a task relevant to co-teaching that should be added to the scale. Two items, one measuring communication with parents of students with disabilities and one measuring communication with parents of any student, were added to the scale. Table 7 shows all original and revised items, as well as items that were added or removed from the original scale.

Table 7

Original and Revised Items from the Active Involvement in Instruction Scale

Original Item	Revised Item
Provide students with disabilities one-on-one instruction	...providing one-on-one instruction to students with disabilities.

Provide any students needing help one-on-one instruction	...providing one-on-one instruction to any student.
Adapt lessons, materials for students with disabilities	...adapting lessons and/or materials for students with disabilities.
Work with students with disabilities in the co-taught class	...implementing accommodations for students with disabilities.
Monitor progress of students with disabilities	...monitoring the progress of students with disabilities.
Know strengths and weaknesses of students with disabilities	...acquiring information on the strengths areas of need of students with disabilities.
Work with behavior problems of students with disabilities	...implementing behavior management methods for students with disabilities.
Work directly with students with disabilities for most of the class time	Dropped Item (Not Relevant)
Review concepts with the class	...reviewing concepts with the class.
Conduct evaluation conferences for portfolios, projects	...conducting evaluation conferences for portfolios and/or projects.
Teach learning strategies and study skills to the class	...teaching learning strategies and study skills to the class.
Work with any student's behavior problems	...implementing behavior management methods for any students.
Select teaching methods	...selecting teaching methods.
Demonstrate hands-on techniques	...demonstrating hands-on techniques.
Establish procedures to evaluate student learning	...establishing procedures to evaluate student learning.
Organize cooperative learning groups	...organizing cooperative learning groups.

Set rules for student behavior	...setting rules and expectations for student behavior.
Lead class discussion	...leading whole-class discussion.
Select instructional technology for the class	...selecting instructional technology for the class.
Plan daily lessons	...planning daily lessons.
Present new content or conceptual lessons	...presenting new content or conceptual lessons.
Grade/evaluate all students	...grading/evaluating all students.
Assign work to all students	...assigning work to all students.
Plan the curriculum	...planning the curriculum (e.g., unit plans, semester plans).
Arrange the physical classroom environment	...arranging the physical classroom environment.
No Original Item (item added to parallel "adapting lessons and/or materials for students with disabilities")	...creating instructional materials.
No Original Item (item added to parallel "monitoring the progress of students with disabilities")	...monitoring the progress of all students.
No Original Item (item added to parallel "acquiring information on the strengths and areas of need of students with disabilities")	...acquiring information on the strengths and areas of need of all students.
No Original Item (item added per expert feedback)	...communicating with parents regarding the progress of students with disabilities.
No Original Item (item added per expert feedback)	...communicating with parents regarding the progress of any student.

Pilot testing of finalized active involvement in instruction scale. The finalized active involvement in instruction scale was pilot tested on a sample of 53 high school co-

teachers (27 special education co-teachers; 26 general education co-teachers) from eight different states across the United States. Approximately 70% of participants were female, and all but six participants were Caucasian (89%). Two participants identified as African-American, two as American Indian, and two as multi-racial. Three participants were between 20 and 25 years of age, four were between 26 and 30 years, nine between 31 and 35 years, ten between 36 and 40 years, eight between 41 and 45 years, four between 46 and 50 years, three between 51 and 55 years, and twelve over 56 years and over. Participants represented all high school grade levels (9-12) and a variety of subject areas (e.g., English, history, mathematics, science), with several participants teaching multiple grade-levels and subject areas. Similarly, participants reported teaching students who had different disability categories in their co-taught classes, including students with autism, learning disabilities, emotional behavioral disorder, other health impairment, and speech or language impairment.

About 17% of the participants indicated that a bachelor's degree was their highest level of education, 77% earned their master's degree, and 7% had achieved education beyond the master's degree. Almost all of the participants were fully certified to teach (89%), while the remaining 11% evenly split between participants who were working toward certification (5.5%) and those who were unsure (5.5%). Similarly, most participants indicated they were considered highly qualified in their given field per No Child Left Behind requirements (77%), while about 8% of participants reported they had not yet acquired highly qualified status, and 15% were unsure.

Participants were also asked about their years of experience teaching and co-teaching. About 11% of the participants were beginning teachers with between 1 and 3 years of teaching experience. Approximately 13% of the participants had 4 to 7 years of teaching experience, 25% had 8 to 12 years of teaching experience, 15% had 13 to 18 years of teaching experience, and 36% had over 18 years of teaching experience. Regarding years of experience co-teaching as a general or special education co-teacher, nearly half of the participants were beginning co-teachers (49%), within their first three years of co-teaching. Approximately 30% of the participants had 4 to 7 years of co-teaching experience, 9% of the participants had 8 to 12 years of co-teaching experience, 6% of the participants had 13 to 18 years of co-teaching experience, and 4% had over 18 years of co-teaching experience. One participant did not provide information for years of co-teaching experience.

Data obtained from the pilot sample using the finalized active involvement in instruction scale was used to obtain evidence of reliability. The internal consistency reliability for all 29 items was strong with a Cronbach alpha reliability of $\alpha = .95$. Although the sample size was not sufficient, the data were also subjected to exploratory factor analysis. Results from principle-axis factoring with promax rotation suggested a two-factor solution, which accounted for 64.077% of the variance in the data. The two factors could be easily interpreted as representing whole-group activities and individual/small group activities, respectively. The internal consistency reliabilities for the two factors was strong (whole group: $\alpha = .96$; individual/small group: $\alpha = .92$). One potentially problematic item was identified (“...conducting evaluation conferences for

portfolios and/or projects.”) based on factor loading (.371) and extraction communality (.291). However, based on the small sample size, removal of the item based on the pilot study results was not justified. Similarly, identifying the scale as comprised of two factors, neither of which had been identified in Fennick and Liddy’s (2001) original study, was not justified based on the small size of the pilot sample.

Analysis Plan

The current study employed three different sets of analyses to answer the research questions guiding the study. To answer Research Question 1, independent samples t-tests were conducted to determine whether a significant difference existed between general and special education co-teachers on TSE, personal compatibility, and active involvement in instruction. To answer Research Question 2a., two sets of Actor-Partner Interdependence Models (APIM) were tested to determine whether TSE and personal compatibility were able to predict general and special education co-teachers’ active involvement in instruction. Finally, to answer Research Question 2b., an Actor-Partner Interdependence Model with Moderation (APIMoM) was tested to determine whether personal compatibility moderated the relationship between TSE and active involvement in instruction for general and special education co-teachers.

Correlational research. To answer Research Question 2a. and Research Question 2b., the current study employed a correlational research design to examine the relationship among three variables: TSE, personal compatibility, and active involvement in instruction. Teacher self-efficacy was defined as teachers’ beliefs about their own ability to deliver instruction to their students, including students considered difficult to

teach (Bandura, 1997; Tschannen-Moran, & Woolfolk Hoy, 2001). Personal compatibility was defined as how similar co-teachers perceive themselves to be with their co-teaching partners regarding beliefs and approaches to teaching as well as on personal characteristics (Dieker, 2001; McCormick et al., 2001; Noonan et al., 2003; Pratt, 2014; Rice & Zigmond, 2000). Active involvement in instruction was defined as how involved general and special education co-teachers are in specific co-teaching tasks including: planning lessons, delivering instruction, evaluating student learning, making modifications, and implementing behavior management methods (Fennick & Liddy, 2001; Hang & Rabren, 2009).

Power for determining sample size. A power analysis was conducted prior to data collection and was based on an initial goal of 50 dyads. A power analysis algorithm specific to the APIM with distinguishable dyads approach is still in development. However, as the basis for APIM is regression, G-Power was used to provide an estimate of power using dyad as the unit of analysis, and Cohen's (1988) recommended conventions for effect sizes. With a sample size of 50 dyads, assuming an alpha level of .05, the power of the regression F-test to detect significance for one predictor (TSE or personal compatibility) is approximately 86% in the presence of a medium effect size and 95% in the presence of a large effect.

When determining the power needed to detect the significance of an interaction term, which would indicate the presence of a moderator, issues of reliability in measurement become increasingly impactful (Cohen, Cohen, West, & Aiken, 2003; Whisman & McClelland, 2005). The reliability of the interaction term is equal to the

product of the reliabilities for each of the terms making up the interaction term. For example, the reliability for the interaction term used to measure the moderating effect of personal compatibility on the relationship between TSE and the dependent variable (active involvement in instruction), would be equal to the reliability for TSE multiplied by the reliability for personal compatibility. Neither TSE nor personal compatibility was measured without error, and when individual predictor variables are less than perfectly reliable, the reliability of the interaction term is even more greatly diminished. The implication of the diminished reliability of the interaction term is a decrease in power and the need for a larger sample size to detect significant interactions. Aiken, West, and Reno (1991) report that the sample size needed to achieve power of .80 at $\alpha = .05$ is about double when reliabilities drop from 1.0 to .80 and about triple when reliabilities drop from 1.0 to .70. Even larger sample sizes are needed to detect an interaction when the variables included in the interaction are themselves significantly related to the dependent variable.

Overall Aiken et al. (1991) report that a sample size of more than 200 participants may be needed to detect interactions with medium effect sizes when measures have reliabilities of .70, and a sample size of more than 1,000 participants may be needed to detect interactions with small effect sizes. Based on the reliabilities of the measures in the current study, and based on the significant zero-order correlations between the predictor variables (TSE and personal compatibility) and the dependent variable (active involvement in instruction) it is likely that upwards of 100 dyads would have been needed to detect an interaction with a medium effect size in the current study.

Recruitment for the current study occurred across a 6-week period, within which data were collected from 56 intact co-teaching pairs. At the end of the 6-week period data collection was suspended so that data analysis could proceed in a timely fashion.

Although data from a greater number of co-teaching pairs was desired, the time allotted for data collection could not be extended for additional recruitment.

Dyadic data. Data were collected from co-teachers working together in co-teaching teams who responded individually to an electronic survey. Because co-teachers working together in a co-teaching team may have an influence on one another, their responses on the constructs of interest (TSE, personal compatibility, and active involvement in instruction) cannot be viewed as independent. The non-independence of the co-teachers' data requires dyadic analysis, a technique that accounts for the influence that each member of the co-teaching team, or dyad, has on the responses of the other. Kenny, Kashy, and Cook (2006) explain, "If the two scores from the two members of the dyad are nonindependent, then those two scores are more similar to (or different from) one another than are two scores from two people who are not members of the same dyad" (p. 4).

There are three types of variables that can be included in dyadic analyses. The first type of variable is referred to as a between-dyads variable. When responses are identical within the dyad, but vary from one dyad to the next, the variable is a between-dyads variable. An example of a between-dyad variable is the type of content (English, math, history, science) that co-teachers in a co-teaching team are responsible for delivering to their students. The type of content would be the same for co-teachers in the

same co-teaching team (e.g., math) while other co-teaching teams in the sample may be responsible for delivering different content (e.g., history). The second type of variable is referred to as a within-dyads variable. When responses differ between the two members in the dyad, but averaged together produce the same score as all other dyads, the variable is a within-dyads variable. Co-teacher type (general education versus special education) is a within-dyads variable, because all co-teaching teams in the current study are comprised of one general education co-teacher and one special education co-teacher. Finally, the third type of variable is referred to as a mixed variable. When responses vary both within and between dyads, the variable is a mixed variable. The variables of interest in the current study (TSE, personal compatibility, and active involvement in instruction) are mixed variables because scores may be different between co-teachers in a co-teaching team (within-dyad) as well as between the co-teaching teams. For example, individual co-teachers may have high or low TSE scores which may be different from the TSE scores of their co-teaching partner, and co-teaching teams may have higher or lower average TSE scores than other dyads in the sample.

One other basic feature of dyadic data is whether members of the dyad can be distinguished from each other in a meaningful way given the purpose of the research. In marriage and family therapy, where use of dyadic data analysis techniques are more common (Wittenborn, Dolbin-MacNab, & Keiley, 2013), an example of a distinguishable dyad would be heterosexual married couples. In that research, all dyads would have one member that is a male and one that is a female, and gender would be a meaningful variable on which the dyad members could be distinguished. If a dyad contains members

that can be distinguished from one another on a trait that is meaningful given the nature of the study, then the dyad is considered a distinguishable dyad. In co-teaching, each co-teaching team is made up of one general education co-teacher and one special-education co-teacher, and in the current study, co-teacher type (general education versus special education) is a meaningful variable on which to distinguish the co-teachers in each co-teaching team (dyad).

Indistinguishable dyads are dyads for which a meaningful distinction between members cannot be made. For example, if students in a classroom were assigned to work in pairs, there may not be any particular variable on which the members in all pairs (dyads) could be distinguished in a meaningful way. In the example of student pairs, assuming that the students are not assigned to different roles within the pair, or that the pairs were not purposefully put together to represent different groupings of students (e.g., all groups have one male and one female, or all groups have one older student and one younger student), then the student pairs would represent indistinguishable dyads. Distinguishable and non-distinguishable dyads require different methods for analyzing data. In the current study, the co-teaching teams were considered distinguishable dyads based on co-teacher type (general education versus special education).

Actor-Partner Interdependence Models (APIM). The current study examined the relationship among TSE, personal compatibility, and active involvement in instruction for general and special education co-teachers who work together within co-teaching teams (dyads). Specifically, the current study examined whether TSE and personal compatibility predict co-teachers' active involvement in instruction. Due to the

interdependent nature of co-teachers' dyadic relationships, one co-teacher's score on the outcome variable (active involvement in instruction) may be influenced by that same co-teacher's score on predictor variables (TSE, personal compatibility) as well as the score of his or her co-teaching partner on those same variables. The Actor-Partner Interdependence Model (APIM) is a dyadic data analysis technique that accounts for how each member of a dyad's scores on the same predictor variables influence both members' scores on the outcome variable (Garcia, Kenny, & Ledermann, 2015; Kenny et al., 2006). The effect that an individual's score on a predictor variable has on that same person's score on the outcome variable is called an actor effect. The effect that an individual's score on a predictor variable has on the other member of the dyad's score on the outcome variable is called a partner effect. Garcia et al. (2015) explains actor and partner effects stating, "The effect of a person's own *X* on his or her own *Y* is referred to as the *actor effect* and the effect of the partner's *X* on the other person's *Y* is referred to as the *partner effect*" (p. 8).

In the current study, the various APIM models that were tested were what Kenny et al. (2006) define as "actor-oriented models." In an actor-oriented model, it is expected that participants' outcomes are predicted primarily by their own characteristics (actor effects), and the inclusion of partner effects allows the researcher to obtain unbiased estimates for the actor effects by modeling any non-independence in the data. For example, it is expected that a co-teacher's active involvement in instruction is predicted more by his or her own TSE than the TSE of his or her co-teaching partner. However, given the interdependent nature of the dyadic relationship, a co-teacher's active

involvement in instruction may indeed be impacted by the TSE of his or her co-teaching partner. Therefore, in the current study, APIM was used to model both the actor and partner effects of TSE and personal compatibility for the ability to predict general and special education co-teachers' active involvement in instruction.

An extension of APIM, referred to as Actor-Partner Interdependence Moderation Modeling (APIMoM), is designed to model the moderation of actor and partner effects by a mixed moderator variable. In the current study, APIMoM was used to test whether general and special education co-teachers' personal compatibility moderated the relationship between TSE and active involvement in instruction, and whether the moderating effect of personal compatibility was significantly different between general and special education co-teachers. Both APIM and APIMoM were estimated using a multi-level modeling approach, which is discussed in greater detail later in this chapter.

APIMs for Research Question 2a. Two Actor-Partner Interdependence Models (APIM) were tested using SPSS mixed models analysis and Kenny et al.'s (2006) interaction approach. In the interaction approach, the effect of the distinguishing variable, which in the current study is co-teacher type, is modeled using an effect-coded variable. Modeling co-teacher type using a variable effect-coded as “-1” for general education co-teachers and “1” for special education co-teachers creates regression coefficients that can be interpreted as average effects for all co-teachers. The first interaction-approach APIM examined the relationship between TSE and active involvement in instruction and whether that relationship is different for general education co-teachers versus special education co-teachers. The second interaction-approach APIM model examined the

relationship between personal compatibility and active involvement in instruction and whether that relationship is different for general education co-teachers versus special education co-teachers.

Each of the two interaction-approach APIMs were followed up by an additional APIM using the two-intercept approach (Kenny et al., 2006; Kenny & Kashy, 2010; Raudenbush, Brennan, & Barnett, 1995). In the two-intercept approach, the effect of the distinguishing variable is modeled using two dummy coded variables, one for each type of dyad member. This approach essentially disaggregates results, and in the current study provided estimates of the actor and partner effects for general education co-teachers and special education co-teachers, separately. The first two-intercept APIM model provided estimates of TSE actor and partner effects on active involvement in instruction for general education co-teachers and special education co-teachers, separately. The second two-intercept APIM model provided estimates of personal compatibility actor and partner effects on active involvement in instruction for general education co-teachers and special education co-teachers, separately.

To summarize, two APIM approaches were used to examine the relationship of TSE and personal compatibility with active involvement in instruction. APIM analysis with the interaction approach was used to obtain estimates of actor and partner effects for all co-teachers, and APIM analysis with the two-intercept approach was used to obtain estimates of actor and partner effects for general education co-teachers and special education co-teachers, separately. It is important to note that the interaction approach and the two-intercept approach are statistically identical, but by representing the

distinguishing variable using different coding methods (effect codes versus dummy codes) the two approaches facilitate making different types of interpretations based on the data (Kenny et al., 2006).

APIMoM for Research Question 2b. One interaction-approach Actor-Partner Interdependence Model with moderation (APIMoM) was tested using SPSS mixture modeling to determine whether personal compatibility moderates the relationship between TSE and active involvement in instruction, and whether the moderating effect of personal compatibility is different for general education co-teachers versus special education co-teachers. The interaction-approach APIMoM was followed up by a two-intercept APIMoM that allowed for separate examination of the moderating effect of personal compatibility for general education co-teachers and special education co-teachers. Although the APIMoM models included several actor and partner effects, it is worth repeating that in the current study, all models were considered to be actor-oriented models. Therefore, in the APIMoM models it is the actor's personal compatibility moderating the relationship between the actor's TSE and active involvement in instruction that is of interest.

Chapter Four

This chapter provides information on preliminary analyses, group mean comparisons, and results from dyadic data analysis from the current study. Information from preliminary analyses includes: the treatment of missing data, reliability information for all three scales, identification and treatment of univariate and multivariate outliers and normality, and descriptive statistics. To answer Research Question 1, group mean comparisons of teacher self-efficacy (TSE), personal compatibility, and active involvement in instruction for general and special education co-teachers were made using independent-samples t tests. Research Question 2a. and Research Question 2b. were addressed using dyadic data analysis. Non-independence in general and special education co-teachers' scores on each variable were determined by Pearson product-moment correlation (Kenny et al., 2006). The Actor–Partner Interdependence Model (APIM; Kenny et al., 2006) was used to test whether TSE and personal compatibility were able to predict general and special education co-teachers' active involvement in instruction while accounting for the dyadic nature of the data (non-independence). Similarly, The Actor–Partner Interdependence Model with Moderation (APIMoM; Kenny et al., 2006) was used to test the moderating effect of personal compatibility on the relationship between TSE and active involvement in instruction while accounting for non-independence in the data. All analyses were performed using SPSS version 23.0, and $\alpha = .05$ was required to indicate statistical significance.

Missing Data

A total of 129 participants responded to the electronic survey. Two participants indicated that they had not been a high school general or special education co-teacher during the 2015-2016 school year, and thus the electronic survey software, by design, terminated their participation and submitted their survey without obtaining responses. Altogether, 61 general education co-teachers and 66 special education co-teachers responded to the electronic survey. The 127 co-teachers who completed the electronic survey represented 56 intact co-teaching dyads.

Responses from 127 co-teachers on the Co-Teacher Relationship Scale (CRS; Noonan et al., 2003), the finalized version of Fennick and Liddy's (2001) perceptions of co-teachers' responsibilities subscale, and the Teacher Sense of Efficacy Scale (TSES) long-form (Tschannen-Moran & Woolfolk Hoy, 2001) were examined for missing values. No single item on any scale had more than five missing values (3.9%), and the total amount of missing values on any of the three scales did not exceed 2.4%.

On the finalized version of Fennick and Liddy's (2001) perceptions of co-teachers' responsibilities subscale, which consisted of 29 total items, one participant had four missing values (13.8%), and one participant had three missing values (10.3%). An additional 15 participants had only one missing value, and 110 of the 127 total participants (86.6%) had no missing values at all. On the TSES (Tschannen-Moran & Woolfolk Hoy, 2001) scale, two participants provided no responses at all and were removed from all analyses involving the teacher self-efficacy variable through listwise deletion. Ten additional participants had only one missing value on the TSES scale, and 115 of the 127 total participants (90.6%) had no missing values at all. The TSES scale

consisted of 24 total items. On the CRS (Noonan et al., 2003) scale, one participant provided no responses at all, and was removed from all analyses involving the personal compatibility variable through listwise deletion. On the 19 total items making up the CRS scale, one participant had four missing values (21.1%), and two participants had two missing values (10.5%). One additional participant had only one missing value, and 122 of the 127 total participants (96.1%) had no missing values at all on the CRS scale. Aggregate scores were calculated for all three variables (TSE, personal compatibility, and active involvement in instruction) by averaging item scores obtained using the aforementioned scales. Except in cases where participants were removed from analysis (listwise deletion) for providing no responses on a given scale, missing values were ignored and aggregate scores were calculated using only the items to which participants had responded.

In summary, 125 participants had scores for TSE that could be included in analyses, 126 participants had scores for personal compatibility, and 127 participants had scores for active involvement in instruction. Out of the 127 total participants who responded to the electronic survey, two participants were removed from analyses involving TSE using listwise deletion, and one participant was removed from analyses involving personal compatibility using listwise deletion. All analyses involving TSE used a sample of 125 participants. All that did not involve TSE, but did involve personal compatibility used a sample of 126 participants. All analysis that involved only active involvement in instruction (e.g., descriptive statistics, independent samples t-test) used a sample of 127 participants.

Scale Reliability

Active involvement in instruction. Data obtained from the responses of all 127 participants to the finalized version of Fennick and Liddy's (2001) perceptions of co-teachers' responsibilities subscale were used to obtain reliability information regarding the measurement of active involvement in instruction. The internal consistency reliability for all 29 items was strong with a Cronbach alpha reliability of $\alpha = .94$. The data were also subjected to exploratory factor analysis (EFA). Results from principle-axis factoring with Promax rotation suggested a two-factor solution, which accounted for 61.464% of the variance in the data, based on interpretation of the scree plot. The two factors could be interpreted as representing whole-group activities and individual/small group activities, as was the case in the pilot study analysis. The internal consistency reliabilities for the two factors were strong (whole group: $\alpha = .96$; individual/small group: $\alpha = .88$). Four potentially problematic items were identified based on low extraction communalities, weak factor loadings, and/or evidence of cross-loading on more than one factor. The communalities and factor loadings for all items included in the scale used to measure active involvement in instruction are displayed in Table 8.

Table 8

Communalities and Factor Loadings

	Communalities	Factor loadings
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Item	Initial	Extraction	Factor 1	Factor 2
...presenting new content or conceptual lessons.	0.930	0.885	0.937	0.112
...planning daily lessons.	0.954	0.873	0.931	0.124
...assigning work to all students.	0.919	0.857	0.924	0.141
...leading whole-class discussion.	0.938	0.858	0.921	0.103
...planning the curriculum (e.g., unit plans, semester plans).	0.908	0.843	0.914	0.108
...creating instructional materials.	0.861	0.793	0.887	0.110
...reviewing concepts with the class.	0.897	0.77	0.877	0.201
...selecting teaching methods.	0.906	0.721	0.848	0.128
...selecting instructional technology for the class.	0.840	0.718	0.846	0.137
...establishing procedures to evaluate student learning.	0.865	0.717	0.846	0.216
...setting rules and expectations for student behavior.	0.783	0.597	0.768	0.245
...demonstrating hands-on techniques.	0.772	0.553	0.744	0.153
...grading/evaluating all students.	0.744	0.54	0.733	0.206
...teaching learning strategies and study skills to the class.	0.757	0.491	0.690	0.262
...arranging the physical classroom environment.	0.708	0.369	0.606	0.085
...organizing cooperative learning groups.	0.667	0.435	0.558	0.462
...communicating with parents regarding the progress of any student.	0.647	0.291	0.539	0.146
...monitoring the progress of all students.	0.621	0.260	0.503	0.187
...acquiring information on the strengths and areas of need of all students.	0.790	0.520	0.458	0.641
...implementing behavior management methods for any students.	0.779	0.473	0.446	0.606

...providing one-on-one instruction to any student.	0.782	0.526	0.403	0.675
...conducting evaluation conferences for portfolios and/or projects.	0.600	0.257	0.401	0.389
...adapting lessons and /or materials for students with disabilities.	0.633	0.466	0.319	0.657
...providing one-on-one instruction to students with disabilities.	0.733	0.540	0.211	0.732
...implementing behavior management methods for students with disabilities.	0.847	0.629	0.150	0.793
...acquiring information on the strengths and areas of need of students with disabilities.	0.715	0.472	0.064	0.682
...implementing accommodations for students with disabilities.	0.811	0.796	-0.048	0.861
...monitoring the progress of students with disabilities.	0.628	0.403	-0.060	0.605
...communicating with parents regarding the progress of students with disabilities.	0.575	0.415	-0.134	0.588

Note. Factor loadings > .50 are in boldface.

Although the EFA results suggested extraction of two factors, a two-factor solution had not been proposed in Fennick and Liddy's (2001) original study, nor in subsequent studies using the scale (Cramer & Nevin, 2006; Malian & McRae, 2010). Fennick and Liddy (2001) described their 29 co-teaching tasks as representing four subscales: planning, instruction, evaluation, and classroom management. However, neither of the two factors identified in the current study could be interpreted as representing any of Fennick and Liddy's (2001) four subscales. Therefore, the results

from exploratory factor analysis in the current study did not provide evidence that the data obtained in the current study on co-teachers' active involvement in instruction represented four factors.

Both in previous research (Cramer & Nevin, 2006; Fennick & Liddy, 2001; Malian & McRae, 2010) and in the content validity process in the current study, the goal for this scale was to capture the tasks relevant to co-teaching. Cramer and Nevin (2006) and Malian and McRae (2010) focused exclusively on item-level analyses and did not calculate subscale scores. Results were reported and discussed as if all items represented tasks relevant to co-teaching, and the data obtained was not considered as representing a multi-factor structure for co-teaching tasks. Therefore, based on the strong internal consistency reliability for all 29 items ($\alpha = .94$), and the expectation that the items on this scale represent an operational definition of a singular construct (active involvement in instruction for co-teachers), a single-factor solution was adopted for the current study. Scores for all 29 individual items were averaged to produce a single composite score to represent co-teachers' active involvement in instruction.

Teacher self-efficacy. Data obtained from the responses of 125 participants to Tschannen-Moran and Woolfolk Hoy's (2001) Teacher Sense of Efficacy Scale (TSES) long-form were used to obtain reliability information regarding the measurement of teacher self-efficacy. The three-factor structure of the TSES (instruction, classroom management, and student engagement) has been validated by previous research (Fives & Buehl, 2010; Klassen et al., 2009; Ryan et al., 2015; Tschannen-Moran & Woolfolk Hoy, 2001), so reliability testing in the current study was confined to the internal consistency

of each factor and the internal consistency of the scale as a whole, as measured by Cronbach alpha. The internal consistency reliability for each of the three subscales (instruction, classroom management, and student engagement) was strong with Cronbach alpha reliabilities ranging from .88 to .92. The reliability of all 24 items was strong with a Cronbach alpha reliability of .95. A total scale score for overall teacher self-efficacy (TSE) was calculated by first averaging the scores of the 8 items within each subscale to produce separate subscale scores, and then averaging the three subscale scores to achieve a single composite score to represent overall TSE.

Personal compatibility. Data obtained from the responses of 126 participants to the Co-Teacher Relationship Scale (CRS; Noonan et al., 2003) were used to obtain reliability information regarding the measurement of personal compatibility. Based on reliability information provided in the initial validation study (Noonan et al., 2003), and the use of the scale in subsequent studies (Cramer & Nevin, 2006; Malian & McRae, 2010), the CRS was treated as a unidimensional scale, and reliability testing was confined to the internal consistency of the scale as a whole, as measured by Cronbach alpha. The internal consistency reliability for all 19 items was strong, achieving a Cronbach alpha reliability of .95. Scores for all 19 individual items on the CRS were averaged to produce a single composite score to represent personal compatibility.

Outliers

Univariate outliers for the TSE, personal compatibility, and active involvement in instruction composite scores were identified based on the $|z\text{-score}| > 3.29$ criterion (Tabachnick & Fidell, 2014). One case was identified as a univariate outlier for active

involvement in instruction ($z = -3.32$), one case for TSE ($z = -3.89$), and one case for personal compatibility ($z = -3.84$). The next closest score to the case identified as univariate outlier for TSE was 1.2 standard deviations higher, and the next closest score to the case identified as univariate outlier for personal compatibility was .76 standard deviations higher. One score was close to the case identified as univariate outlier for active involvement in instruction (.06 standard deviations higher), but the next score after that was .86 standard deviations higher. Therefore, all three univariate outliers represented scores that were very different than the other scores on each respective variable. However, all scores represented values within the scale of measurement and reasonable responses, so no scores were removed from analysis for being univariate outliers.

Multivariate outliers were considered using Mahalanobis distance (Stevens, 1984) created by regressing all three variables (TSE, personal compatibility, and active involvement in instruction) on a dependent variable populated with scores assigned using a random number generator. Participants who achieved a Mahalanobis distance score greater than the chi-square critical value for alpha level .001 were considered multivariate outliers (Tabachnick & Fidell, 2014). Three cases (Mahalanobis distance: 19.06; 16.05; 14.79) achieved a Mahalanobis distance value greater than the chi-square critical value of 13.816 ($df = 2$; $\alpha = .001$). Although these three cases represented very unique combinations of scores on the three variables of interest (TSE, personal compatibility, and active involvement in instruction), and in two cases contained scores that represented univariate outliers, no cases were removed from analysis. The choice to refrain from

removing multivariate outliers was based on the effect that removing an outlier had on the remaining cases. Removal of one of the multivariate outlier cases would generate additional outlier cases that had not originally met the criterion for identification as multivariate outliers, and because the Mahalanobis distance values of the outliers were somewhat close to the chi-square critical value, the choice was made to remove no cases.

Univariate and Bivariate Normality

Both mean comparison and regression-based analyses assume that variables are normally distributed, and regression assumes that bivariate relationships are linear. Univariate normality for the TSE, personal compatibility, and active involvement in instruction composite scores was examined through visual inspection of histograms. All three variables exhibited a negative skew, with the negative skew for personal compatibility (skewness = -1.346, SE = 0.217) and active involvement in instruction (skewness = -1.077, SE = 0.217) quite pronounced. The negative skew reflects that most co-teachers scored themselves high on TSE, personal compatibility, and active involvement in instruction. When univariate normality was examined separately for general education co-teachers and special education co-teachers, the responses of special education co-teachers on active involvement in instruction (skewness = -0.527, SE = 0.586) were somewhat normal, while the responses of general education co-teachers (skewness = -1.870, SE = 0.309) exhibited a strong negative skew. The skewness and kurtosis statistics for general and special education co-teachers on each variable are identified in Table 9.

Table 9

Univariate Normality

	skewness		kurtosis	
	statistic	standard error	statistic	standard error
All Co-teachers				
TSE	-0.671	0.217	0.663	0.430
personal compatibility	-1.346	0.217	1.11	0.430
active involvement in instruction	-1.077	0.217	1.598	0.430
General education co-teachers				
TSE	-0.931	0.309	1.864	0.608
personal compatibility	-1.276	0.309	0.944	0.608
active involvement in instruction	-1.870	0.309	4.547	0.608
Special education co-teachers				
TSE	-0.419	0.297	-0.311	0.586
personal compatibility	-1.448	0.297	0.226	0.586
active involvement in instruction	-0.527	0.297	2.539	0.586

Bivariate relationships between each of the independent variables (TSE and personal compatibility) and the dependent variable (active involvement in instruction) were checked using visual inspection of scatterplots. None of the bivariate relationships showed signs of a non-linear relationship. Because independent-samples t-tests for group comparisons assume equal variances between groups, Levene's test for equality of variances was run for general and special education co-teachers on each of the three variables. In the comparison of general and special education co-teachers' active involvement in instruction, Levene's test for equality of variances was found to be violated ($F(1,125) = 18.310, p < .001$), therefore results not assuming homogeneity of variance were reported in the current study. In the comparisons of general and special education co-teachers' TSE ($F(1,123) = 0.880, p = .350$) and personal compatibility

($F(1,124) = 0.044, p = .833$), Levene's test for equality of variances was not violated, therefore results assuming equal variances were reported for these two variables.

Descriptive Statistics

Mean scores and standard deviations were calculated for personal compatibility and active involvement in instruction composite scores and for the composite scores and three subscale scores for TSE (results displayed in Table 10). Personal compatibility was measured on a 5-point scale ranging from 1 (extremely different from my co-teacher) to 5 (the same as my co-teacher). The mean score for all co-teachers on the personal compatibility ($M = 4.51; SD = 0.56$) indicates that, on average, co-teachers reported being very similar to their co-teaching partners on beliefs and approaches to teaching and personal and professional characteristics. When descriptive statistics were calculated separately for general education co-teachers ($M = 4.50; SD = 0.57$) and special education co-teachers ($M = 4.51; SD = 0.55$), both groups of co-teachers reported high levels of personal compatibility.

Active involvement in instruction was measured on a 5-point scale ranging from 1 (not involved at all) to 5 (very involved). The mean score for all co-teachers on active involvement in instruction ($M = 4.41; SD = 0.56$) indicates that, on average, co-teachers reported high involvement in co-teaching tasks. When descriptive statistics were calculated separately for general education co-teachers ($M = 4.62; SD = 0.39$) and special education co-teachers ($M = 4.21; SD = 0.62$), general education co-teachers reported being closer to "very involved" in co-teaching tasks, while special education co-teachers reported being a less than "very involved" in co-teaching tasks.

Finally, TSE was measured on a 9-point with anchors at: 1 (nothing), 3 (very little), 5 (some influence), 7 (quite a bit), and 9 (a great deal). The mean score for all co-teachers on overall TSE ($M = 7.63$; $SD = 0.84$) indicates that, on average, co-teachers were confident in their ability to instruct students, reporting being able to do between “quite a bit” and “a great deal” in instruction ($M = 7.70$; $SD = 0.89$), classroom management ($M = 7.91$; $SD = 0.94$), and student engagement ($M = 7.27$; $SD = 0.96$). Descriptive statistics calculated separately for general education co-teachers ($M = 7.69$; $SD = 0.90$) and special education co-teachers ($M = 7.57$; $SD = 0.78$) revealed that both groups of co-teachers reported high levels of confidence in their ability to instruct students. General education co-teachers reported being able to do between “quite a bit” and “a great deal” in instruction ($M = 7.81$; $SD = 0.93$), classroom management ($M = 7.94$; $SD = 0.98$), and student engagement ($M = 7.31$; $SD = 1.02$). Similarly, special education co-teachers reported being able to do between “quite a bit” and “a great deal” in instruction ($M = 7.61$; $SD = 0.84$), classroom management ($M = 7.88$; $SD = 0.90$), and student engagement ($M = 7.23$; $SD = 0.90$).

Table 10

Descriptive Statistics

	All Co-teachers		General Education Co-teachers		Special Education Co-teachers	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Active Involvement in Instruction	4.41	0.56	4.62	0.39	4.21	0.62
Personal Compatibility	4.51	0.56	4.50	0.57	4.51	0.55
Teacher Self-efficacy (overall)	7.63	0.84	7.69	0.90	7.57	0.78
Teacher Self-efficacy (Instruction)	7.70	0.89	7.81	0.93	7.61	0.84
Teacher Self-efficacy (Classroom Management)	7.91	0.94	7.94	0.98	7.88	0.90
Teacher Self-efficacy (Student Engagement)	7.27	0.96	7.31	1.02	7.23	0.90

Bivariate correlations were calculated among all three variables (TSE, personal compatibility, and active involvement in instruction) for all co-teachers, and then for general education co-teachers and special education co-teachers separately (results displayed in Table 11). All co-teachers' TSE ($r = .235, p = .008$) and personal compatibility ($r = .198, p = .026$) scores achieved significant positive correlations with scores on active involvement in instruction. When bivariate correlations were calculated for general education co-teachers and special education co-teachers separately, both TSE ($r = .385, p = .003$) and personal compatibility ($r = .275, p = .032$) scores achieved significant positive correlations with scores on active involvement in instruction for general education co-teachers, but neither TSE ($r = .143, p = .254$) nor personal

compatibility ($r = .192, p = .126$) scores achieved significant correlations with scores on active involvement in instruction for special education co-teachers. The bivariate correlation between TSE scores and personal compatibility scores ($r = .415, p < .001$) was significant and positive for all co-teachers and was also positive and significant when calculated for general education co-teachers ($r = .460, p < .001$) and special education co-teachers ($r = .370, p = .002$).

Table 11

Bivariate Correlations

	Teacher Self- efficacy	Personal Compatibility	Active Involvement in Instruction
All co-teachers			
Teacher Self-efficacy	-	0.235**	0.198*
Personal Compatibility		-	0.415**
Active Involvement in Instruction			-
General education co-teachers			
Teacher Self-efficacy	-	0.385**	0.275*
Personal Compatibility		-	0.460**
Active Involvement in Instruction			-
Special education co-teachers			
Teacher Self-efficacy	-	0.143	0.192
Personal Compatibility		-	0.370**
Active Involvement in Instruction			-

Note. * $p < .05$. ** $p < .01$.

Research Question 1

The first research question was whether differences existed among general and special education co-teachers' reported levels of TSE, personal compatibility, and active involvement in instruction. In order to determine whether general and special education co-teachers differed significantly on the variables of interest (TSE, personal compatibility, and active involvement in instruction), independent-samples t-tests were conducted (results displayed in Table 12). General education co-teachers reported significantly greater active involvement in instruction than special education co-teachers, $t(110.703) = 4.478, p < 0.001; d = 0.851$. The effect size for the difference in general and special education co-teachers' active involvement in instruction ($d = 0.851$) represents a large effect according to Cohen's (1988) criteria for effect sizes (large effect: $d = .80$). Comparison of general and special education co-teachers on TSE and personal compatibility revealed no significant differences. General and special education co-teachers were not found to differ on overall TSE or any of the TSE subscales (Overall TSE: $t(123) = 0.757, p = 0.450$; TSE – Instruction: $t(123) = 1.295, p = 0.198$; TSE – Classroom Management: $t(123) = 0.339, p = 0.984$; TSE – Student Engagement: $t(123) = 0.456, p = 0.649$). Similarly, general and special education co-teachers were not found to differ on personal compatibility ($t(124) = -0.110, p = 0.913$). Overall, results of the group comparisons indicated that general education co-teachers reported greater active involvement in instruction than special education co-teachers, but the two groups reported similar levels of TSE and personal compatibility.

Table 12

Group mean comparisons

	General Education Co- teachers		Special Education Co- teachers		<i>t</i>	Effect Size (Cohen's <i>d</i>)
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Active Involvement in Instruction	4.62	0.39	4.21	0.62	4.478**	0.851
Personal Compatibility	4.50	0.57	4.51	0.55	-0.110	-0.020
Teacher Self-efficacy (overall)	7.69	0.90	7.57	0.78	0.757	0.137
Teacher Self-efficacy (Instruction)	7.81	0.93	7.61	0.84	1.295	0.234
Teacher Self-efficacy (Classroom Management)	7.94	0.98	7.88	0.90	0.339	0.061
Teacher Self-efficacy (Student Engagement)	7.31	1.02	7.23	0.90	0.456	0.082

Note. * $p < .05$. ** $p < .01$.

Research Question 2

The second research question was about the relationship between general and special education co-teachers' TSE, personal compatibility, and active involvement in instruction. As was discussed in Chapter 3, because general and special education co-teachers work together in pairs, it cannot be assumed that data gathered on co-teachers' TSE, personal compatibility, and active involvement in instruction are independent. The Actor-Partner Interdependence Model (APIM; Kenny et al., 2006) was used to model the

relationship between the variables of interest (TSE, personal compatibility, and active involvement in instruction) while accounting for non-independence in the data. From the 127 co-teachers who responded to the electronic survey, data from 56 intact co-teaching dyads ($n = 112$) was separated out for the APIM analyses. Reporting of results pertaining to research question 2 begins with evaluation of non-independence in co-teachers' responses on each variable (TSE, personal compatibility, and active involvement in instruction), followed by results of APIM models, and finally results of an APIM with moderation model.

Measurement of non-independence. Analysis of data obtained from participants in meaningful dyads begins with evaluating the level of non-independence in the participants' responses (Kenny et al., 2006). According to Kenny et al. (2006), non-independence between responses of participants from distinguishable dyads is determined by computing the Pearson product-moment correlation between partners' scores on a given variable. For example, the correlation between general education co-teachers' TSE and special education co-teachers' TSE represents the degree of non-independence present in co-teachers' reported TSE, with higher correlations indicating greater non-independence. The correlation between general education and special education co-teachers scores on active involvement in instruction, which is the dependent variable in the APIM models discussed later, was $r = -0.131$, which was not significant ($p = 0.335$). Similarly, the correlation of general education co-teachers' TSE and special education co-teachers' TSE was not significant ($r = 0.103$, $p = 0.452$). However, the correlation of general education co-teachers' personal compatibility and special education co-teachers'

personal compatibility was significant ($r = 0.647, p < 0.001$), which may be expected because personal compatibility was a measure of how similar co-teachers perceived themselves to be with their partners on beliefs and approaches to teaching and personal and professional characteristics. Results of the tests for non-independence are summarized in Table 13.

Table 13

Measurement of non-independence

	<i>r</i>
Teacher Self-efficacy	0.103
Personal Compatibility	0.647**
Active Involvement in Instruction	-0.131

Note. * $p < .05$. ** $p < .01$.

Kenny et al. (2006) proposed that a correlation of $r = .45$ represents a level of non-independence that requires dyadic data analysis, because a correlation of $r = .45$ would result in raising the probability of committing at Type I error from .05 to .10. The results for the non-independence of data in the current study does not provide strong evidence for analyzing the data with dyadic data analysis, however some non-independence does exist in the dependent variable ($r = -0.131, p = .335$), and there is non-independence in the independent variable personal compatibility ($r = 0.647, p < .001$). Moreover, in practice, general and special education co-teachers are necessarily assigned to work in dyads for entire class periods over the course of one to several school years. Therefore, APIM was used to obtain the most accurate model of the relationship between TSE, personal compatibility, and active involvement in instruction for general and special

education co-teachers, while taking into account the non-independence that was present in the data.

Actor-Partner Interdependence Models (APIM). Two interaction-approach Actor-Partner Interdependence Models (APIM) were tested to determine whether TSE and personal compatibility were predictive of active involvement in instruction. The equations for each model are identified next, and the results are displayed in Table 14.

$$\text{Equation 1: } Y_{ij}(\text{active involvement in instruction}) = \beta_0 + \beta_1(\text{actor_TSE}_{ij}) + \beta_2(\text{partner_TSE}_{ij}) + \beta_3(\text{co-teacher type}_{ij}) + \beta_4(\text{actor_TSE}_{ij} * \text{co-teacher type}_{ij}) + \beta_5(\text{partner_TSE}_{ij} * \text{co-teacher type}_{ij}) + e_{ij}$$

$$\text{Equation 2: } Y_{ij}(\text{active involvement in instruction}) = \beta_0 + \beta_1(\text{actor_personal compatibility}_{ij}) + \beta_2(\text{partner_personal compatibility}_{ij}) + \beta_3(\text{co-teacher type}_{ij}) + \beta_4(\text{actor_personal compatibility}_{ij} * \text{co-teacher type}_{ij}) + \beta_5(\text{partner_personal compatibility}_{ij} * \text{co-teacher type}_{ij}) + e_{ij}$$

Table 14

Active Involvement in Instruction Predicted by TSE; Personal Compatibility

	All Co- teachers β	General Education Co-teachers β	Special Education Co-teachers β
--	--------------------------------	--	--

Model 1. TSE

Intercept	4.452**	4.618**	4.285**
Co-teacher type	-0.167**		
TSE (actor)	0.150**	0.169**	0.132
TSE (partner)	-0.006	0.087	-0.099
Co-teacher type × TSE (actor)	-0.018		
Co-teacher type × TSE (partner)	-0.093		
Model 2. Personal Compatibility			
Intercept	4.435**	4.609**	4.262**
Co-teacher type	-0.173**		
Personal Compatibility (actor)	0.181	0.178	0.185
Personal Compatibility (partner)	0.117	0.134	0.101
Co-teacher type × Personal Compatibility (actor)	0.003		
Co-teacher type × Personal Compatibility (partner)	-0.016		

Note. * $p < .05$. ** $p < .01$.

Each of the interaction-approach APIMs was followed up by a two-intercept APIM to provide estimates of actor and partner effects for general education co-teachers and special education co-teachers, separately. Equations for each of the two-intercept APIM models are identified next, and the results are displayed in Table 14.

$$\text{Equation 3: } Y_{ij}(\text{active involvement in instruction}) = \beta_1(\text{general education co-teacher}_i) + \beta_2(\text{special education co-teacher}_i) + \beta_3(\text{actor_TSE}_{ij})(\text{general education co-teacher}_i) + \beta_4(\text{partner_TSE}_{ij})(\text{general education co-teacher}_i) + \beta_5(\text{actor_TSE}_{ij})(\text{special education co-teacher}_i) + \beta_6(\text{partner_TSE}_{ij})(\text{special education co-teacher}_i) + E_{ij}$$

$$\text{Equation 4: } Y_{ij}(\text{active involvement in instruction}) = \beta_1(\text{general education co-teacher}_i) + \beta_2(\text{special education co-teacher}_i) + \beta_3(\text{actor_personal compatibility}_{ij} * \text{general education co-teacher}_i) + \beta_4(\text{partner_personal compatibility}_{ij} * \text{general education co-teacher}_i) + \beta_5(\text{actor_personal compatibility}_{ij} * \text{special education co-teacher}_i) + \beta_6(\text{partner_personal compatibility}_{ij} * \text{special education co-teacher}_i) + E_{ij}$$

The interaction-approach APIM represented by Equation 1 was used to test whether TSE is predictive of active involvement in instruction for all co-teachers. The TSE actor effect (β_1) represents the effect that a co-teacher's own TSE has on his or her own active involvement in instruction. The results from this model indicated a significant positive effect for the TSE actor effect on active involvement in instruction ($\beta_1 = .150, p = .009$). This means that co-teachers who report higher TSE are predicted to be more actively involved in instruction. The only other predictor variable in this model that was significant was co-teacher type ($\beta = -.167, p = .002$). Because the effect coding for co-teacher type was “-1” for general education co-teachers and “1” for special education co-teachers, the significant and negative regression coefficient indicated that active involvement in instruction can be predicted by co-teacher type, and that general education co-teachers reported significantly higher active involvement in instruction than

special education co-teachers. This finding coincides with the result of the independent-samples t-test comparing general and special education co-teachers on active involvement in instruction. The TSE partner effect ($\beta_2 = -.006, p = .908$) was not significant, indicating that a co-teacher's active involvement in instruction was not impacted by the TSE of his or her co-teaching partner. Finally, neither interaction term was statistically significant, indicating that the predictive relationship between TSE (actor and partner, respectively) and active involvement in instruction was not different for general education co-teachers and special education co-teachers.

Despite the non-significance of the actor_TSE*co-teacher type interaction term (β_4) in the interaction-approach APIM, an additional two-intercept APIM (Equation 3) was estimated to disaggregate results by co-teacher type and examine the relationship between TSE and active involvement for general education co-teachers and special education co-teachers separately. The two-intercept APIM represented co-teacher type using two dummy coded variables for general education co-teachers and special education co-teachers. Results from the two-intercept APIM revealed that the TSE actor effect for general education co-teachers ($\beta = .169, p = .002$) was significant, while the TSE actor effect for special education co-teachers ($\beta = .132, p = .191$) was not significant. Overall, the results from these APIM analyses indicated that, when viewed as an aggregate group, the TSE of general and special education co-teachers is predictive active involvement in instruction. However, disaggregated results revealed that TSE was predictive of active involvement in instruction for general education co-teachers, but TSE was not predictive of active involvement in instruction for special education co-teachers.

The interaction-approach APIM represented by Equation 2 was used to test whether personal compatibility is predictive of active involvement in instruction for all co-teachers. The personal compatibility actor effect (β_1) represents the effect that a co-teacher's own reported personal compatibility has on his or her own active involvement in instruction. The results from this model indicated no significant effect for the personal compatibility actor effect on active involvement in instruction ($\beta_1 = .181, p = .133$). Likewise, the personal compatibility partner effect ($\beta_2 = .117, p = .339$) was not significant, indicating that a co-teacher's active involvement in instruction was not impacted by the perceived personal compatibility of his or her co-teaching partner. Finally, neither interaction term was statistically significant, indicating that although neither main effect was significant (actor personal compatibility and partner personal compatibility, respectively), the predictive relationship between personal compatibility and active involvement in instruction was not different for general education co-teachers and special education co-teachers. Results from the two-intercept APIM (Equation 4) revealed that the personal compatibility actor effect for general education co-teachers ($\beta = .178, p = .141$) and special education co-teachers ($\beta = .185, p = .331$) were not significant. Overall, the results from the APIM analyses indicate that, when viewed as an aggregate group, the personal compatibility of general and special education co-teachers was not predictive active involvement in instruction. Similarly, disaggregated results reveal that personal compatibility was not predictive of active involvement in instruction for general education co-teachers or special education co-teachers.

Actor-Partner Interdependence Model with Moderation (APIMoM). An

interaction-approach APIM with moderation (APIMoM) was tested to determine whether personal compatibility moderated the predictive relationship between TSE and active involvement in instruction and whether the moderating effect of personal compatibility is different for general education co-teachers versus special education co-teachers. The equation for the full APIMoM model is:

$$\begin{aligned} \text{Equation 5: } Y_{ij}(\text{active involvement in instruction}) = & \beta_0 + \beta_{1j}(\text{actor_TSE}_{ij}) + \\ & \beta_{2j}(\text{partner_TSE}_{ij}) + \beta_{3j}(\text{actor_personal compatibility}_{ij}) + \beta_{4j}(\text{partner_personal} \\ & \text{compatibility}_{ij}) + \beta_{5j}(\text{co-teacher type}_{ij}) + \beta_{6j}(\text{actor_TSE}_{ij} * \text{actor_personal compatibility}_{ij}) \\ & + \beta_{7j}(\text{actor_TSE}_{ij} * \text{partner_personal compatibility}_{ij}) + \beta_{8j}(\text{partner_TSE}_{ij} * \text{actor_personal} \\ & \text{compatibility}_{ij}) + \beta_{9j}(\text{partner_TSE}_{ij} * \text{partner_personal compatibility}_{ij}) + \\ & \beta_{10j}(\text{actor_TSE}_{ij} * \text{co-teacher type}_{ij}) + \beta_{11j}(\text{partner_TSE}_{ij} * \text{co-teacher type}_{ij}) + \\ & \beta_{12j}(\text{actor_personal compatibility}_{ij} * \text{co-teacher type}_{ij}) + \beta_{13j}(\text{partner_personal} \\ & \text{compatibility}_{ij} * \text{co-teacher type}_{ij}) + \beta_{14j}(\text{actor_TSE}_{ij} * \text{actor_personal compatibility}_{ij} * \text{co-} \\ & \text{teacher type}_{ij}) + \beta_{15j}(\text{actor_TSE}_{ij} * \text{partner_personal compatibility}_{ij} * \text{co-teacher type}_{ij}) + \\ & \beta_{16j}(\text{partner_TSE}_{ij} * \text{actor_personal compatibility}_{ij} * \text{co-teacher type}_{ij}) + \\ & \beta_{17j}(\text{partner_TSE}_{ij} * \text{partner_personal compatibility}_{ij} * \text{co-teacher type}_{ij}) + e_{ij} \end{aligned}$$

The APIMoM represented by Equation 5, contains twelve interaction terms, eight two-way interaction terms and four 3-way interaction terms. The meanings of each interaction term are provided next.

Two-way interaction terms:

1. $\beta_{6j}(\text{actor_TSE}_{ij} * \text{actor_personal compatibility}_{ij})$ – indicates whether the actor's personal compatibility moderates the relationship between the actor's TSE and active involvement in instruction.
2. $\beta_{7j}(\text{actor_TSE}_{ij} * \text{partner_personal compatibility}_{ij})$ – indicates whether the partner's personal compatibility moderates the relationship between the actor's TSE and active involvement in instruction.
3. $\beta_{8j}(\text{partner_TSE}_{ij} * \text{actor_personal compatibility}_{ij})$ – indicates whether the actor's personal compatibility moderates the relationship between the partner's TSE and the actor's active involvement in instruction.
4. $\beta_{9j}(\text{partner_TSE}_{ij} * \text{partner_personal compatibility}_{ij})$ – indicates whether the partner's personal compatibility moderates the relationship between the partner's TSE and the actor's active involvement in instruction.
5. $\beta_{10j}(\text{actor_TSE}_{ij} * \text{co-teacher type}_{ij})$ – indicates whether the relationship between the actor's TSE and active involvement in instruction is different for general education co-teachers and special education co-teachers.
6. $\beta_{11j}(\text{partner_TSE}_{ij} * \text{co-teacher type}_{ij})$ – indicates whether the relationship between the partner's TSE and the actor's active involvement in instruction is different for general education co-teachers and special education co-teachers.
7. $\beta_{12j}(\text{actor_personal compatibility}_{ij} * \text{co-teacher type}_{ij})$ – indicates whether the relationship between the actor's personal compatibility and active involvement in instruction is different for general education co-teachers and special education co-teachers.

8. $\beta_{13j}(\text{partner_personal compatibility}_{ij} * \text{co-teacher type}_{ij})$ – indicates whether the relationship between the partner’s personal compatibility and the actor’s active involvement in instruction is different for general education co-teachers and special education co-teachers.

Three-way interaction terms:

9. $\beta_{14j}(\text{actor_TSE}_{ij} * \text{actor_personal compatibility}_{ij} * \text{co-teacher type}_{ij})$ - indicates whether the moderating effect of the actor’s personal compatibility on the relationship between the actor’s TSE and active involvement in instruction is different for general education co-teachers and special education co-teachers.
10. $\beta_{15j}(\text{actor_TSE}_{ij} * \text{partner_personal compatibility}_{ij} * \text{co-teacher type}_{ij})$ - indicates whether the moderating effect of the partner’s personal compatibility on the relationship between the actor’s TSE and active involvement in instruction is different for general education co-teachers and special education co-teachers.
11. $\beta_{16j}(\text{partner_TSE}_{ij} * \text{actor_personal compatibility}_{ij} * \text{co-teacher type}_{ij})$ - indicates whether the moderating effect of the actor’s personal compatibility on the relationship between the partner’s TSE and the actor’s active involvement in instruction is different for general education co-teachers and special education co-teachers.
12. $\beta_{17j}(\text{partner_TSE}_{ij} * \text{partner_personal compatibility}_{ij} * \text{co-teacher type}_{ij})$ - indicates whether the moderating effect of the partner’s personal compatibility on the relationship between the partner’s TSE and the actor’s active

involvement in instruction is different for general education co-teachers and special education co-teachers.

As was discussed in Chapter 3, all of the models in the current study were considered to be actor-oriented models (Kenny et al., 2006), meaning that co-teachers' active involvement in instruction is expected to be primarily impacted by their own TSE and personal compatibility (actor effects). The inclusion of partner effects allowed the model to account for any non-independence in the data so that the researcher could obtain unbiased estimates for the actor effects, which were of primary interest. Therefore, in the APIMoM model represented in equation five, the regression coefficients of only two interaction terms were of particular relevance to answering research question 2b (bolded in the list above).

1. $\beta_{6j}(\text{actor_TSE}_{ij} * \text{actor_personal compatibility}_{ij})$ – indicates whether the actor's personal compatibility moderates the relationship between the actor's TSE and active involvement in instruction.
2. $\beta_{14j}(\text{actor_TSE}_{ij} * \text{actor_personal compatibility}_{ij} * \text{co-teacher type}_{ij})$ - indicates whether the moderating effect of the actor's personal compatibility on the relationship between the actor's TSE and active involvement in instruction is different for general education co-teachers and special education co-teachers.

Prior to testing the full APIMoM model, a partial model was tested that included the actor and partner direct effects and the four two-way interaction terms modeled the moderating effect of personal compatibility on the relationship between TSE and active involvement in instruction. The results from the partial APIMoM model indicated that

personal compatibility did not have a significant moderating effect on the relationship between TSE and active involvement in instruction, as evidenced by the non-significant actor_TSE* actor_personal compatibility interaction term ($\beta_6 = -0.089, p = .501$). The equation for the partial APIMoM model is identified next, and the results are displayed in Table 15.

$$\text{Equation 6: } Y_{ij}(\text{active involvement in instruction}) = \beta_0 + \beta_1(\text{actor_TSE}_{ij}) + \beta_2(\text{partner_TSE}_{ij}) + \beta_3(\text{actor_personal compatibility}_{ij}) + \beta_4(\text{partner_personal compatibility}_{ij}) + \beta_5(\text{co-teacher type}_{ij}) + \beta_6(\text{actor_TSE}_{ij} * \text{actor_personal compatibility}_{ij}) + \beta_7(\text{actor_TSE}_{ij} * \text{partner_personal compatibility}_{ij}) + \beta_8(\text{partner_TSE}_{ij} * \text{actor_personal compatibility}_{ij}) + \beta_9(\text{partner_TSE}_{ij} * \text{partner_personal compatibility}_{ij}) + e_{ij}$$

Table 15

Moderating Effect of Personal Compatibility

	β
Intercept	4.48**
Co-teacher type	-0.160**
TSE (actor)	0.100
TSE (partner)	-0.009
Personal Compatibility (actor)	0.087
Personal Compatibility (partner)	0.144
TSE (actor) × Personal Compatibility (actor)	-0.089
TSE (actor) × Personal Compatibility (partner)	0.071
TSE (partner) × Personal Compatibility (actor)	-0.001
TSE (partner) × Personal Compatibility (partner)	-0.094

Note. * $p < .05$. ** $p < .01$.

Although the results from the partial APIMoM indicated no moderating effect of personal compatibility for all co-teachers, the full APIMoM model (Equation 5) was

tested to determine whether the moderating effect of personal compatibility was different for general education co-teachers and special education co-teachers. The results from the full APIMoM model indicated that the moderating effect of personal compatibility on the relationship between TSE and active involvement in instruction was not different for general education co-teachers and special education co-teachers as evidenced by the non-significant actor TSE*actor personal compatibility*co-teacher type interaction term ($\beta_{14} = .108, p = .416$). The results for the full APIMoM model are displayed in Table 16.

Table 16

Moderating Effect of Personal Compatibility by Co-teacher type

	β
Intercept	4.464**
Co-teacher type	-0.228**
TSE (actor)	0.098
TSE (partner)	-0.069
Personal Compatibility (actor)	0.133
Personal Compatibility (partner)	0.187
Co-teacher type $\times$ TSE (actor)	0.002
Co-teacher type $\times$ TSE (partner)	-0.154*
Co-teacher type $\times$ Personal Compatibility (actor)	-0.065
Co-teacher type $\times$ Personal Compatibility (partner)	0.197
TSE (actor) $\times$ Personal Compatibility (actor)	-0.078
TSE (actor) $\times$ Personal Compatibility (partner)	0.144
TSE (partner) $\times$ Personal Compatibility (actor)	-0.232
TSE (partner) $\times$ Personal Compatibility (partner)	0.097
Co-teacher type $\times$ TSE (actor) $\times$ Personal Compatibility (actor)	0.108
Co-teacher type $\times$ TSE (actor) $\times$ Personal Compatibility (partner)	0.066
Co-teacher type $\times$ TSE (partner) $\times$ Personal Compatibility (actor)	-0.037
Co-teacher type $\times$ TSE (partner) $\times$ Personal Compatibility (partner)	0.307

Note. * $p < .05$. ** $p < .01$.

Chapter Five

The current study was conducted to examine three constructs: teacher self-efficacy (TSE), personal compatibility, and active involvement in instruction. Specifically, the current study sought to determine whether high school general and special education co-teachers' active involvement in instruction is influenced by their efficacy beliefs (TSE) and perceived personal compatibility with their co-teaching partner. Three instruments were used to measure co-teachers' level of trait on each of the three constructs of interest: 1) teacher self-efficacy was measured using Tschannen-Moran and Woolfolk Hoy's (2001) Teacher Sense of Efficacy Scale; 2) personal compatibility was measured using Noonan et al.'s (2003) Co-Teacher Relationships Scale; 3) active involvement in instruction was measured using a scale adapted from Fennick and Liddy's (2001) perceptions of teachers' responsibilities subscale. All three instruments are provided in Appendix C. The research questions that guided the current study were:

1. Is there a significant difference between general and special education co-teachers on teacher self-efficacy (TSE), personal compatibility, and active involvement in instruction?
2. What is the relationship between general and special education co-teachers' TSE, personal compatibility, and active involvement in instruction?
 - a. Do TSE and personal compatibility predict general and special education co-teachers' active involvement in instruction?

- b. Does personal compatibility moderate the relationship between TSE and active involvement in instruction for general and special education co-teachers?

Findings from Research Question 1 Related to Previous Research

To answer the first research question, independent-samples t-tests were conducted to compare general and special education co-teachers' scores on TSE, personal compatibility, and active involvement in instruction. Results from the independent-samples t-test revealed the following:

- 1.1 General and special education co-teachers did not differ in their reported levels of TSE.
- 1.2 General and special education co-teachers did not differ in their reported levels of TSE on any of the TSE subscales (instruction, classroom management, and student engagement).
- 1.3 General and special education co-teachers did not differ in their reported levels of personal compatibility.
- 1.4 General and special education co-teachers did differ on their reported levels of active involvement in instruction, with general education co-teachers reporting greater active involvement in instruction than special education co-teachers.

The statistically significant result reported in the current study, that general education co-teachers reported greater active involvement in instruction than special education co-teachers, is consistent with other research examining delivery of instruction in co-taught

classes (Harbort et al., 2007; Keefe & Moore, 2004; Moin et al., 2009; Murawski, 2006). For example, Harbort et al. (2007) observed two high school science co-teaching teams and reported that general education co-teachers presented content in 29.93% of observed intervals, compared to less than 1% for special education co-teachers. Similarly, general education co-teachers were observed managing behavior fifteen times as opposed to four times for special education co-teachers. Special education co-teachers were most frequently observed monitoring, which the researchers defined as the teacher standing or sitting to watch students, and sometimes making gestures to redirect students who were off-task. In another study, Keefe and Moore (2004) interviewed current and former high school co-teachers and found that general education co-teachers were perceived as responsible for curriculum, planning, and large group instruction, while special education co-teachers were viewed as paraprofessionals who helped individual students and recommended modifications.

Although special education co-teachers in the current study ($M = 4.21$; $SD = 0.62$) reported significantly lower active involvement in instruction than general education co-teachers ($M = 4.62$; $SD = 0.39$), special education co-teachers' mean score for active involvement in instruction was high. Both mean scores indicated that co-teachers reported being close to "very involved" in instruction in their co-taught classes, however, general education co-teachers reported being closer to "very involved" in instruction than special education co-teachers. This is consistent with research by King-Sears et al. (2014) and van Hover et al. (2012) that found, while the general education co-teacher

took the lead for presenting content, both co-teachers were engaged in delivering in the co-taught class.

In the current study, group mean comparisons of general and special education co-teachers on each TSE subscale (instruction; classroom management; student engagement) revealed no statistical difference between general education co-teachers and special education co-teachers. These results indicate that special education co-teachers perceive themselves to be just as capable as general education co-teachers in the areas of instruction, classroom management, and student engagement. This may provide some evidence supporting Bessette's (2008) report that general and special education co-teachers perceived that special education co-teachers were capable of a more active role in instruction despite being under-utilized in co-taught classes. Additionally, it is possible that the special education co-teachers in the current study were more comfortable with curriculum content than were high school special education co-teachers in previous research studies (Keefe & Moore, 2004; Moin et al., 2009). Out of the nine special education co-teachers that Moin et al. (2009) interviewed and observed, eight reported having no previous science knowledge, and one communicated not having seen the science content since being a student in high school.

The result reported in the current study, that general and special education co-teachers did not differ in their reported levels of personal compatibility, indicates that both general and special education co-teachers perceived a high level of similarity with their co-teaching partner on beliefs and approaches to teaching and personal and professional characteristics. This is consistent with Malian and McRae's (2010) report of

no statistically significant difference between general and special education co-teachers on personal compatibility using the same scale. Malian and McRae interpreted their results stating, “These results... may indicate that the gap is shrinking between educators in co-teaching relationships. Moreover, the fact that general and special education [co]teachers have reported minimal variance in their beliefs, approaches to teaching, and personal characteristics shows that effectiveness has a greater potential because they want, and are willing to work for the same things for their students” (p. 9).

Taken together, results in the current study that general and special education co-teachers did not differ on either TSE or personal compatibility may be connected. The impact that personal compatibility between co-teaching partners could have on the co-teachers themselves was addressed by Scruggs et al. (2007) within the researchers’ treatment of the benefits of co-teaching. Scruggs et al. found that one of the major benefits of co-teaching, for the co-teachers themselves, was the ability to learn from their co-teaching partners, provided that the two co-teachers were personally compatible. In another study, Austin (2001) found general education co-teachers reported gaining skills in classroom management and curriculum adaptation, while special education co-teachers reported increased content knowledge, from working in a co-teaching partnership. In a more recent study of general educators, Siciliano (2016) found that TSE was positively related to accessing knowledge and advice from peers. For co-teachers in the current study, it may be that both general and special education co-teachers reported high levels of TSE based, in part, on skills gained from working with co-teaching partners whom they perceived as highly compatible.

Findings from Research Question 2a Related to Previous Research

To answer research question 2a, two sets of Actor-Partner Interdependence Models (APIM) were tested to examine TSE and personal compatibility as predictors of general and special education co-teachers' active involvement in instruction. APIM analysis began with the testing of two interaction-approach APIMs that revealed the following results:

- 2a.1 TSE predicted active involvement in instruction for all co-teachers.
- 2a.2 The relationship between TSE and active involvement in instruction was not significantly different for general education co-teachers and special education co-teachers.
- 2a.3 Personal compatibility did not predict active involvement in instruction for all co-teachers.
- 2a.4 The relationship between personal compatibility and active involvement in instruction was not significantly different for general education co-teachers and special education co-teachers.

Despite the results from the interaction-approach APIMs that the relationships between TSE and active involvement instruction and between personal compatibility and active involvement in instruction were not different for general and special education co-teachers, two two-intercept APIMs were tested to disaggregate results for general and special education co-teachers. Testing of the two-intercept APIMs revealed the following results:

2a.5 TSE predicted active involvement in instruction for general education co-teachers.

2a.6 TSE did not predict active involvement in instruction for special education co-teachers.

2a.7 Personal compatibility did not predict active involvement in instruction for general education co-teachers.

2a.8 Personal compatibility did not predict active involvement in instruction for general education co-teachers.

The result reported in the current study, that general education co-teachers' TSE predicted their active involvement in instruction, is similar to what has been found in previous research involving general education teachers in solo-taught settings (De Neve et al., 2015; Muijs & Reynolds, 2002; Ryan et al., 2015; Skaalvik & Skaalvik, 2014). For example, Muijs and Reynolds (2002) collected data from 103 elementary teachers and found that TSE for teaching mathematics had a significant direct effect on teacher behavior, which was measured across nine factors: classroom management, behavior management, direct instruction, review and practice, classroom interaction, constructivist methods, mathematical language, varied teaching, and classroom climate. Additionally, the researchers found that TSE's impact on teacher behavior resulted in improved student achievement a mathematical numeracy test. In another study, Allinder (1995) measured the TSE of 19 elementary special educators who were involved in implementing curriculum-based measurement with SWD to whom the special educators delivered mathematics instruction. Allinder found that high TSE special educators set more

ambitious goals for the number of math computations SWD would correctly complete and more frequently increased those goals in response to student learning. Similar to what was reported by Muijs and Reynolds (2002), Allinder (1995) found that the students of high TSE teachers performed more calculations correctly and showed a greater rate of improvement in math calculation than the students of low TSE teachers.

In light of previous research indicating that TSE may influence teacher behavior and student achievement (e.g., Allinder, 1995; Muijs & Reynolds, 2002), the results from the current study provide important information on the TSE of general and special education co-teachers. In the current study, general education co-teachers with higher TSE were more actively involved in instruction, but the relationship between TSE and active involvement in instruction was not significant for special education co-teachers. The results of the current study suggest a need for a greater understanding of the TSE of special education co-teachers, and to determine whether and why a relationship exists between co-teachers' TSE and active involvement in instruction.

The result reported in the current study, that general education co-teachers' TSE did not predict their active involvement in instruction, may be connected to results from previous studies that found general education co-teachers exercising a great deal of control over co-taught classes (Bessette, 2008; Harbort et al., 2007; Keefe & Moore, 2004; Moin et al., 2009; Murawski, 2006; Rice & Zigmond, 2000; Zigmond & Matta, 2004) compared to special education co-teachers. Moin et al. (2009) described general education co-teachers as the "dominant voice" in the co-taught science classes they observed. Murawski (2006) also engaged in direct observation of co-taught classes and

reported that general education co-teachers controlled instruction “even in the class in which much more parity in instruction was observed” (p. 240). In co-taught classes controlled by general education co-teachers, the active involvement of the special education co-teacher may be more a matter of the willingness of the general education co-teacher to include the special education co-teacher in instruction than the beliefs and capabilities of the special education co-teachers. Leafstedt et al. (2007) found that the active involvement of special educators decreased when they went from a solo-taught to a co-taught setting, despite the fact that both classes consisted of the same curriculum content. Perhaps the special education co-teachers in the co-taught setting, despite being capable of instructing students in the curriculum content, were relegated to a less active role in instruction by general education co-teaching partners seeking to maintain control of instruction.

Although parity between co-teaching partners was not examined directly in the current study, the result indicating special education co-teachers reported significantly lower active involvement in instruction than their general education co-teaching partners implies that a lack of parity may have existed. Furthermore, that special education co-teachers’ own efficacy beliefs did not influence how involved they were in instruction in co-taught classes may also imply that the special education co-teachers in the current study maintained a subordinate role in co-taught classes. For general education co-teachers, identified in some past research as in charge of instruction in co-taught classes (Bessette, 2008; Harbort et al., 2007; Keefe & Moore, 2004; Magiera et al., 2005; Mastropieri et al., 2005; Moin et al., 2009; Murawski, 2006; Pearl & Miller, 2007;

Scruggs et al., 2007; Rice & Zigmond, 2000; Zigmond & Matta, 2004), the relationship between TSE and active involvement in instruction in the current study was significant.

Results from Research Question 2b Related to Previous Research

An Actor-Partner Interdependence Model with moderation (APIMoM) approach was used to examine whether personal compatibility moderated the relationship between TSE and active involvement in instruction, and whether the moderating effect of personal compatibility is different for general education co-teachers versus special education co-teachers. First, a partial APIMoM was tested and revealed the following result:

- 2b.1 Personal compatibility did not have a significant moderating effect on the relationship between TSE and active involvement in instruction for all co-teachers.

Second, the full APIMoM was tested and revealed the following results:

- 2b.2 Personal compatibility did not have a significant moderating effect on the relationship between TSE and active involvement in instruction for general education co-teachers.
- 2b.3 Personal compatibility did not have a significant moderating effect on the relationship between TSE and active involvement in instruction for special education co-teachers.

Personal compatibility has been identified in previous research as critical to effective co-teaching (Keefe & Moore, 2004; Pratt, 2014, Rice & Zigmond, 2000; Scruggs et al., 2007; Van Hover et al., 2012). In fact, Keefe and Moore (2004) found personal compatibility, which they described in terms of co-teachers forming positive

interpersonal relationships, as the most important determinant of co-teachers' perceived success and willingness to continue co-teaching. Rice and Zigmond (2000) reported that most of the co-teachers they interviewed identified personal compatibility as a critical determinant of successful co-teaching, as did the co-teachers observed and interviewed by Pratt (2014) and van Hover et al. (2012). Scruggs et al. (2007) reviewed 32 qualitative studies on co-teaching and found many of the studies emphasized the need for co-teaching partners to be personally compatible. Specifically, the researchers identified personal compatibility as a determinant of co-teachers' ability to learn from each other, a reported benefit to teachers of participating in co-teaching. The results of the current study, however, did not provide evidence of personal compatibility impacting co-teachers' active involvement in instruction either directly or as a moderating variable. This means that the impact of co-teachers' TSE on their active involvement in instruction was not determined by personal compatibility, as found in the current study. When replicated with an adequate sample size, the finding may be counter to what was found in the current study with a lower sample size.

Limitations

There are four limitations that impact the generalizability of the results of the current study. The use of convenience sampling in the recruitment of participants is discussed first, followed second by a discussion of the use of self-report measures for data collection. Third, limitations based on the demographic characteristics of the participant sample are discussed. Finally, issues related to power are discussed fourth.

Convenience sampling. Participants were selected for participation in the current study through convenience sampling. Therefore, the results of the current study cannot be generalized beyond the co-teachers who make up the study's sample. Co-teachers were recruited from schools whose principals agreed to facilitate the research, and the co-teachers being recruited had the option of declining to participate in the research at any time. Therefore, self-selection bias may have impacted the data collected in the present study. It is plausible that co-teachers who would score high on one or more of the constructs being measured (TSE, personal compatibility, and active involvement in instruction) may be more likely to participate in research on co-teaching. Furthermore, recruitment of co-teachers at some schools was managed by school-based personnel, who may or may not have contacted all co-teachers to invite them to participate. For example, it is unknown whether school-based personnel may have targeted higher-performing co-teaching pairs to participate in the research.

Self-report. The instruments used for data collection in the current study were surveys, which required co-teachers to self-report responses. Although self-report surveys can be used to obtain data from a large number of participants, it is a limitation of the current study that self-report was the only method by which data was collected. Weaknesses of self-report data include social desirability bias and lack of understanding or experience with the item, scale, or trait being measured, which can reduce the validity of self-report measures. In the current study, it is plausible that co-teachers may have wanted to report high levels of TSE, personal compatibility, and active involvement in instruction, which could introduce social desirability bias into the data obtained. Indeed,

the mean scores for all three variables were quite high and exhibited low variability. Such ceiling effects have been found in previous studies on TSE (e.g., Klassen & Chiu, 2011; Ryan et al., 2015; Wolters & Daugherty, 2007).

Demographics of the participant sample. Three main issues regarding the demographic characteristics of the participating co-teachers and co-teaching dyads limit the generalizability of results in the current study. First, there was a lack of diversity among the participating co-teachers on demographic variables. The majority of participants were Caucasian (81%) and female (74%), and all but eight participants taught in one of two school districts in the same mid-Atlantic metropolitan area. Therefore, the results of the current study may not generalize to co-teachers who are male, non-White, or who work in other geographical locations or in school districts with different demographic compositions. Second, almost one-fifth (17%) of the participants were beginning teachers in their first three years of teaching. Additionally, 28% of the co-teachers were beginning co-teachers within their first three years of co-teaching. Therefore, just under one-third or one-fifth of the participants in this study were beginning teachers or co-teachers (or both), which may have impacted the way they responded to survey items. Third, many of the participating co-teaching dyads represented new co-teaching pairs. Almost half of the co-teaching pairs were in their first year co-teaching together. About a quarter were in their second or third year co-teaching together. This means that over three quarters of the co-teaching pairs in the current study were new co-teaching pairs within their first three years co-teaching together, which may have impacted the way they responded to survey items.

Power. The sample size in the current study was not large enough to detect a moderation effect of medium effect size. Based on research by Aiken et al. (1991), upwards of 100 co-teaching dyads would have been needed to detect the proposed moderating effect of personal compatibility on the relationship between TSE and active involvement in instruction, unless the effect size of the moderation was large (Cohen, 1988). Similarly, actor and partner main effects of small effect size, that may still represent relevant influences on general and special education co-teachers' active involvement in instruction, could not be detected given the power provided by the 56 co-teaching dyads that participated in the current study.

Suggestions for Future Research

Suggestions for future research from research question 1. For research question 1, a comparison of general and special education co-teachers' scores on TSE, personal compatibility, and active involvement in instruction occurred. General and special education co-teachers did not differ on TSE or personal compatibility, but did differ on active involvement in instruction. One suggestion for future research is to continue examining the construct of TSE and how TSE is measured for general and special education co-teachers. Bandura (1986) claimed that self-efficacy is context-, task-, and domain-specific, and therefore, future research may include measurement of co-teachers' self-efficacy beliefs directly related to the specific curriculum content of their co-taught classes. For example, Muijs and Reynolds (2002) measured TSE for teaching mathematics using items addressing teachers' perceived capabilities to teach: number, calculation, probability, measurement, and data handling. Future research

focusing on other domain-specific content, such as co-teachers' self-efficacy beliefs for implementing specific research-based practices found effective for promoting the learning of SWD, may also reveal whether co-teachers believe their repertoire of pedagogies include practices responsive to students' learning needs.

Another recommendation for future research is more depthful examination of how co-teachers characterize their learning from each other as a result of their professional relationship, including their personal compatibility. Although high levels of reported TSE by general and special education co-teachers may have represented a ceiling effect caused by overly optimistic evaluations of efficacy on the part of co-teachers, the high TSE scores may also indicate that co-teachers do possess a heightened sense of self-efficacy that may be attributed to personal compatibility. Siciliano (2016) found that teachers accessed their peers to gain knowledge, and that accessing knowledgeable peers increased TSE. It is possible that by working together with co-teaching partners whom they perceived as highly compatible, general and special education co-teachers gained skills in areas that otherwise would have represented relative weaknesses and thus accounts for their high levels of TSE. Future research on personal compatibility between co-teachers may explore how co-teachers learn from one another, and how their unique skill sets may transfer to one another through the experience of co-teaching. Some specific questions include:

- Do general education co-teachers experience an increase in their ability to adapt curriculum and manage behavior from working in a compatible co-teaching partnership, as Austin (2001) reported?

- Do special education co-teachers working in compatible co-teaching partnerships acquire greater content knowledge?
- What other skills or competencies do co-teachers gain from working in compatible co-teaching relationships, and which of these skills result in greater active involvement in instruction?

Continued research on the personal compatibility between co-teaching partners may provide important insights into how co-teaching partners gain new skills from working collaboratively, as well as insights into how decisions are made for instructional methods used in co-taught classes.

Finally, it should be noted that in the current study co-teacher beliefs were measured in two different ways. TSE was measured by asking co-teachers to report on their beliefs about themselves, whereas personal compatibility was measured by asking teachers to report on beliefs about their co-teaching partnerships. An alternative to measuring personal compatibility beliefs by asking co-teachers how similar they and their co-teaching partners are on beliefs and approaches to teaching would be to ask co-teachers to report their own level of endorsement for specific beliefs and approaches to teaching, and then compare the responses of co-teaching partners in order to calculate a measure for personal compatibility. This type of measurement would allow co-teachers to report solely on their own beliefs.

Suggestions for future research from research question 2a. Answering research question 2 required examining the relationship among general and special education co-teachers' TSE, personal compatibility, and active involvement in

instruction. One result from the current study, that TSE was predictive of active involvement in instruction for general education co-teachers and personal compatibility was not, may be due to the control general education co-teachers often have over instruction in co-taught classes (Harbort et al., 2007; Keefe & Moore, 2004; Moin et al., 2009; Murawski, 2006), and the similarity of co-taught instruction to what occurs in general education solo-taught classes (Harbort et al., 2007; Moin et al., 2009; Murawski, 2006; Zigmond, 2006). Perhaps for general education co-teachers who prefer to maintain control of instruction, their active involvement in instruction may be more a matter of what they believe themselves to be capable of than how personally compatible they perceive their co-teaching partner to be. Perhaps general education co-teachers who are in charge of instruction in co-taught classes are not greatly concerned with whether or not their special education co-teaching partners share similar views on beliefs and approaches to teaching to their own. It may be that general education co-teachers feel empowered to be actively involved in all tasks for which they feel efficacious and do not prioritize inclusion of the special education co-teacher in instruction. Consequently, for special education co-teachers, beliefs of teaching efficacy and personal compatibility may be of little consequence as to whether special education co-teachers are able to be actively involved in instruction in co-taught classes. Special education co-teachers' active involvement in instruction may be more a matter of general education co-teachers' willingness to incorporate them into co-taught classes than special education co-teachers' TSE or personal compatibility, which were not found predictive of active involvement in instruction for special education co-teachers in the current study.

Based on the current study's findings that neither TSE nor personal compatibility predicted special education co-teachers' active involvement in instruction, and based on findings from previous co-teaching research that co-taught instruction was dominated by general education co-teachers (Harbort et al., 2007; Keefe & Moore, 2004; Moin et al., 2009; Murawski, 2006), future research may consider examining constructs such as: co-teacher autonomy, co-teacher self-advocacy, and co-teachers' willingness to share control of instruction, or initiate collaborative teaching in co-taught classes. Perhaps the influence of TSE on general and special education co-teachers' active involvement in instruction is impacted by the amount of autonomy co-teachers perceive in co-taught classes

Skaalvik and Skaalvik (2014) found that TSE and teacher autonomy were positively related to one another, and that both constructs predicted engagement and job satisfaction. Similarly, Holzberger et al. (2014) found TSE and intrinsic need satisfaction, which included the need for autonomy, predictive of instructional behavior. Holzberger et al. also reported a significant interaction effect between intrinsic need satisfaction (inclusive of autonomy) and TSE, suggesting that the relationship between TSE and instructional behavior may be influenced by variables such as teacher autonomy. Might it be the case that greater levels of autonomy allow general education co-teachers to determine their own active involvement in instruction based on what they feel capable of instructionally (TSE)? What impact might general education co-teachers' willingness (or lack thereof) to share or relinquish control of instruction in co-taught classes have on themselves and their special education co-teaching partners? Are special

education co-teachers self-advocates who initiate their own active involvement when co-teaching, and are special education co-teachers who are self-advocates more actively involved in instruction than those who take a more passive approach? Attention to issues of autonomy and self-advocacy in co-teaching research may provide researchers and practitioners a greater understanding of how characteristics of co-teachers, such as TSE, impact co-teachers' active involvement in instruction.

Suggestions for future research from research question 2b. In the current study, results from the APIMoM analysis indicated that personal compatibility did not moderate the relationship between TSE and active involvement in instruction for general and special education co-teachers. However, if replicated with an adequate sample size, it is possible that a moderating effect may be detected. Future research may replicate the current study with greater than 100 co-teaching pairs in order to achieve the power needed to detect small or medium sized moderation effects. Replication studies with greater numbers of co-teaching pairs may also be able to detect significant actor and partner effects that the current study did not have the power to detect.

In future co-teaching research in general, attention to both actor and partner effects in predictive models for co-teachers may provide insights into co-teaching that cannot be obtained through traditional analyses. For example, it may be that special education co-teachers' active involvement in instruction is greatly impacted by partner effects such as general education co-teachers' willingness to share control of instruction. Similarly, special education co-teachers' active involvement in instruction may be impacted by both their own willingness to initiate collaborative teaching, as well as their

general education co-teaching partners' willingness to initiate collaborative teaching (actor and partner effects).

The treatment of dyadic data in the APIM and APIMoM models allows for examination of actor and partner effects. General and special education co-teachers work together in co-taught classrooms, and thus experience co-teaching as members of an interdependent dyad. Therefore, any measurement of a co-teacher's level of trait on a variable of interest may be influenced by the co-teacher's partner. In fact, Siciliano (2016) found a positive correlation between teachers own TSE and the TSE of their teaching peers. The use of APIM applies a more accurate test for the effects of predictor variables by modeling both actor and partner effects to account for non-independence in the data. The continued use of APIM and APIMoM approaches may be particularly useful in future research on co-teaching, not only to account for potential non-independence in co-teachers' responses, but to examine the impact of both co-teaching partners on outcomes of interest.

Implications for Practice

One implication that the results of the current study has for practice is that co-teaching pairs may need more access to professional development as a co-teaching pair. In their meta-analysis examining the relationship between TSE and teaching effectiveness, Klassen and Tze (2014) listed the improvement of professional development as one of the benefits to such research. Past research on co-teaching has provided evidence that co-teachers benefit from access to professional development as a co-teaching pair (Moin et al., 2009; van Hover et al., 2012), and that new co-teachers

benefit from receiving mentoring as a co-teaching pair (van Hover et al., 2012). The co-teachers in van Hover et al.'s (2012) study reported that participating in professional development as a co-teaching pair provided them an opportunity to develop curriculum and establish how their collaborative relationship would work in the classroom. It may be that general and special education co-teachers would benefit from access to professional development as a co-teaching pair that would allow them to plan for *co-implementation* of strategies learned and discussed in professional development.

A second implication that the results of the current study has for practice is that administrators may need to give more attention to preserving co-teaching pairs so that the same co-teachers can work together for several years. In the current study, almost half of the co-teaching pairs were in their first year co-teaching together, and over three quarters of the co-teaching pairs had spent three years or less co-teaching together. Previous research on high school co-teachers supports allowing co-teachers to co-teach together for several years in order to develop co-teaching relationships where co-teachers maintain an active role in instruction (Moin et al., 2009; Pratt, 2014).

Summary

Co-teaching is a common service delivery model that high schools employ to provide SWD access to high quality content instruction and special education services (Magiera & Zigmond, 2005; Murawski, 2006; Zigmond & Magiera, 2001) by combining the unique skill sets of general and special educators. However, pairing a highly-qualified general educator with a highly qualified special educator to work together in a co-taught class does not consistently result in enhanced instruction and improved learning

outcomes for SWD (Murawski & Swanson, 2001; Scruggs et al., 2007; Solis et al., 2012; Weiss, 2004).

Rather, some research on co-teaching has found a lack of parity within co-teaching pairs and special education co-teachers less actively involved in instruction (Bessette, 2008; Harbort et al., 2007; Keefe & Moore, 2004; Magiera et al., 2005; Mastropieri et al., 2005; Moin et al., 2009; Murawski, 2006; Pearl & Miller, 2007; Scruggs et al., 2007; Rice & Zigmond, 2000; Zigmond & Matta, 2004). Furthermore, some research has found that instruction in co-taught classes is not different from the instruction delivered in solo-taught general education classrooms, representing no better attempt to meet the learning needs of SWD.

The purpose of the current study was to examine general and special education co-teachers' active involvement in instruction, and to examine TSE and personal compatibility as factors that may impact co-teachers' active involvement in instruction. Results revealed that general education co-teachers reported significantly higher active involvement in instruction than special education co-teachers, and that TSE is predictive of active involvement in instruction for general education co-teachers, but not for special education co-teachers. Personal compatibility did not predict active involvement in instruction for either general education co-teachers or special education co-teachers, nor did personal compatibility have a moderating effect on the relationship between TSE and active involvement in instruction.

Results from the current study supports previous research that suggest that special education co-teachers may take a less active role in instruction in co-taught classes

(Bessette, 2008; Harbort et al., 2007; Keefe & Moore, 2004; Magiera et al., 2005; Mastropieri et al., 2005; Moin et al., 2009; Murawski, 2006; Pearl & Miller, 2007; Scruggs et al., 2007; Rice & Zigmond, 2000; Zigmond & Matta, 2004). However, the results of this study were not able to identify significant predictors of special education co-teachers' active involvement in instruction. Future research may be conducted to replicate the current study with larger numbers of co-teachers in order to achieve the power needed to detect moderating effects and partner effects that, although too small to be detected in the current study, may represent important relationships among general and special education co-teachers' TSE, personal compatibility, and active involvement in instruction in co-taught classes. Besides continuing to explore the TSE and personal compatibility, another suggestion for future research is to increase attention on issues of autonomy and self-advocacy in co-teaching research. It may be that special education co-teachers are not in a position to maximize the contribution they are capable of making to meeting the learning needs of SWD in co-taught classes.

If co-teaching is to provide SWD with enhanced instruction that is specifically designed to meet their learning needs, then changes may be needed at the school level. It is recommended that school administrators provide co-teachers with access to professional development as a co-teaching pair and to allow co-teachers to spend more time co-teaching together. Providing co-teachers with access to professional development as a co-teaching pair may facilitate co-implementation of strategies that the co-teachers would otherwise not have the knowledge or the time needed to design.

Allowing co-teaching partners more designated time to develop and enhance their craft may result in increased learning outcomes for students with and without disabilities.

Appendix A

Research Permissions



Office of Research Integrity and Assurance

Research Hall, 4400 University Drive, MS 6D5, Fairfax, Virginia 22030
Phone: 703-993-5445; Fax: 703-993-9590

DATE: February 1, 2016

TO: Peggy King-Sears
FROM: George Mason University IRB

Project Title: [845275-1] Co-teachers' Beliefs and Instructional Practices

SUBMISSION TYPE: New Project

ACTION: DETERMINATION OF EXEMPT STATUS
DECISION DATE: February 1, 2016

REVIEW CATEGORY: Exemption category #2

Thank you for your submission of New Project materials for this project. The Office of Research Integrity & Assurance (ORIA) has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations.

Please remember that all research must be conducted as described in the submitted materials.

Please note that any revision to previously approved materials must be submitted to the ORIA prior to initiation. Please use the appropriate revision forms for this procedure.

If you have any questions, please contact Katherine Brooks at (703) 993-4121 or kbrook14@gmu.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within George Mason University IRB's records.

**THIS LETTER MUST BE ACCOMPANIED BY A SIGNED
ACKNOWLEDGEMENT OF RESEARCHER RESPONSIBILITIES**



Office of Program Evaluation
3877 Fairfax Ridge Road, Suite 3300
Fairfax, Virginia 22030-7425

March 25, 2016

Todd Johnson
5772 First Landing Way
Burke, VA 22015

Dear Mr. Johnson:

This letter represents the final phase of your application to conduct a study titled *Co-teachers' Beliefs and Instructional Practices* (see below).

Phase	Description	Completed
1	Receipt of Application	☒
2	Verification of Complete Application (<i>expect six weeks from end of this phase to completion of the research screening process</i>)	☒
3	Review by Committee	☒
4	Acknowledgement of Responsibilities from Researcher	☒
5	Issuance of Research Screening Decision	☒

The Research Screening Committee has reviewed and approved, with conditions, your application to conduct the study. The conditions of approval for this study are described in the attached Acknowledgement of Researcher Responsibilities, which you have signed. The division places great trust in you to maintain the highest standards for research, to uphold all of the researcher responsibilities you agreed to in the attached acknowledgement, and to seek counsel from your sponsor if your commitments are ever in jeopardy. Director of Special Education Instruction Irene Meier has agreed to be your sponsor.

You are authorized to begin your study upon receipt of this letter. Please contact Dr. Meier at (571) 423-4100 or irmeier@fcps.edu to notify her that you are beginning data collection activities. You should be prepared to share this approval letter and your signed Acknowledgement of Researcher Responsibilities with schools and/or participants, if requested.

We look forward to receiving the study results which are expected to provide the school division with information about how co-teachers can structure their collaboration to enhance teaching and learning for students with disabilities.

Sincerely,

A handwritten signature in cursive script that reads 'Ricardo V. Sockwell'.

Ricardo V. Sockwell, Ph.D.
Director

RVS/kf

Enclosure

cc: Irene Meier



Loudoun County Public Schools

Department of Instruction

Research Office

21000 Education Court

Ashburn, Virginia 20148

Telephone: 571-252-1310

FAX: 571-252-1633

TO: Todd Johnson

FROM: Ryan L. Tyler, Ph.D., Supervisor of Research *RLT*

RE: Research Request

Date: March 11, 2016

Your request to conduct the study, Co-Teachers' Beliefs and Instructional Practices, has been approved.

As a courtesy to Loudoun County Public Schools and the participants in your research, please provide a copy of your study and subsequent findings to the Research Office.

Contact Dr. Ryan Tyler, Supervisor of Research, if you have any questions about the approval.

Good luck with your project.

Cc: Nereida Gonzalez-Sales
Mary Kearney
Dr. Mary Kealy

Appendix B

Co-Teacher Informed Consent Form

Co-teacher instructional practices and beliefs

CO-TEACHER INFORMED CONSENT FORM

RESEARCH PROCEDURES

This research is being conducted to examine co-teachers' beliefs and instructional practices. If you agree to participate, you will be asked to complete a survey that should take you approximately 15 minutes to complete. Because data are being sought from high school co-teaching teams (consisting of one general education co-teacher and one special education co-teacher) you will be asked to identify your co-teaching partners and provide contact information so that one of your co-teaching partners can be invited to participate in this research by completing a survey.

RISKS

There are no foreseeable risks for participating in this research.

BENEFITS

There will be no direct benefits to you as a participant.

CONFIDENTIALITY

The data in this study will be confidential. Names of teachers, schools, and school districts will not be used in any research reports that are developed. All names will be replaced by numeric ID codes as soon as data are appropriately sorted. Through the use of an identification key, the researchers will be able to link information to participants' identity, and only the researchers will have access to the identification key.

PARTICIPATION

Your participation is voluntary, and you may withdraw from the study at any time and for any reason. If you decide not to participate or if you withdraw from the study, there is no penalty or loss of benefits to which you are otherwise entitled. There are no costs to you or any other party for participating in the research.

CONTACT

This research is being conducted by Todd Johnson, a doctoral candidate at George Mason University. He may be reached at 703-599-7197 or via email at tjohnsob@gmu.edu for questions or to report a research-related problem. Additionally, you may contact Dr. Peggy King-Sears, faculty advisor, at 703-993-3916 or mkingsea@gmu.edu with any related concerns. You may contact the George Mason University Office of Research Integrity & Assurance at 703-993-4121 if you have questions or comments regarding your rights as a participant in the research.

This research has been reviewed according to George Mason University procedures governing your participation in this research.

CONSENT

I have read this form, all of my questions have been answered by the research staff, and I agree to participate in this study.

The George Mason University Office of Research Integrity & Assurance has waived the requirement for signing the consent form. However, if you would like to sign a consent form prior to beginning the research, please contact Todd Johnson at tjohnsob@gmu.edu

By entering your name and clicking on "SUBMIT," you have provided the Co-teacher Informed Consent per the box you checked regarding your participation in the study.

Appendix C

Instruments

Teacher Sense of Efficacy Scale (TSES; Tschannen-Moran & Woolfolk Hoy, 2001)

Teacher Sense of Efficacy Scale (TSES) long-form (Tschannen-Moran & Woolfolk Hoy, 2001)

	How much can you do?								
	nothing		very little		some influence		Quite a bit		A great deal
Directions: Thinking about your co-taught class, please indicate your opinion about each of the statements below.									
1 How much can you do to get through to the most difficult students?	1	2	3	4	5	6	7	8	9
2 How much can you do to help your students think critically?	1	2	3	4	5	6	7	8	9
3 How much can you do to control disruptive behavior in the classroom?	1	2	3	4	5	6	7	8	9
4 How much can you do to motivate students who show low interest in schoolwork?	1	2	3	4	5	6	7	8	9
5 To what extent can you make your expectations clear about student behavior?	1	2	3	4	5	6	7	8	9
6 How much can you do to get students to believe they can do well in schoolwork?	1	2	3	4	5	6	7	8	9
7 How well can you respond to difficult questions from your students?	1	2	3	4	5	6	7	8	9
8 How well can you establish routines to keep activities running smoothly?	1	2	3	4	5	6	7	8	9
9 How much can you do to help your students value learning?	1	2	3	4	5	6	7	8	9
10 To what extent can you gauge student comprehension of what you have taught?	1	2	3	4	5	6	7	8	9
11 To what extent can you craft good questions for your students?	1	2	3	4	5	6	7	8	9
12 How much can you do to foster student creativity?	1	2	3	4	5	6	7	8	9
13 How much can you do to get children to follow classroom rules?	1	2	3	4	5	6	7	8	9
14 How much can you do to improve the understanding of a student who is failing?	1	2	3	4	5	6	7	8	9
15 How much can you do to calm a student who is disruptive or noisy?	1	2	3	4	5	6	7	8	9
16 How well can you establish a classroom management system with each group of students?	1	2	3	4	5	6	7	8	9
17 How much can you do to adjust your lessons to the proper level for individual students?	1	2	3	4	5	6	7	8	9
18 To what extent can you use a variety of assessment strategies?	1	2	3	4	5	6	7	8	9
19 How well can you keep a few problem students from ruining an entire lesson?	1	2	3	4	5	6	7	8	9
20 To what extent can you provide an alternative explanation or example when students are confused?	1	2	3	4	5	6	7	8	9
21 How well can you respond to defiant students?	1	2	3	4	5	6	7	8	9
22 How much can you assist families in helping their children do well in school?	1	2	3	4	5	6	7	8	9
23 How well can you implement alternative strategies in your classroom?	1	2	3	4	5	6	7	8	9
24 How well can you provide appropriate challenges for very capable students?	1	2	3	4	5	6	7	8	9

Co-Teacher Relationship Scale (CRS; Noonan et al., 2003) REVISED

Directions: Indicate the extent to which you believe you and your co-teaching partner are the same or different in your beliefs and approaches to teaching, and personal/professional characteristics and style (MARK THE APPROPRIATE BOX)		<i>extremely different from my co-teacher</i>					<i>the same as my co-teacher</i>
		1	2	3	4	5	
1	Views regarding the physical arrangement of the classroom	1	2	3	4	5	
2	Views regarding classroom scheduling	1	2	3	4	5	
3	Views regarding how to structure students' activities	1	2	3	4	5	
4	Beliefs about what the curriculum for students should be	1	2	3	4	5	
5	Beliefs about how students learn	1	2	3	4	5	
6	Beliefs about students with disabilities participating in co-taught classes	1	2	3	4	5	
7	Views about how to adapt and individualize activities	1	2	3	4	5	
8	Views about how to manage inappropriate behavior	1	2	3	4	5	
9	Beliefs about co-teachers' roles and responsibilities	1	2	3	4	5	
10	Views regarding parent involvement	1	2	3	4	5	
11	Desire to try new things	1	2	3	4	5	
12	Confidence as an educator	1	2	3	4	5	
13	Ways of dealing with colleagues, supervisors, parents, and other professionals	1	2	3	4	5	
14	Approaches to educational planning	1	2	3	4	5	
15	Flexibility in dealing with unforeseen events	1	2	3	4	5	
16	Sense of humor	1	2	3	4	5	
17	Ability to be supportive to colleagues and other staff	1	2	3	4	5	
18	Interest in learning new things	1	2	3	4	5	
19	Dedication to teaching	1	2	3	4	5	

Finalized Active Involvement in Instruction scale - based on Fennick & Liddy's (2001)
perceptions of co-teachers' responsibilities subscale

Directions: Indicate your level of active involvement in the following tasks when you are co-teaching with your designated co-teaching partner. **Your designated co-teacher partner is XXX.**

		<i>Not involved at all</i>				<i>Very involved</i>
In the co-taught class with XXX, I am involved in...		1	2	3	4	5
1	...arranging the physical classroom environment.	1	2	3	4	5
2	...planning the curriculum (e.g., unit plans, semester plans).	1	2	3	4	5
3	...planning daily lessons.	1	2	3	4	5
4	...creating instructional materials.	1	2	3	4	5
5	...selecting teaching methods.	1	2	3	4	5
6	...setting rules and expectations for student behavior.	1	2	3	4	5
7	...selecting instructional technology for the class.	1	2	3	4	5
8	...acquiring information on the strengths areas of need of students with disabilities.	1	2	3	4	5
9	...acquiring information on the strengths and areas of need of all students.	1	2	3	4	5
10	...presenting new content or conceptual lessons.	1	2	3	4	5
11	...leading whole-class discussion.	1	2	3	4	5
12	...assigning work to all students.	1	2	3	4	5
13	...adapting lessons and/or materials for students with disabilities.	1	2	3	4	5
14	...reviewing concepts with the class.	1	2	3	4	5
15	...demonstrating hands-on techniques.	1	2	3	4	5
16	...teaching learning strategies and study skills to the class.	1	2	3	4	5
17	...providing one-on-one instruction to students with disabilities.	1	2	3	4	5
18	...providing one-on-one instruction to any student.	1	2	3	4	5
19	...implementing accommodations for students with disabilities.	1	2	3	4	5

20	...organizing cooperative learning groups.	1	2	3	4	5
21	...implementing behavior management methods for students with disabilities.	1	2	3	4	5
22	...implementing behavior management methods for any students.	1	2	3	4	5
23	...monitoring the progress of students with disabilities.	1	2	3	4	5
24	...monitoring the progress of all students.	1	2	3	4	5
25	...establishing procedures to evaluate student learning.	1	2	3	4	5
26	...grading/evaluating all students.	1	2	3	4	5
27	...conducting evaluation conferences for portfolios and/or projects.	1	2	3	4	5
28	...communicating with parents regarding the progress of students with disabilities.	1	2	3	4	5
29	...communicating with parents regarding the progress of any student.	1	2	3	4	5

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Biography

Todd Johnson graduated from Robinson High School, Fairfax, Virginia, in 1995. He received his Bachelor of Business Administration from James Madison University in 1999. He was employed as a teacher in Fairfax County for eight years and received his Masters of Education from George Mason University in 2009.