Teleconsultation: The use of technology to improve evidence-based practices in rural communities

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ABSTRACT

Problem-solving consultation in schools has been found to be an effective method of service delivery to support teachers who are struggling to address student social–emotional behavioral (SEB) concerns. Despite its benefits, a number of barriers (e.g., lack of time and limited access to trained professionals) restrict the use of consultation within schools, especially in rural settings. The purpose of the study was to examine the impact of teleconsultation designed to improve behavior support to students living in rural communities. Both student outcomes and teacher perceptions were evaluated. Results indicated that (a) student disruptive behaviors improved through the implementation of an individualized behavior support plan developed through teleconsultation, and (b) teachers found the teleconsultation experience acceptable and feasible. As the demands placed on psychologists and the quality of videoconferencing continue to increase, teleconsultation is becoming a viable option for service delivery within rural school settings.

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1. Introduction

Teachers are frequently asked to identify students who have behavioral challenges within the classroom and implement interventions to address the behavior concerns. Despite this need, previous research has found that many teachers are unaware of evidence-based interventions for social–emotional behavioral (SEB) concerns and do not feel that they possess the skills to implement these interventions in the classroom setting (Reinke, Stormont, Herman, Puri, & Goel, 2011). Problem-solving consultation has been identified as an effective approach for increasing the use of evidence-based interventions and improving student outcomes when addressing SEB difficulties (Kratochwill, Altschaefl, & Bice-Urbach, 2014).

Although problem-solving consultation has demonstrated positive outcomes for students experiencing SEB challenges, the feasibility of using this model in all schools varies. Problem-solving consultation can often be difficult to implement due to the heavy workload of school psychologists (Auster, Feeney-Kettler, & Kratochwill, 2006). School psychologists only find consultation as an acceptable model of service delivery if they feel that they have sufficient time to implement the problem-solving process (Gravois, 2012; Sheridan & Steck, 1995; Sladeczek, Madden, Illsley, Finn, & August, 2006). Consultation can be especially challenging in rural areas where school psychologists have long distances to travel between schools and limited time available for providing comprehensive services. These factors make multiple meetings with teachers sometimes unrealistic and limit the amount of consultation support a psychologist can provide (Beebe-Frankenberger, Grimes, & Thomas, 2008; Rohland, 2001). This situation suggests the need for innovative methods to increase access to these services in the rural school setting.

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1.1. School psychology services in rural settings

Rural settings are defined as open country and settlements of fewer than 2500 residents (U.S. Census Bureau, 2010). Currently, 33% of public school buildings are identified as being located in rural settings, where 20% of American students are being educated (Rural School and Community Trust, 2012). Approximately 24% of U.S. school psychologists work in these rural areas (Curtis, Catillo, & Gelley, 2012).

Rural settings have several differences in the variety and level of services that school psychologists can provide. Although there is variability in services across all geographic settings, school psychologists in rural areas have been found to spend more time conducting assessments and engaging in meetings for special education eligibility, less time engaging in direct intervention and consultation, and greater time traveling long distances between schools (Beebe-Frankenberger et al., 2008; Beebe-Frankenberger, 2014; Gibson, Pennington, Stenhoff, & Hopper, 2010). Most rural school psychologists are required to serve as psychologists in several buildings. In a study by Goforth and Beebe-Frankenberger (2012), 74% of rural school psychologists served three or more schools and 32% were required to travel more than 250 miles per week. The requirements for rural school psychologists not only limit the amount of time that psychologists are able to spend at each school, but they also lead districts to incur greater cost, as they must reimburse travel mileage. Additionally, many rural school districts do not have sufficient resources to hire a full-time school psychologist. These districts may rely on independent agencies to provide support staff to address the most extreme needs of the student population (Beebe-Frankenberger et al., 2008). Given these limitations, rural school psychologists often have difficulty supporting teachers through the consultation process—they must prioritize services to individuals with the most significant needs, they are limited to brief consultation that may not always allow for needed problem solving, and they are less likely to be present in the school in order to provide direct training and coaching of teachers when implementing interventions (Gibson et al., 2010). All of these barriers indicate that face-to-face consultation within rural settings is challenging and that alternatives must be considered.

1.2. Teleconsultation

With the difficulties of face-to-face consultation within rural schools, the field must look toward new innovations to provide teachers with needed support in implementing SEB interventions. One area that may help improve the amount of time spent in consultation is providing consultation services via videoconferencing (i.e., teleconsultation). Within this format, a consultant provides services to many schools from a central location through an interactive video medium. Videoconferencing allows consultants and consultees to be in different locations and interact as if they were in the same room (American Academy of Child and Adolescent Psychiatry [AACAP], 2008; American Psychological Association, APA, 2013). These videoconferencing methods have been found to be useful, as they allow for full two-way audio and video communication (Manhal-Baugus, 2001).

Videoconferencing has previously been used in the fields of medicine and psychiatry to improve access to needed health services within rural areas (American Academy of Child and Adolescent Psychiatry, AACAP, 2008; Novotney, 2011). Telehealth, the use of telecommunications and information technologies to provide access to health information and services across a geographic distance, is rapidly expanding across the county (American Psychological Association, APA, 2013). From 2000 to 2008, the use of videoconferencing increased from 2% to 10% for Telehealth services (Novotney, 2011). It has also been shown to produce positive findings that support its continued use. It has been found that telepsychiatry and face-to-face patient contact have produced comparable results regarding diagnoses, treatment recommendations, and treatment outcomes (American Academy of Child and Adolescent Psychiatry, AACAP, 2008). These findings suggest that a similar method for consultation within schools could help to address some of the barriers to consultation while still providing high-quality services.

1.2.1. Previously identified limitations of teleconsultation

Previous research in medical, psychiatric, and educational settings has identified several limitations of using this method for service delivery. These limitations include (a) unreliable videoconferencing systems (e.g., lost calls, freezing, and loss of sound; Bishop, O'Reilly, Maddox, & Hutchinson, 2002; Kennedy & Yellowlees, 2000); (b) decreased control over sessions (e.g., unable to set up the room or control location of materials; Brenes, Ingram, & Danhauer, 2011); (c) loss of personal contact with clients (Day & Schneider, 2002; Pesamaa et al., 2004); (d) initial expense in purchasing technology for videoconferencing (American Academy of Child and Adolescent Psychiatry, AACAP, 2008; Gibson et al., 2010; Hilty, Marks, Urness, Yellowlees, & Nesbitt, 2004); (e) limited rigorous research (American Academy of Child and Adolescent Psychiatry, AACAP, 2008; Grubaugh, Cain, Elahai, Patrick, & Frueh, 2008); and (f) client concerns about using unfamiliar technology (e.g., worry about knowing how to use the system and concern about solving technical problems; Hilty, Servis, Nesbitt, & Hales, 1999; Rohland, Saleh, Rohrer, & Romitti, 2000).

1.2.2. Previously identified benefits of teleconsultation

Despite several potential limitations of teleconsultation, numerous benefits have also been found through previous research. These benefits include (a) a reduction in travel time for clinicians (American Academy of Child and Adolescent Psychiatry, AACAP, 2008; Krupinski, Barker, Lopez, & Weintein, 2004); (b) increased contact between the consultant and consultees to assist with the consultation process, case management, and support of those implementing interventions (American Psychological Association, APA, 2013; Brownlee, Graham, Doucette, Hotson, & Halverson, 2010; McGinty, Saeed, Simmons, & Yildirim, 2006; Myrick & Sabella, 1995); (c) client satisfaction with services over videoconferencing (American Academy of Child and Adolescent Psychiatry, AACAP, 2008; Alessi, 2000; Germain, Marchand, Bouchard, Guay, & Drouin, 2010; Glueckauf & Ketterson, 2004;

Richardson, Frueh, Grubaugh, Egede, & Elahi, 2009); (d) client progress through videoconferencing services (Day & Schneider, 2002; Glueckauf & Ketterson, 2004); and (e) long-term savings due to reduced travel costs (e.g., potential savings of approximately $50 per session; Dimmick, Mustaleski, Burgiss, & Welsh, 2000; Gibson et al., 2010; Pesamaa et al., 2004).

1.2.3. Teleconsultation research in schools

Given the many identified benefits of teleconsultation, the use of videoconferencing in the school setting has become a burgeoning area of research. Previous research within the school setting has examined the use of teleconsultation as a way to monitor treatment fidelity and provide immediate feedback to improve intervention implementation (Machalicek et al., 2009; Rule, Salzberg, Higbee, Menlove, & Smith, 2006). The American Telemedicine Association (ATA) (2009) recognizes that addressing school-based concerns in a manner where school personnel can be involved within treatment (i.e., teleconsultation) is the ideal format for addressing child and adolescent mental health and behavioral concerns. Nevertheless, there is no published research on the applications of problem solving consultation with the use of videoconferencing over the many years of research on problem solving behavioral consultation. Although there is currently limited research on teleconsultation in schools generally, the research conducted demonstrates the potential to improve the amount and variety of services that rural students and schools can access. Further research must be conducted to determine the best method for delivering consultation over videoconferencing in schools and the perceptions of consultants and consultees regarding teleconsultation services.

1.3. Purpose of the current study

The primary purpose of this study was to examine the student outcomes and feasibility of using teleconsultation methods to provide support by expert consultants in implementing evidence-based behavioral interventions. The first goal of the study was to determine if teleconsultation could be used to implement evidence-based behavioral interventions that reduce student disruptive behavior within the classroom. This question was examined using a randomized multiple baseline design. The second goal of the study was to evaluate the acceptability and feasibility of the teleconsultation process as perceived by teachers. The findings from this study will help to further understand the technical process of teleconsultation within the school setting and the perceived acceptability and feasibility of this new option for consultation services.

2. Methods

2.1. Participants

2.1.1. Teachers

The study included six teachers who were requesting additional guidance regarding the disruptive behaviors of a student within their classroom. The involvement of student–teacher dyads was dependent upon the teacher's voluntary participation within the study, the student meeting study protocol criteria for disruptive behaviors within the classroom, and the student's parent or guardian consenting to the development of a behavior support plan for the child. All teachers were employed in one of two public schools in rural Midwestern towns (i.e., population under 5000) where there was not a full-time school psychologist within the building. The six teachers within the study were all Caucasian women teaching in Kindergarten through fifth grade. The average amount of teaching experience was 15.67 (range 3–35 years). Additional background information regarding the teachers is provided in Table 1.

2.1.2. Students

Child participants for consultation services included six students from Kindergarten through fifth grade with disruptive behaviors (e.g., out of seat, talking out, disruptive noises, inattention, throwing things, tantrums, and talking to peers) within the classroom setting. For each child, the teacher identified 3 to 5 core behaviors of concern that were disrupting the classroom environment. At the beginning of the study, all of the students had previously received initial interventions by the classroom teacher, with three of the teachers seeking additional support from the school problem-solving team, social worker, school counselor, and/or school psychologist. None of the children had received intensive intervention support at the start of the study. Additionally, none of the students were taking medication for any behavioral concerns. The participating students were not receiving any special education services at the time of the study. All participating students spoke English as their first language and were Caucasian. The average age for student participants was 7.50 (range 5–10 years). Additional background information regarding the students is provided in Table 2.

Table 1
Teacher demographic information.

	Years teaching	Gender	Ethnicity	Highest degree held	Grade level
Teacher A	10	Female	Caucasian	Masters	1
Teacher B	31	Female	Caucasian	Masters	5
Teacher C	6	Female	Caucasian	Masters	4
Teacher D	35	Female	Caucasian	Masters	K
Teacher E	3	Female	Caucasian	Bachelors	K
Teacher F	9	Female	Caucasian	Bachelors	3

Table 2
Student demographic information.

	Age	Gender	Ethnicity	SESBI-R intensity T-score	SESBI-R problem T-score	Teacher reported behaviors of concern
Student A	7	Male	Caucasian	65[a]	66[a]	Tantrum (e.g., crying, whining, breaking objects, stomping feet, pounding fists)
Student B	10	Male	Caucasian	70[a]	60[a]	Leaving seat, speaking out, banging desk, inattention
Student C	9	Male	Caucasian	69[a]	66[a]	Leaving seat, kicking chairs, pounding fists, destroying objects, inappropriate Language, speaking out, inattention
Student D	5	Male	Caucasian	59	55	Tantrum (e.g., crying, yelling, throwing objects, task refusal), leaving seat, inattention
Student E	5	Male	Caucasian	63[a]	58	Speaking out, leaving seat, asking questions
Student F	9	Male	Caucasian	57	57	Noncompliance, inappropriate language, inattention

[a] Exceeds the cutoff score.

2.1.3. Consultant and independent observers

The consultant for this study was an advanced school psychology graduate student from a Midwestern university that was knowledgeable in the areas of consultation, videoconferencing, and behavioral interventions. In addition to the consultant, four independent observers were used to observe intervention implementation within the classroom. These observers were graduate level school psychology students who had been trained in the methods of direct observation via videoconferencing, conducting observations using partial interval recording, and using checklists to analyze treatment integrity.

2.2. Measures

2.2.1. Sutter–Eyberg Student Behavior Inventory — Revised

The Sutter–Eyberg Student Behavior Inventory — Revised was used as a descriptive measure of student behavior prior to beginning the study. It has been found to have high internal consistency (Intensity scale .98, Problem scale .96; Rayfield, Eyberg, & Foote, 1998) and strong content and construct validity (Querido & Eyberg, 2003). The inventory contains two scales, an Intensity scale and a Problem Scale. The Intensity scale measures the frequency of the disruptive behavior for the student as rated by the teacher. The Problem scale allows the teacher to indicate if each behavior is or is not considered a problem. Students that score at or above the cutoff (T-score = 60) are considered to have significant externalizing behavioral concerns.

2.2.2. Direct observation of disruptive behaviors

During consultation, teachers and consultants identified specific disruptive behaviors of concern and a specific time period (e.g., during math, during writing) when the student was most likely to engage in the identified behaviors. Disruptive behaviors were broken into between 3 and 5 core behaviors. Each behavior was operationally defined and differentiated by separate codes for the observation period. Each observation day, the consultant observed the student during the identified 15-min time period and conducted a partial interval recording to collect data on the disruptive behaviors over videoconferencing. The 15-min session was broken into 60 15-s intervals that were standardized across observers through the use of an audio file. After the observation had concluded, the consultant calculated the daily percentage of intervals when the student engaged in the overall category of disruptive behavior. Throughout baseline, intervention, and maintenance data collection, independent raters observed 29% (range 27–30% of sessions per student) of the identified observation periods to collect IOA. Agreement was calculated as the number of intervals in which the two observers agreed, divided by the total number of intervals (i.e., 60), multiplied by 100. The average IOA per phase was 95.19% (range 80% — 100.00%).

2.2.3. Goal attainment scale (GAS)

GAS has been found to be a time efficient and individualized method of measuring perceptions of student behavior within the educational setting (Roach & Elliot, 2005). A GAS is considered an indirect measure of student behavior, as the teacher is scoring his or her perception of the targeted behavior (Roach & Elliot, 2005). In this study, a GAS was used to measure teacher perceptions of student behavior over time. The teacher and consultant worked together to identify criteria for monitoring behavior during the problem identification session. After the session, each teacher was provided with an individualized GAS form that targeted a specific behavioral goal for each student. Teachers were asked to rate the student on days when the consultant observed in the classroom during the baseline, intervention, and maintenance phases using the GAS. GAS ratings ranged from 0 (the student did not obtain the desired behavior goal for the targeted time period) to 6 (the student obtained the desired behavior goal). GAS ratings were broken into intervals based on a percentage of time engaging in the disruptive behavior (4 students) or a number of instances engaging in the disruptive behavior (2 students) based on the desired behavior goal.

2.2.4. Treatment integrity

A treatment integrity checklist was used during all of the intervention observations to ensure the teacher was implementing the intervention as intended. The treatment integrity measure included (a) a description of each component of the behavior support plan, (b) a rating of the level of adherence to each intervention component, (c) a rating of the quality of implementation for each intervention component, and (d) anecdotal notes about the intervention implementation (Sanetti, Collier-Meek, Long, Byron, & Kratochwill, 2015). Throughout intervention and maintenance data collection, independent raters scored treatment integrity forms for 31% (range 26.92% — 38.46% of sessions per student) of the identified periods to collect interobserver agreement (IOA). The average IOA per phase was 100%.

Additionally, a checklist was used to ensure the integrity of the problem-solving consultation interviews (Sanetti et al., 2015). Significant components of each of the consultation sessions were identified in a checklist previously developed by Sanetti and colleagues. The consultant completed each procedural integrity checklist immediately after completing each session between the consultant and teacher. Each session was also audio recorded to allow the independent rater to complete the procedural integrity checklists. Independent raters listened to 100% of the available consultation audio files to identify procedural integrity. There were some technical tape recording errors in recording 4 of the 24 consultation sessions, making them unreviewable by a second rater. The consultant rated that she had completed 99.1% of the consultation components across all 24 interviews. The independent raters' score for the 20 observations that were reviewable was 97.6%.

2.2.5. Teleconsultation Acceptability and Feasibility Form

Prior to beginning the study and after the final consultation interview, teachers completed a questionnaire regarding the acceptability and feasibility of teleconsultation. The questionnaire is a revised version of a questionnaire developed by Machalicek (2008) to examine the acceptability and feasibility of videoconferencing for providing training and performance feedback. The pre-questionnaire measured the teacher's initial beliefs about the acceptability and feasibility of teleconsultation and using technology in the classroom. The post-questionnaire measured the teacher's perceptions regarding the acceptability and feasibility of using teleconsultation after using the method for the study. The Teleconsultation Acceptability and Feasibility Form contains 12 items on a six-point Likert scale ranging from 1 (I disagree) to 6 (I agree). A second part of the questionnaire includes six open-ended questions focused on identifying the teacher's opinions regarding teleconsultation and the use of videoconferencing.

2.2.6. Consultant Evaluation Form

The perceived effectiveness of the consultant by the teachers was measured using the Consultant Evaluation Form (CEF; Erchul, 1987). The CEF includes 12 questions with a Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). The CEF was given to teachers as a pre and post measure. The CEF has been found to have high internal consistency, with mean alpha coefficients ranging from .94 to .95 (Erchul, 1987).

2.2.7. Behavior Intervention Rating Scale

An adapted version of the Behavior Intervention Rating Scale (BIRS; Von Brock & Elliott, 1987) was used to examine the acceptability and effectiveness of both the consultation process and the identified intervention. The BIRS Acceptability factor contains 15 items measured by a 6-point Likert scale ranging from 1 (Strongly Disagree) to 6 (Strongly Agree). Reliability for the Acceptability factor has a Cronbach's alpha of .98 and has been found to have strong content validity within consultation research (Von Brock & Elliott, 1987). The BIRS Effectiveness factor contains 9 items to examine the effectiveness of the consultation process. The BIRS Effectiveness factor has a Cronbach's alpha of .92 (Von Brock & Elliott, 1987).

2.3. Materials

2.3.1. Videoconferencing equipment

Videoconferencing equipment varied based on each teacher and classroom. Teachers viewed the consultation sessions on a 4th generation Apple iPad with retina display, while the consultant conducted the session using a 2.7 GHz, 8GB iMac desktop computer with Iris Pro Graphics. All of these systems have built-in cameras and microphones that support both audio and video transmission. For the observations in the classroom, three teachers utilized the iPads, one teacher used a Dell laptop computer, and two teachers used Dell desktop computers with a separate Logitech C615 webcam.

Videoconferencing sessions within teleconsultation took place over Skype. All devices filled the minimum requirement for successful videoconferencing through Skype. Skype uses an Advanced Encryption Standard known as Rijndael to protect sensitive information when conducting a Skype-to-Skype videoconferencing session (Skype Technologies, 2013), the same system used by the US Government.

2.4. Research design

Within this study, the consultation phases and intervention implementation occurred within a randomized multiple-baseline across participants design (Kratochwill & Levin, 2010). The study was structured to meet the What Works Clearinghouse (WWC) Single-Case Design Pilot Standards for research design standards and evidence criteria. The design allowed examination of teacher ratings and direct observations of student outcomes (dependent variable) after the implementation of an intervention to address disruptive behaviors (independent variable). This design was chosen because it does not require a withdrawal of the intervention

once it is implemented, it is useful when targeting a distinct behavior within different people, and it is feasible to complete within the applied setting (Kazdin, 2011). Teacher perceptions regarding the feasibility and acceptability of teleconsultation were also evaluated before and after engaging in the consultation process.

2.5. Procedures

Prior to beginning the study, the consultant established a time to meet with each teacher to provide an overview of the study procedures, provide a tutorial on how to use the technology equipment for the study, and set up equipment within the classroom. During this meeting, teachers also completed two questionnaires on their perceptions of teleconsultation prior to beginning the study. The activities for this study occurred in two different locations. The teachers were present in their own classroom for each consultation and classroom observation session. Four teachers connected via wireless Internet while two teachers were directly connected to the school's network. The consultant was present at each meeting via videoconferencing from a private university office. The consultant was connected to the Internet through the university's secure network.

For each of the six students included within the study, the child's teacher engaged in the consultation process to address student disruptive behavior via teleconsultation with a trained graduate student in school psychology. Each teacher was involved with five structured interviews throughout the consultation process, each lasting between 15 and 90 min. These interviews helped identify behavior concerns and goals, determine procedures for data collection, develop individualized interventions, implement interventions in the classroom setting, and evaluate intervention effectiveness. Throughout the consultation process, the consultant and independent observers observed the students in the classroom setting via videoconferencing to gather additional information for behavior intervention planning and collect behavioral data.

Protocols were developed for the consultation sessions and observations over videoconferencing, including procedures related to completing an observation and troubleshooting any technical difficulties. These protocols helped ensure that things ran smoothly during the sessions and teachers did not have to spend too much time trying to connect if there were issues. The videoconferencing protocol included details about how to begin consultation and observation sessions, camera placement in the classroom (i.e., 3 cameras remained fixed on the student's seat throughout the observation and 3 cameras moved with the students as they moved in the room), and details about ending a session. The technical protocol included a series of steps to complete if the teacher was having difficulty connecting or experienced a poor connection during a consultation or observation session.

2.5.1. Problem identification

The Problem Identification Interview (PII) is the first step of the problem-solving consultation process. It was used to establish rapport, provide information about the goals and objectives of consultation, come to agreement about roles and responsibilities, operationally define target behaviors, discuss data collection procedures, and discuss the display of collected data (Kratochwill & Bergan, 1990). For each student, the target behaviors were slightly different given the specific disruptive behavior concerns and perceived acceptability by the teachers. After the PII, the consultants began observations in the classroom to collect baseline data on the agreed upon student behaviors. The teachers also began providing baseline goal attainment scale data after this interview. Observation sessions were scheduled to occur any day in which the teacher and student were both present for the identified classroom time period, with at least 2 observations per dyad per week.

2.5.2. Functional behavior assessment

Given the information provided by the teachers during the PII, the consultant began collecting data for a brief functional behavior assessment (FBA) for each student on the identified disruptive behaviors of concern. FBA is a process for understanding the variables that give rise to and maintain target behaviors. The brief FBA process for this study included both systematic direct observations through videoconferencing and a structured interview with the teacher. The consultant completed a modified version of the Functional Assessment Interview (O'Neill et al., 1997) with each teacher to further examine the function of each student's behavior. It was during this interview that the consultant reviewed the collected baseline data with the teacher to ensure that the intervention plan was targeting the most critical behavior components. Before and after the functional assessment interview, the consultant also engaged in systematic direct observations of each student during the times of day when the teacher had identified the student as most likely to engage in the disruptive behaviors. The information collected through the brief FBA aided the consultant in developing behavior support plans (BSPs) for each student given his unique behaviors and environmental factors.

2.5.3. Behavior support plan

Given results from the brief FBA, the consultant developed a draft of a BSP to discuss with the teacher during the Problem Analysis Interview (PAI). The BSP included (a) operational definitions of the problem behaviors; (b) a summary of findings from the brief FBA; (c) intervention strategies to make the problem behaviors irrelevant, inefficient, and ineffective (e.g., setting event strategies, instructional interventions that must be taught to the student, and consequence interventions that are aimed at reducing the undesired behaviors); (d) descriptions of the most challenging problem situations and routines; and (e) how the plan would be monitored and evaluated (O'Neill et al., 1997). Each BSP was individualized to the unique needs of each student–teacher dyad. Operational definitions of the target behavior, a summary statement regarding the function of the behaviors, and the number of strategies (i.e., setting event, antecedent, teaching, and consequence) are provided in Table 3.

Table 3
Individual student BSP data.

Target behavior definition(s)	Summary statement	Strategies in BSP
Student A		
Crying: tears on face, rubbing eyes as if he was crying	The student appeared to become frustrated when he did not know how to complete a task. The behaviors of destroying objects and hitting/stomping appear to be maintained by avoidance of independent work completion and the behaviors of crying and whining appear to be maintained by obtaining adult attention/support for completing the challenging work.	Student A's BSP included one setting event strategy, four antecedent strategies, one teaching step, and two consequence strategies.
Whining: making verbal noise when upset/frustrated without raising his voice		
Destroying objects: crumpling paper and breaking pencils		
Hitting/stomping: feet make sound from striking the floor, hands in fist or open palm making contact with the table or paper		
Student B		
Movement: physically leaving his desk without reason of going up to the board, getting supplies, throwing something out, sharpening pencil; feet leaving the ground or upper body moving below the desktop, as if lying on his side or moving underneath the desk	When encountering teacher-led discussion or independent work, he engaged in off-task motor behaviors to avoid the current activity. He also engaged in off-task verbal behavior to receive both teacher and peer attention.	Student B's BSP included one setting event strategy, six antecedent strategies, one teaching step, and three consequence strategies.
Desk noise: opening and closing desk when the rest of the class does not do the same		
Speaking out: vocalizations not directed at others, arguing with teacher, talking with peers when the class is meant to be quiet		
Inattention: eyes not focused on the front of the classroom or the teacher, drawing on desk/paper, not responding to classroom questions for greater than 3 s		
Student C		
Movement: physically leaving his desk without reason of going up to the board, getting supplies, throwing something out, sharpening pencil; feet leaving the ground or upper body moving below the desktop, as if lying on his side or moving underneath the desk; standing at desk and moving head, legs, or arms around for greater than 3 s	The student desires opportunities to have the attention of his teacher. Unfortunately, when he engages in his disruptive behaviors, he receives negative attention from the teacher that may help maintain the undesired behaviors. The student appears to be engaging in the disruptive behaviors to a) obtain some needed sensory stimulation during less stimulating times of the day (e.g., movement), b) avoid situations in the classroom where he may not be as successful (e.g., hitting/striking/destruction and inattention), and c) gain attention from his teacher (e.g., speaking out)	Student C's BSP included one setting event strategy, four antecedent strategies, one teaching step, and two consequence strategies.
Hitting/stomping/destruction: feet make sound from striking the floor, hands in fist or open palm making contact with the table or paper, tearing papers, crumpling papers		
Speaking out: using inappropriate language in class (i.e., swearing, saying that he hates the teacher), speaking out in a raised voice during times when the class is meant to be quiet		
Inattention: eyes not focused on the front of the classroom or person speaking, drawing on desk/paper, not responding to classroom questions for greater than 3 s		
Student D		
Movement: Moving more than 2 ft from his assigned carpet or seat space OR moving under objects within the classroom	The student has difficulty maintaining his attention and appropriately expressing his frustration/confusion without engaging in tantrum behaviors. These behaviors are challenging when the student does not have his glasses and when he is asked to complete challenging work independently. The behaviors are especially exacerbated when the student does not know how to complete a task and when the student does not have direct access to the teacher. The behaviors appear to be maintained by adult attention.	Student D's BSP included two setting event strategies, five antecedent strategies, one teaching step, and two consequence strategies.
Tantrum: crying (i.e., tears on face, rubbing eyes as if he was crying), yelling (i.e., raising voice), throwing objects (i.e., releasing objects from hand that are in the air before making contact with an individual or another object), refusal to complete tasks		
Inattention: talking to peers, looking away from his paper/the teacher, not responding during whole class responses for greater than 3 s		
Student E		
Question: any verbalization indicating question about the daily schedule or how to complete a task	The student engages in the problem behavior in order to avoid completing his work independently. By asking questions constantly to the teacher, the teacher eventually needs to provide individualized support and help the student complete the assignment. The undesired behavior appears to be maintained by avoidance of independent work completion and adult attention/support for completing the work.	Student E's BSP included three setting event strategies, five antecedent strategies, and two consequence strategies.
Shouting: speaking in a raised voice		
Movement: Moving more than 2 ft from the designated seat space (non-example: leaving the seat space to obtain supplies for completing the task)		
Student F		
Noncompliance: taking greater than 5 s to comply with a request	It appears that the student's behavior is maintained because he is able to receive adult and peer attention. The teacher or his peers will support him when he is unclear on instructions and needs additional instruction to complete a task.	Student F's BSP included two setting event strategies, four antecedent strategies, one teaching step, and two consequence strategies.
Talking back: talking back to teacher or students in a disrespectful manner (i.e., using inappropriate phrases or unkind words)		
Inattention: talking to peers, looking away from his paper/the teacher, not responding during whole class responses for greater than 3 s		

2.5.4. Problem analysis

After conducting the brief FBA and developing a draft BSP for each student, the consultant and teacher engaged in a revised version of the Problem Analysis Interview (PAI). Although interventions are typically identified collaboratively with the consultee during problem-solving consultation, a revised method was used for this study to ensure that teachers received appropriate training for the agreed upon behavior interventions. The PAI was used to discuss the FBA results, discuss agreed upon goals, and finalize the behavior support plans (BSPs) for each child (Kratochwill & Bergan, 1990; Sanetti et al., 2015). The consultant conferred with the teacher to ensure that the BSP for each student was feasible and problem-solved around strategies that the teacher was less confident in implementing. The teachers had the opportunity to discuss each component of the plan to determine if it would be kept in the official BSP. Once the teacher had consented to implementing the agreed upon BSP, the consultant provided direct training for the teacher on how to implement the components of the BSP. The consultant went through each strategy of the plan during the PAI meeting and discussed how this component would be implemented with the student in the classroom. In addition, the teachers received an implementation manual that was individualized to supporting the teacher implementing the specific strategies identified for her student's needs. After completion of the PAI, the teachers began implementing the interventions within the classroom.

2.5.5. Plan implementation

During plan implementation, the teachers implemented the agreed upon plans. During this time, obstacles were identified and addressed, treatment fidelity was examined, initial intervention data were examined, and the consultant provided feedback and support to the consultees through direct coaching (Kratochwill & Bergan, 1990). Direct coaching through videoconferencing provided consultants with a clear idea of the concerns within the classroom, allowed the teacher to receive feedback regarding intervention implementation, and allowed for additional support outside of the planned consultation meetings (Gibson et al., 2010). During intervention sessions, some teachers had questions regarding implementation of intervention strategies. They were able to contact the consultant and ask their implementation questions. In this manner, the teachers were able to receive responsive feedback on strategies that they were implementing.

Each teacher also had had one planned videoconferencing meeting to provide coaching support to facilitate intervention integrity (Sanetti & Kratochwill, 2009). During this meeting, the teacher and consultant discussed each strategy and how it was being implemented in the classroom. The consultant specifically targeted the conversation around identifying the strategies that had gone well and discussing the strategies that the consultant had not yet seen implemented or that had been implemented with poor fidelity. For the latter strategies, the consultant problem-solved how to improve implementation, answered any teacher questions, and provided further training as needed.

2.5.6. Treatment evaluation

During the final stage of consultation, a Treatment Evaluation Interview (TEI) was implemented (Kratochwill & Bergan, 1990). During this interview, progress was discussed, treatment was modified and continued if needed, intervention effectiveness was determined, and a need for further consultation was assessed. At the end of the TEI, teachers completed three questionnaires about their perceptions of teleconsultation feasibility and acceptability.

2.6. Data analysis

2.6.1. Visual analysis

The examination of observational data adhered to the WWC Single-Case Design Pilot Standards and specifically the evidence criteria (Kratochwill et al., 2010). The GAS data did not adhere to the WWC Design Pilot Standards for evidence criteria. For all six teachers, the GAS targeted a minimum of one 60-min classroom period (e.g., math time, reading time, writing time). Since observers only saw a fraction of the overall time period, they were not capable of providing accurate GAS ratings for the entire time period on each observation day.

For the partial interval recording observational data, further examination of the evidence criteria occurred. Visual analysis was examined using the "Evidence Standards Protocol and Data Dictionary" (Maggin, Briesch, & Chafouleas, 2013; Maggin, Chafouleas, Goddard, & Johnson, 2011) to identify the evidence for a functional relationship between intervention implementation and a reduction in student disruptive behavior. This protocol allows for an examination of the student outcome graphs based on the WWC Pilot Standards. In completing the protocol, evidence criteria ratings are provided for five categories (i.e., baseline, within phase analysis, between phase basic effects, between phase experimental effects, and overall evidence). For each area, a rating between 0 (i.e., does not meet criteria) and 1 or 2 (i.e., meets criteria) is applied (see Appendix A in Maggin et al., 2013). From the ratings, an overall evidence rating can be assigned (e.g., 0 = no evidence, 1 = moderate evidence, 2 = strong evidence). Two raters provided visual analysis ratings for the partial interval recording student outcome graph. Both raters were graduate level school psychology students with prior training in the WWC Single-Case Design Pilot Standards. The raters examined the graphs independently and provided independent evidence ratings. The overall agreement across ratings was 94.44%.

2.6.2. Statistical analysis

Researchers have proposed that the integration of randomization within a single-case design strengthens the internal validity of the study (Kratochwill & Levin, 2010) and allows the use of randomization statistical tests (Kratochwill et al., 2014). This study utilized the Koehler and Levin (1998) dual-regulated randomization procedure, a nonparametric procedure recommended for use

within a MBD across participants (see Ferron & Levin, 2014 for more details on this test and other randomization tests). Briefly, the procedure includes two forms of randomization: (a) random assignment of teacher–student dyads to intervention start times, and (b) intervention start points for each teacher–student dyad based on random selection from an interval of potential start points during each phase. This procedure is useful when the study contains a small sample size, but is still focused on identifying statistically significant outcomes of intervention (Reinke et al., 2011). The formula $N! \times k^N$ was used to identify the potential intervention-versus-baseline mean differences within the study. Within the formula, N is the number of participants within the study ($N = 6$) and k is number of potential start points for a participant within each phase ($k = 2$).

The Koehler and Levin (1998) dual regulated-randomization procedure was analyzed using a statistical software program, ExPRT (Excel® Package of Randomization Tests (Gafurov & Levin, described by Levin, Evmenova, & Gafurov, 2014) to determine if there were significant differences between the baseline and intervention means, slopes, and variance. A one-tailed test was used for each analysis, since it was predicted that the implementation of the behavior support plan would decrease the level, variance, and slope of disruptive behavior for each student within the study. Effect sizes were also measured within the program using the "no assumptions" approach (i.e., treatment mean minus baseline mean divided by baseline standard deviation; Busk & Serlin, 1992), also referred to as a standardized mean difference approach. This approach divides the differences in treatment mean and baseline mean by the standard deviation of the baseline. Effect sizes measure the magnitude of the Behavior Support Plan intervention on student disruptive behavior outcomes. The effect sizes were used as descriptive measures to compare teacher–student dyads and compare study results to prior research that has utilized the same metrics. Finally, the probability of a Type I error was calculated by computing the proportion of test statistic values that were as large as or larger than the obtained test statistic in the predicted direction.

3. Results

The purpose of this study was to (a) identify if student disruptive behavior could be decreased through implementing individualized BSPs through teleconsultation, and (b) evaluate the acceptability and feasibility of using teleconsultation in the schools. The results of the study were examined for each research goal. The first section will examine both the visual and statistical analyses of student disruptive behavior outcome data and treatment integrity for all six student–teacher dyads. The next section will evaluate teacher perceptions regarding the acceptability and feasibility of using teleconsultation.

3.1. Student outcomes

3.1.1. Partial interval recording outcomes

Partial Interval Recording data met the WWC Design Pilot Standards. Given the study met the WWC design standards, the WWC evidence criteria were applied to the partial interval recording data that assessed student outcomes as related to disruptive behavior. A visual representation of the data can be found in Fig. 1. As outlined within the WWC Standards evidence criteria, most ratings indicated that baseline data displayed behavior that required change and were sufficiently predictable, consistent, and trending appropriately. The between phase basic effects ratings for all participants indicated an overall presence of basic effects. Between phase ratings indicated six opportunities to demonstrate a treatment effect for disruptive behavior. Treatment effects were rated as present for all cases. Based on these ratings, the partial interval recording graph was rated as providing strong evidence of a treatment effect.

Overall, levels of student disruptive behavior improved after the implementation of the behavior support plan as demonstrated in the partial interval recording data. The means and standard deviations across phases can be found in Table 4. The effect sizes, slopes, and variance for partial interval recording can be found in Table 5. All student data demonstrated an overall decrease in disruptive behavior from baseline to intervention. The trend in the baseline phase was decreasing for students A and B, stable for students C and F, and increasing for students D and E. There were minimal overlapping data points between baseline and intervention with a larger number of overlapping data points present for student C. Additionally, a decrease in variability was observed for all students except student C.

Results from the Koehler–Levin dual regulated-randomization procedure indicated a statistically significant overall decrease in student disruptive behavior ($p < .001$) between baseline and intervention phases as observed using partial interval recording. The average ES $= -1.50$ across all phases for change in level. There was not a significant change in slope (B–A $= 0.21$) for student disruptive behavior ($p = .11$) between baseline and intervention phases. However, as predicted, there was a significant decrease in the variance of student disruptive behavior ($p = .02$) from baseline to intervention phase. Overall difference in variance using the B–A method was -261.69.

3.1.2. Goal attainment scale

Overall, levels of most student disruptive behaviors improved after the implementation of the behavior support plan as rated by teachers using GAS (see Fig. 2). The means and standard deviations across phases can be found in Table 6 and the effect sizes, slopes, and variance for the GAS can be found in Table 7.

The mean teacher rating on the GAS increased from baseline to intervention phase for students A, D, E, and F. The mean teacher rating slightly decreased from baseline to intervention for students B and C. Given that the GAS only allowed for 7 rating options of student behavior, all student GAS data displayed overlapping data points between baseline and intervention. Baseline data were decreasing for students A and D, stable for students B, E, and F, and increasing for student C. Changes in level in the desired direction were found for students A, D, E, and F. Changes in variability were found for students A, D, and E.
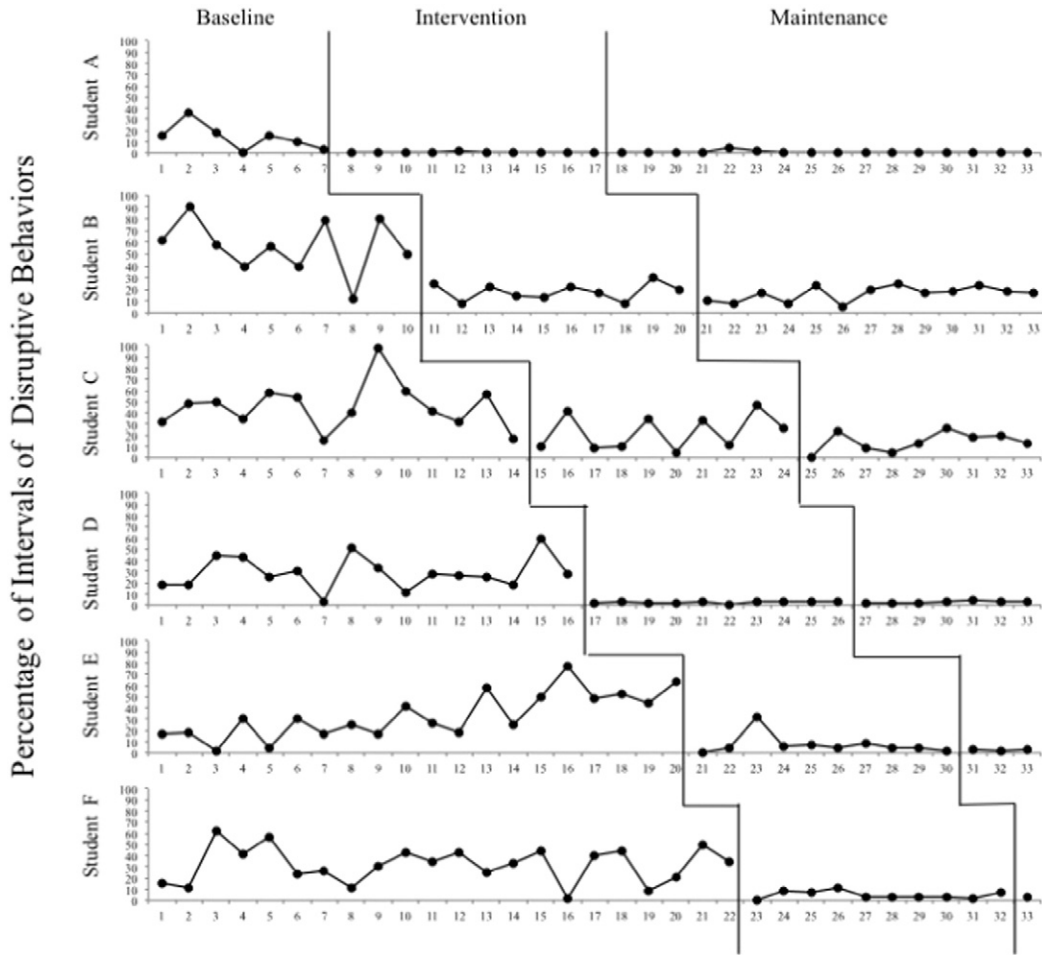
Fig. 1. Percentage of intervals of disruptive behavior present across sessions.

Results from the Koehler–Levin dual regulated-randomization procedure indicated a statistically significant decrease in student disruptive behavior ($p = .03$) between baseline and intervention phases as rated by teachers on the GAS. The average ES = 0.84 across all phases for change in level. There was not a significant change in slope (B–A = 0.10) for student disruptive behavior ($p = .14$) between baseline and intervention phases. Additionally, there was not a significant change in the difference in variance of student disruptive behavior ($p = .14$) from baseline to intervention phase. Overall difference in variance using the B–A method was −1.67.

3.1.3. Treatment integrity

Overall, teachers implemented the BSPs with relatively high treatment fidelity for both adherence and quality, except for one teacher. Teacher A had an overall adherence fidelity rating of 94.3%. The quality of implementation remained at 100% across both phases. Teacher B had a lower overall adherence fidelity rating of 82.9%. The quality of implementation remained at 100% across both phases. Teacher C had a very low level of adherence fidelity, with an overall rating of 5.3%. The quality of implementation

Table 4
Means and standard deviations of student outcome data by phase using partial interval recording.

	Baseline		Intervention		Maintenance	
	M	*SD*	*M*	*SD*	*M*	*SD*
Student A	14.05	11.98	0.17	0.53	0.42	1.29
Student B	56.67	23.04	17.92	7.15	16.15	6.40
Student C	45.52	20.83	22.74	15.48	14.26	8.74
Student D	29.17	14.82	2.50	1.18	2.86	1.26
Student E	33.28	20.22	7.46	8.83	2.78	0.96
Student F	32.03	16.14	4.83	3.47	3.33	0.00

Table 5
Effect size, slope, and variance for disruptive behavior partial interval recordings for students and across all students.

	Partial interval disruptive behavior effect size	Partial interval disruptive behavior slope (B–A)	Partial interval disruptive behavior variance (B–A)
Student A	−1.15	3.27	−121.86
Student B	−1.73	1.95	−435.61
Student C	−1.29	−0.19`	−239.28
Student D	−1.79	−0.27	−204.60
Student E	−1.33	−3.34	−330.24
Student F	−1.69	−0.19	−238.54
Overall average	−1.50	0.21	−261.69

was 90.9% for the steps that were implemented. Teacher D adhered to 100% of the intervention steps. Teacher D received a 100% for the quality of implementation. Teacher E had an overall adherence fidelity rating of 92.9. Teacher E received a 100% rating for quality of implementation. Finally, Teacher F had an overall adherence fidelity rating of 94.6%. Teacher F received a rating of 100% for quality of implementation.

3.2. Acceptability and feasibility

3.2.1. Teleconsultation Acceptability and Feasibility Form

Prior to the beginning of the study, the teachers provided a moderate to high mean rating for the feasibility questions within the Teleconsultation Acceptability and Feasibility Form ($M = 4.79$, $SD = 0.78$), indicating that they perceived the consultation would be feasible over the videoconferencing format during the upcoming study. After completing the study, there was an
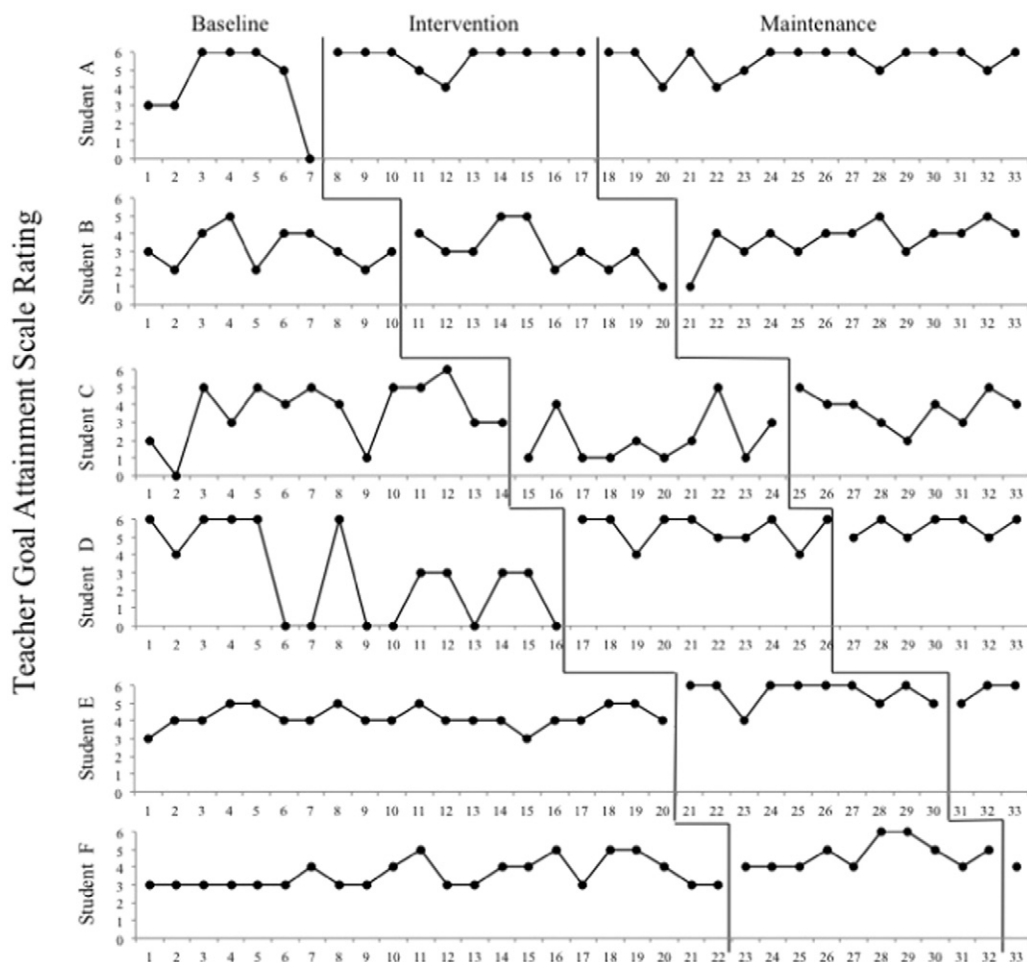

Fig. 2. Goal attainment scale rating of student behavior across all sessions.

Table 6
Means and standard deviations of student outcome data by phase using goal attainment scaling.

	Baseline		Intervention		Maintenance	
	M	SD	M	SD	M	SD
Student A	4.14	2.27	5.70	0.67	5.56	0.73
Student B	3.20	1.03	3.10	1.29	3.69	1.03
Student C	3.64	1.74	2.10	1.45	3.78	0.97
Student D	2.88	2.58	5.40	0.84	5.57	0.53
Student E	4.20	0.62	5.60	0.70	5.67	0.58
Student F	3.59	0.80	4.70	0.82	4.00	0.00

increase in average mean rating on the feasibility questions ($M = 5.58$, $SD = 0.36$), indicating that the teachers found the video-conferencing format feasible for completing a consultation.

Prior to the beginning of the study, the teachers provided a high mean rating for the acceptability questions within the Teleconsultation Acceptability and Feasibility Form ($M = 5.23$, $SD = 0.54$), indicating that they perceived the consultation would be acceptable over the videoconferencing format during the upcoming study. After completing the study, there was an increase in average mean rating on the acceptability questions ($M = 5.61$, $SD = 0.36$), indicating that the teachers found the videoconferencing format acceptable for completing a consultation.

3.2.2. Consultant Evaluation Form

Prior to the beginning of the study, the teachers provided a high mean rating on the Consultation Evaluation Form ($M = 6.32$, $SD = 0.42$), indicating that they perceived that the consultant would be helpful in the upcoming study. After completing the study, the teachers again provided a high mean rating on the Consultation Evaluation Form ($M = 6.71$, $SD = 0.37$), indicating that the teachers found the consultant helpful.

3.2.3. Behavior intervention rating system

After completing the intervention, teachers completed the Behavior Intervention Rating Scale to indicate the effectiveness and acceptability of the BSP. The teachers provided a moderate to high mean rating for the effectiveness of the BSP ($M = 4.20$, $SD = 0.58$). The teachers provided a high mean rating for the acceptability of the BSP ($M = 5.20$, $SD = 0.50$).

4. Discussion

This study utilized a new medium of providing consultation services (i.e., teleconsultation) to examine student outcomes after teachers had implemented a BSP and the feasibility and acceptability of the teleconsultation process. The results of this study (a) extend the previous research regarding the effectiveness of problem-solving consultation with teachers to address student disruptive behavior concerns, (b) extend research on the use of telecommunication for improving access to mental health services in rural settings, (c) provide some guidance regarding the use of teleconsultation services within rural school settings, and (d) provide insight into future directions for research and practice.

4.1. Impact of problem-solving consultation

Previous research within the area of problem-solving consultation has demonstrated that this method and its associated interventions can be effective for addressing social–emotional and behavioral problems within the school setting (Capella et al., 2012; Gutkin & Curtis, 2009; Sheridan, Welch, & Orme, 1996; Sladeczek et al., 2006; Wilkinson, 2005). Problem-solving consultation has been successfully used within the educational setting to improve student behavior outcomes (Gutkin & Curtis, 2009; Sheridan & Kratochwill, 2008). Additionally, the problem-solving method of consultation has been found to be the most effective and most researched model of consultation for supporting individuals in the school setting (Kratochwill et al., 2014; Sheridan et al., 1996).

Table 7
Effect size, slope, and variance for disruptive behavior by gas for students and across all students.

	Goal attainment scale effect size	Goal attainment scale slope (B–A)	Goal attainment scale variance (B–A)
Student A	0.65	0.18	−3.94
Student B	0.23	0.08	0.33
Student C	0.43	0.02	−0.71
Student D	1.01	0.31	−5.75
Student E	2.30	0.01	0.03
Student F	1.31	0.00	−0.01
Overall average	0.84	0.10	−1.67

This study provides another piece of evidence regarding the effectiveness of problem-solving consultation for improving student outcomes. When using direct observation of behavior through the videoconferencing format, this study demonstrated that student behavior decreased after the implementation of the BSP. Through visual analysis, a basic effect was found across all six student–teacher dyads, leading to an overall indication of strong evidence of an intervention effect. Additionally, a statistically significant difference in both level and variance was obtained through use of the Koehler–Levin dual-regulated randomization procedure. Across all student–teacher dyads, the level and variability of the identified disruptive behaviors decreased after entering the intervention phase. When examining student data using the GAS rating, significant differences in effect sizes were again observed. Although the GAS scores demonstrated variability throughout the study, the overall mean level of the GAS scores improved with the implementation of the intervention. Overall, both methods indicate an improvement in student behavior after implementing a BSP developed through teleconsultation.

4.2. Impact of teleconsultation

This study also helped extend the previous research regarding the use of telehealth within rural settings. Despite the many benefits of telehealth, there has been very limited research within this area (American Academy of Child and Adolescent Psychiatry, AACAP, 2008). There has been even less research within the area of teleconsultation within education and school psychology. Indeed, to our knowledge this is the first investigation to use behavioral problem solving consultation within the mode of videoconferencing. Thus, we aimed to identify the experiences of individuals using teleconsultation in the school setting, including teacher perceptions of acceptability and feasibility during their experience with the consultation process.

One area that was examined was the perceived effectiveness of the consultant. Previous concerns related to the videoconferencing format were that the expert consultant may not be able to build enough rapport with the consultee over videoconferencing and that the consultants may not be able to effectively provide the services required in traditional consultation (Brenes et al., 2011; Pesamaa et al., 2004). Despite these concerns, previous research within telehealth has also shown that consultees are willing to share information over videoconferencing and rapport has not been impacted (Manning, Goetz, & Street, 2000). Within this study, completing the experience over videoconferencing did not appear to impact teacher ratings of consultant effectiveness (i.e., consultee mean ratings ranged from 5.75 to 7, indicating that the teachers found the consultant effective when the consultation took place over videoconferencing). Thus, the consultant was able to provide effective consultation through a videoconferencing format.

Another area that was examined was the acceptability and effectiveness of the intervention plans as developed through the teleconsultation method. Previous researchers within telehealth have found that clients can be comparably successful completing intervention plans over face-to-face and videoconferencing methods (Day & Schneider, 2002; Glueckauf & Ketterson, 2004). Within previous research regarding face-to-face consultation, teachers have rated the developed intervention plans as moderately to highly effective and acceptable using the Behavior Intervention Rating Scale (Sheridan, Clark, Knoche, & Edwards, 2006; Wilkinson, 2005). Within this study, the teachers perceived the behavior plans to be moderately-to-highly effective (4.2) and acceptable (5.2) suggesting that intervention plans could be successfully implemented in the classroom setting through teleconsultation.

Finally, the acceptability and feasibility of teleconsultation was examined in our study. Previous researchers in telehealth have found that after completion of the videoconferencing process, participants reported high satisfaction using videoconferencing for treatment or support, with individuals commonly reporting equal satisfaction with face-to-face and videoconferencing methods (American Academy of Child and Adolescent Psychiatry, AACAP, 2008; Alessi, 2000; Bishop et al., 2002; Germain et al., 2010; Glueckauf & Ketterson, 2004; Richardson et al., 2009; Rohland et al., 2000). This study revealed consistent findings for the completion of teleconsultation. Prior to beginning the consultation process, teachers provided a relatively high rating for the perceived feasibility and acceptability of teleconsultation. The most commonly reported concern prior to beginning the teleconsultation was a concern regarding issues with technology. After completing the teleconsultation, mean teacher ratings remained high for both feasibility and acceptability. Overall, teacher ratings and feedback indicated satisfaction with the teleconsultation experience.

4.3. Limitations

There are several limiting factors that should be considered when evaluating the generalization and strength of the findings from this study. First, the two schools included within the study were rather homogenous (e.g., from the same rural region in a Midwestern state, similar populations within the cities, similar supports at the school and district level, similar access to technology equipment). It is possible that the experience with teleconsultation may not be the same in different rural regions. For example, the access to expert consultants, teacher access to support within the school district and community, strength of Internet connection, and access to needed technology equipment may vary in different locations. Schools located in regions that do not have similar supports may not find teleconsultation as effective, feasible, or acceptable.

Second, there were several factors that may have made the teacher participants within this study vary from the broader population of teachers. First, the teachers in this study volunteered to participate and may therefore have been more willing to participate within the consultation process and intervention implementation. Second, the teachers were compensated for their additional time by keeping the iPad used within the project. This incentive may have led teachers to view the experience more positively. Additionally, the teachers were required by the university IRB to complete lengthy ethics training for their participation, which may have led them to be more committed to the project and the implementation of the BSPs.

Third, the consultant and observers were graduate students, instead of members of the school staff. It is unclear how the findings may have changed if the primary consultant was a member of the school staff (e.g., school psychologist). As a consultant or observer within this study, the graduate students were able to provide open schedules and immense flexibility of when they were available to observe in the classroom setting and complete consultation sessions. It is possible that a school psychologist in the school or expert consultant would not be able to provide an equivalent level of support to the teachers due to other requirements within his/her position. Nevertheless, the study provides outcomes for what can happen under conditions of the research.

Fourth, the consultant and observers were not blind to the beginning of the intervention phase for each student–teacher dyad. Given that the observers were asked to complete a treatment integrity form for rating the completion of intervention strategies once the student–teacher dyads entered the intervention phase, it was impossible to keep the observers blind. Additionally, the researchers were not blind to the predicted outcomes for the study. Nevertheless, this knowledge did not influence the data collection or interpretation of the findings.

Fifth, a single consultant was used for all six consultation cases, limiting the external validity of the study. As it true in much of the problem solving consultation research it is possible that results from the study could be associated with specific characteristics of the consultant. For example, the personal or professional skills of the consultant may have impacted the level of perceived effectiveness and acceptability of the teleconsultation method. Additionally, these skills may have impacted the teacher's fidelity of implementation. It is unclear how this process may have progressed or been perceived by consultees given different consultants. Such an issue is prominent in much of single-case design research and needs to be addressed with replication of findings across investigators, sites, and participants (Kratochwill, Hitchcock, Horner, Levin, Odom, Rindskopf, & Shadish, 2013).

Sixth, there were some individual student factors that may have impacted some students' behavior independent of the intervention. Halfway through the intervention phase for student B, his behavior concerns shifted. For this student, the observers continued collecting data on the original behavior concerns (i.e., movement, speaking out, banging desk, and inattention) for consistency within the study. Although these behaviors remained at a lower level, other behaviors became more prevalent within the classroom. This potentially led to the decrease in teacher GAS ratings halfway through the intervention. Additionally, at the time of intervention implementation, student C also began receiving further supports within the community. During the first week of intervention implementation, the student had an increase in behavior concerns within the classroom as reported by the teacher. He potentially could have been responding negatively to the many changes that occurred simultaneously at school and outside of school.

Another factor that may have impacted student behavior was level of treatment integrity. Despite the assumption that teachers are implementing intervention plans as intended, previous research has shown that many individuals struggle to maintain an adequate level of treatment integrity over time (e.g. Noell, 2010; Noell, Witt, Gilbertson, Ranier, & Freeland, 1997; Noell et al., 2005). When examining overall treatment integrity across both the intervention and maintenance phases, five of the teachers implemented at a level of 80% or higher for using the intervention strategies during an observation sessions. However, one teacher implemented a much lower percentage of the intervention strategies. Student C′s teacher implemented the BSP with a very low level of treatment integrity. This circumstance may have impacted both the behavior observed and the teacher ratings of behavior.

Finally, this study is limited in the scope in which it was able to evaluate the acceptability and feasibility of videoconferencing and teleconsultation. This study utilized a single-case design as a method of exploring the new area of teleconsultation within schools. Dallery, Cassidy, and Raiff (2013) recommend using single-case designs when conducting initial efficacy testing of new technology studies, as it provides a repeated look at behavior in a more cost-effective manner. Although a wealth of qualitative information was gathered through the study, the small sample size limits the analyses that could be completed regarding the teacher's perceptions of the teleconsultation process.

4.4. Future directions

The findings from this study have implications for both future research and practice within the areas of tele-health and school psychology. Pertaining to research, findings from this study suggest the need for additional examination of teleconsultation within the educational setting to (a) expand on its potential benefits, (b) address some of the limitations, and (c) move forward with examining new uses for the technology in treatment for a wider range of problems.

In the future, studies focused on increasing the evidence for the effectiveness of teleconsultation would be beneficial. Findings from this study suggest that the method of teleconsultation can lead to positive student outcomes and can be viewed positively by teachers. However, given the limited research within this area, further examination of the method is necessary. Researchers could not only provide further evidence for the use of this format, but would also provide further guidance for the best practices in tele-health, especially as it pertains to evidence-based practices in school psychology.

One of the largest areas of challenge within this study was around limitations with control over what was seen in an observation and difficulty with dropped or poor connections. Within this study, 9.83% of scheduled observations were missed due to technology issues and 12.5% of completed observations experienced a technology issue as some point during the session. It appeared that videoconferencing connection was greatly improved when a device was directly linked to the school's server instead of using a wireless connection. As technology continues to improve and rural areas continue to gain access to better Internet connections and wireless systems, the opportunities for teleconsultation will continue to expand. Further research needs to be completed regarding the best equipment and videoconferencing systems to be using when conducting teleconsultation. Additionally, future research should examine if the teachers and schools rate the feasibility of using these varying systems differently.

A final area of research to examine within the future would be to identify how the videoconferencing method could be used in different ways to improve school access to expert consultants and evidence-based practices. This method could be used to provide more direct assessment and intervention services to students within schools. Additionally, this method could be used to increase access to system-level support. Further research would need to be completed to identify the feasibility of expanding the kinds of services that could be provided over videoconferencing within the educational setting.

The study results also suggest some possible innovations to practice within the near future. First, this study suggests that the use of teleconsultation can provide a level of support to teachers that they find beneficial. Specifically, the teachers appreciated the increased flexibility and feedback provided through this method. This finding suggests that school psychologists, especially located within rural settings, may benefit from implementing teleconsultation within their practices for providing direct services (e.g., intervention and therapy) to children, consultation support to teachers, and system level consultation to schools and districts.

Finally, this study provides additional information and guidance regarding the best practices for completing teleconsultation in an educational setting. Previous guidelines have been developed through the American Telemedicine Association (American Telemedicine Association, ATA, 2009) and the American Psychological Association (APA, 2013) regarding the practice of "Tele-Health and Telepsychology." However, these guidelines are aimed at providing *direct* mental or physical health services to individuals over videoconferencing. Despite the benefits of these guidelines, there are different factors that need to be considered as pertaining to providing teleconsultation services and videoconferencing services in an educational setting using a consultation model. This study provides some initial research on the beneficial practices for completing consultation work in an educational setting. Specific areas for additional guidelines identified through this study include (a) completing consultation sessions, (b) completing observation sessions, (c) setting up and using technology equipment, and (d) maintaining confidentiality over technology within the school setting. In the future, more specific guidelines for teleconsultation within the schools should be developed. As part of the guidelines, step-by-step instructions on the best practices should be provided. As further research is completed, the best practices in this methodology can be identified and disseminated.

5. Conclusions

The use of teleconsultation in school psychology practice provides many opportunities for improved access to well-implemented evidence-based interventions. We demonstrated the effectiveness of this methodology for supporting teachers in identifying and implementing behavioral interventions for students with disruptive behaviors. In addition, we provided relevant data evaluating the feasibility and perceived acceptability of using this methodology in a rural school setting. Despite some teacher frustration over technology difficulties, teachers reported that they were connected with the consultant, appreciated the opportunity for frequent feedback, and that the identified interventions were improving student behavior. This study provides an initial examination for both future research and applied practice.

Acknowledgments

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