An Alternative to Seclusion And Restraint: Collaborative Problem Solving

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An Alternative to Seclusion And Restraint: Collaborative Problem Solving

Abstract
The use of seclusion and restraint within psychiatric and residential settings is controversial, particularly when used with children. No consensus exists that supports its use despite it being a widely accepted form of intervention throughout the world. Research suggests the use of such interventions can have deleterious effects and national guidelines have been implemented to govern the practice of seclusion and restraint with children. Collaborative Problem Solving (CPS) is a transtheoretical model designed to decrease aggressive and explosive behavior in children and adolescents. Evidence suggests CPS is effective in the reduction of seclusion and restraint in inpatient settings. This study investigates the effectiveness of CPS in reducing the incidents of seclusion and restraint on a child and adolescent inpatient unit. Participants of the study ranged in age from 9 to 18 years of age. Eight years of seclusion and restraint data was analyzed that included four years pre and four years post the implementation of CPS. A time-series segmented regression analysis was used to analyze the data. A significant reduction was found in the incident of restraints immediately following the implementation of CPS; however, the results did not sustain over time. A discussion of the research is provided concluding that CPS was not a highly effective method for reducing seclusion and restraint rate. Limitations of the study and directions for future research are also discussed.

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AN ALTERNATIVE TO SECLUSION AND RESTRAINT:
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Approved by the Committee
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AN ALTERNATIVE TO SECLUSION AND RESTRAINT

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AN ALTERNATIVE TO SECLUSION AND RESTRAINT

Abstract

The use of seclusion and restraint within psychiatric and residential settings is controversial, particularly when used with children. No consensus exists that supports its use despite it being a widely accepted form of intervention throughout the world. Research suggests the use of such interventions can have deleterious effects and national guidelines have been implemented to govern the practice of seclusion and restraint with children. Collaborative Problem Solving (CPS) is a transtheoretical model designed to decrease aggressive and explosive behavior in children and adolescents. Evidence suggests CPS is effective in the reduction of seclusion and restraint in inpatient settings. This study investigates the effectiveness of CPS in reducing the incidents of seclusion and restraint on a child and adolescent inpatient unit. Participants of the study ranged in age from 9 to 18 years of age. Eight years of seclusion and restraint data was analyzed that included four years pre and four years post the implementation of CPS. A time-series segmented regression analysis was used to analyze the data. A significant reduction was found in the incident of restraints immediately following the implementation of CPS; however, the results did not sustain over time. A discussion of the research is provided concluding that CPS was not a highly effective method for reducing seclusion and restraint rate. Limitations of the study and directions for future research are also discussed.
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An Alternative to Seclusion and Restraint: Collaborative Problem Solving

Introduction

Imagine being held down on a mattress by seven adults while your limbs are restrained and secured to the floor, and a leather strap is placed around your waist. You are now told to “calm down” then you are left immobilized alone in a room. You have just experienced your first episode of seclusion and restraint. The use of such forms of seclusion and restraint is not uncommon in child psychiatric and residential facilities throughout the United States, and continues to be a controversial and highly debated topic. On one side of the debate is concern regarding the safety and usefulness of seclusion and restraint. For example, each year there are 100 reported patient deaths associated with the use of restraints; in these incidents, children are disproportionally overrepresented (Bush & Shore, 2000; Tazis, 2002). In addition to fatalities, patients experience physical injury, medical complications, and psychological distress from seclusion and restraint (Martin, Krieg, Esposito, Stubbe, & Cardona, 2008). Moran et al. (2009) suggested that the practice of seclusion and restraint is both unethical and a violation of human rights. Despite these alarming statistics, seclusion and restraint continues to be widely accepted as an effective intervention strategy for aggressive and “out-of-control” psychiatric patients. In contrast to this view, some clinicians and researchers believe seclusion and restraint has therapeutic benefits. Cotton (1995) argued that the use of seclusion in a therapeutic setting provides behaviorally dysregulated children an opportunity to participate in the disciplinary process. Additionally, Stirling and McHugh (1998) suggested that therapeutic holding is based in attachment theory and is beneficial in aggressive children’s development.

For those who view seclusion and restraint as an ineffective behavioral management technique, it is necessary to identify new effective strategies for working with behaviorally
dysregulated children. The purpose of this paper is to examine the effectiveness of Collaborative Problem Solving (CPS), a cognitive behavioral model designed to work with aggressive and explosive children, in decreasing the number of seclusion and restraint incidents on a child inpatient psychiatric unit (Greene, 2005).

**Seclusion and Restraint**

**Definitions of Seclusion and Restraint**

In 1997, the American Academy of Pediatrics (AAP) provided definitions of seclusion and restraint. Seclusion was defined as the “involuntary confinement of a patient alone in a room, from which the patient is physically prevented from leaving, for any period of time” (p. 497). Furthermore, AAP defined two types of restraint, “chemical restraints involve the use of psychotropic drugs or sedatives or paralytic agents” and “physical restraint involves the use of physical or mechanical devices to restrain movement” (p. 497). The AAP reported that The Joint Commission on Accreditation of Health-care Organizations (JCAHO) categorizes restraint as a special treatment intervention that requires special justification. The AAP provided four recommendations that should be followed when utilizing seclusion and restraint as a treatment intervention. These recommendations included explaining to children why restraint is necessary, requiring a physician’s written or verbal order, immediate documentation explaining to parents why restraint is necessary, and an assessment to ensure the restraints were applied properly and that they accomplished the purpose for which they were applied. Overall, the position of the AAP is to recognize the use of seclusion and restraint as a last resort for children and adolescents who are extremely disruptive, aggressive or self-injurious.
Therapeutic Rationale and Guidelines for Seclusion and Restraint Use

The therapeutic benefits of seclusion and restraint are highly debatable with proponents insisting that they have clear therapeutic benefits, whereas opponents claiming they are harmful (Cotton, 1995; Moran et al, 2009). In favor of seclusion and restraint, Cotton (1995) asserted that these techniques have additional benefits outside of simple behavioral control. She suggested that children could learn developmentally necessary socialization experiences and engage as participants in the disciplinary process. Cotton acknowledged that not all seclusion is therapeutic and reported guidelines for the appropriate use of secluding a patient. She also recognized that it should never be used as corporal punishment, for the convenience of staff, for the show of power, or when it is not clinically required. In contrast, Finke (2001) reported that the use of seclusion and restraint is primarily implemented as a milieu management technique rather than a therapeutic intervention. Furthermore, Finke reported incidents of seclusion and restraint increase with poor staffing and higher patient census. Finke also suggested that the use of seclusion and restraint is more determined by convenience for the psychiatric staff than what is best for the child.

In an attempt to regulate the unnecessary use of these practices, guidelines have been developed to protect patients (Donovan et al., 2003). The guidelines include the following requirements: a mental health worker must have training in the use of these interventions, a licensed practitioner must evaluate, in person, the need for seclusion and restraint each hour, the patient must be continually monitored by staff, and orders may not exceed a certain period as determined by the patient’s age (Donovan et al., 2003). Furthermore, the AAP suggested only using these techniques as a “last resort;” yet what dictates this arbitrary line is specific to each organization (AAP, 1997; Finke, 2001). In most instances, safety is considered the last resort.
When a child is judged to be unsafe towards themselves or another person, the use of seclusion and restraint is considered appropriate (Day, 2002). Similarly, in a study investigating seclusion and restraint, Gullick et al. (2002) reported the primary reason for seclusion was potential risk or harm to others. In an attempt to clarify antecedents to seclusion and restraint, Day (2002) completed a literature review that only included articles focusing on seclusion alone, and seclusion and restraint with children and adolescents. He found 111 articles from which he provided the seven most cited reasons a child is secluded or restrained.

- To prevent a child who is acting out of control from harming himself;
- (b) to prevent him from harming others, including staff or other patients;
- (c) to prevent him from damaging property;
- (d) to bring a sense of control to a unit;
- (e) to respond to a rule violation or other acts of noncompliance;
- (f) to use when other, less restrictive methods have proven ineffective; and
- (g) to promote self-control and enhance coping skills (Day, 2002, p. 269).

Noticeably the prevention of harm is the most cited justification for seclusion and restraint, but what additional factors contribute to its prevalence? Donovan, Plant, Peller, Siegal, and Martin (2003) found that younger patients are at greater risk for seclusion as well as ethnic minority children. Additionally, they indicated that hospital admission status was an important predictor of both seclusion and restraint. Patients who were court mandated to psychiatric hospitalization or voluntarily admitted were less likely to experience seclusion or restraint than those admitted on an emergency basis. Gullick, McDermott, Stone, and Gibbon (2005) found that the severity level of psychopathology, problematic family backgrounds, and higher levels of mental health symptoms in primary caregivers are also associated with higher rates of seclusion in an inpatient setting. Gullick et al. collected data from an inpatient psychiatric unit
hypothesizing that seclusion would be more prevalent among younger patients and male adolescent patients. The authors concluded that patients who experience seclusion are those who presented initially with increased scores on psychopathology measures. Elevated externalizing scores were also indicative of a propensity to act out or respond to stress with behavioral dysregulation. Additionally, the patients’ families were less functional and had higher levels of family stress and health concerns. Overall the authors’ hypotheses were supported (Gullick et al., 2005). The aforementioned studies not only recognized the rationale for the initiation of seclusion and restraint (i.e., protect patients from harm) but also highlighted that specific patient characteristics (e.g., level of pathology, family background and dysfunction) are associated with higher rates of them (Gullick et al., 2005).

**Theoretical Rationale for Seclusion and Restraint**

Seclusion and restraint are controversial topics. Thus, it is not surprising that there are conflicting perspectives regarding the theoretical basis for them or the lack thereof. Finke (2001) argued that the use of seclusion and restraint is not evidenced-based. Specifically, she explained that evidenced-based practice requires an underlying theoretical base and argued that the use of seclusion is not supported in the literature, nor is it based in theory. Finke cited decades of research that provide a lack of support for the use of seclusion as a therapeutic intervention. She also reported that seclusion and restraint research including children and adolescents is particularly rare, yet continues to be used as an intervention on psychiatric units. Finke (2001) suggested that the utilization of seclusion with children and adolescents needs to be replaced with researched interventions that are established in science. According to Finke, continued use is simply a means to control the environment and should be no longer acceptable. In keeping with this recommended shift in seclusion and restraint, Delaney (2006) supported the notion of
moving away from them as an intervention technique to an emergency procedure. This type of change must occur systemically and start with policies regarding seclusion and restraint (Delaney, 2006).

In contrast, Day (2002) has argued that theoretical principles supporting the practice of seclusion and restraint do exist. He reported the basis for restraint comes from attachment and psychodynamic theories, where “holding” has been justified as a therapeutic intervention. Day (2002) suggested positive outcomes of therapeutic holding are defined in psychodynamic theory and explained in terms of two processes, the cathartic effect or release of pent-up anger, and the verbal expression of difficult feelings. Similar to restraint, psychodynamic theory provides a theoretical rationale for seclusion. Seclusion is also understood through social learning theory and behaviorism, where it is thought to remove all external reinforcement of negative behavior (Day, 2002). Cotton (1995) believed that children require external control when they lack the ability to master their own internal control mechanisms. Therefore, Cotton asserted that seclusion from the environment decreases reinforcement that may be maintaining problematic behavior.

**Psychological Impact of Seclusion and Restraint on Patients**

In a study investigating the subjective experience of restraint, Finke (2001) found that when child patients are secluded, they perceived the experience as traumatic and punishing. Finke also believed it to increase negative behavior. Following a seclusion and restraint incident anger was reported as the typical child emotion associated with seclusion and restraint, compared to guilt, doubt or remorse (Steckley & Kendrick, 2008). Child patients in a study by Morgan (2005) were able to acknowledge that seclusion and restraint is a necessary part of psychiatric hospitalization, however, they believed it should be used as a last resort option. This suggests
that they, too, viewed seclusion and restraint negatively. Day (2002) described several studies that compared the use of physical restraint to seclusion, and children’s behavior after being secluded. Although support was found for the use of physical restraint over seclusion alone (Friedman, 1989 as cited in Day, 2002) other studies reported decreased coping skills in children that were secluded (Day, 2002).

Some studies have included both children’s reports of their experiences of seclusion and restraint as their perception of the adults involved. Morgan (2005) found that the majority of children surveyed believed adults are responsible for deescalating children before it becomes physical. In a qualitative study, children that had experienced restraint were interviewed and reported feeling hurt, bruised, and scared. They were also able to recognize; however, that in most cases the intention of staff was not to cause harm (Steckley & Kendrick, 2008). Stekley and Kendrick (2008) also highlighted the limited insight in childrens’ responses to questions about seclusion and restraint. Most children answered, “yes” when asked if they thought that staff knew the difference between a child blowing off steam or getting angry and potentially causing harm. This may suggest that some children expect adults to understand and foresee their intentions when distressed and act accordingly. Understanding children’s perceptions and experiences can benefit the therapeutic relationship (Greene, 2005), but also provide staff with very important information into the thinking process of patients and their understanding of staff and staff’s role.

In order to investigate whether seclusion and restraint can provide psychological benefits to children, a literature search was conducted to find articles to support this. No studies were found that provided empirical support for the psychological benefits of seclusion and restraint.
**Seclusion and Restraint Reduction**

Due to the potential negative psychological consequences (i.e., fear and trauma) and risk for physical harm in seclusion and restraint, methods to reduce seclusion and restraint have been researched and reported in the literature (Short et al., 2008; Sterling & McHugh, 1998). Most of the methods include staff training in techniques of de-escalation (Steckley, 2010) and system-wide changes to policies regarding seclusion and restraint (i.e., removing seclusion doors and banning the use of physical interventions). Other research suggested that changing the culture of the environment is necessary to reduce and eliminate restraint (Barton, Sandra, Johnson & Price, 2009). Donovan et al., (2003) attempted to identify changes in the prevalence rates of seclusion and restraint after a 1999 Health Care Financing Administration (HCFA) ruling that incidents of seclusion and restraint would adhere to new guidelines. The authors reported that in the two-year period since the ruling there was little reduction in the use of seclusion and restraint. However, changes were documented in individual episodes for each patient and the results indicated that the duration of each episode decreased.

Short et al. (2008) reported a 36% reduction in the occurrence of seclusion and restraint and a 90% reduction of staff injuries following the implementation of safety guidelines when responding to aggressive and out-of-control patients. In this study, a behavioral healthcare facility for approximately 200 civil commitment patients implemented eight safety guidelines based on safety concepts developed in a Best Practices column. The guidelines were in response to a disproportionate amount of staff injuries, specifically when engaging in the seclusion and restraint of a patient. At the beginning of 2004, Short et al. tracked staff perceptions, number of restraints and seclusions, and injuries per year. The staff training in the eight new guidelines resulted in a 90% decrease in staff injuries. The number of individuals who lost workdays...
decreased 77%. In addition to the 36% reduction of seclusion and restraint patient complaints fell by 37% (Short et al., 2008).

The aforementioned studies reported success in seclusion and restraint reduction (Barton et al, 2009; Short et al., 2008; Steckley, 2010). The changes were seen after adopting new guidelines, and staff training in de-escalation. Similarly, in a literature review of seclusion and restraint reduction, Scanlan (2010) discussed the seven most frequent strategies used to reduce incidents of seclusion and restraint. These strategies included staff training and policy change. Additionally, Scanlan reported data collection, external review/debriefing, consumer and family involvement, program change, and an increase in staff and client ratio as other highly cited reduction techniques. According to Witte (2008), increased staff and client interaction is associated with less seclusion and restraints. Scanlan (2010) asserted that monitoring seclusion and restraint data creates a feedback loop allowing organizations to track actual seclusion and restraint use. Curran (2007) reported that in addition to staff trainings on de-escalation techniques, reduction strategies need to address staff attitudes and beliefs regarding seclusion and restraint. Curran reported that psychiatric staff often struggled to change their mindset from seeing seclusion and restraint as a therapeutic intervention to seeing it as something to avoid, and that systemic change requires policy change, educational opportunities and staff training. van Doeselaar, Sleegers, and Hutschemaekers (2008) supported this opinion by reporting that a gap exists between psychiatric staff and policy makers. In a qualitative study interviewing direct care staff, van Doeselaar et al. (2008) found that seclusion and restraint reduction was not a primary concern of staff, suggesting that seclusion and restraint reduction techniques should first target staff members attitudes.
Given the controversies surrounding the use of seclusion and restraint and the difficulties in trying to change the use of these techniques, the following section reviews a promising alternative to seclusion and restraint. Collaborative problem solving (CPS) is introduced as a systemic therapeutic intervention to reduce seclusion and restraint and increase skills in the areas of problem solving, cognitive flexibility, social skills, communication, and emotional regulation.

**Collaborative Problem Solving**

**CPS Theoretical Model**

Collaborative Problem Solving (CPS) is a therapeutic modality designed to help parents communicate effectively with their child while simultaneously setting expectations and listening to their child’s concerns (Greene, 2005). Initially developed to reduce explosive behavior in an outpatient population, CPS has been adopted for use in inpatient settings. The following section reviews the foundational model of CPS followed by a review of supporting research for its effectiveness in several different settings (i.e., outpatient clinic, parent group, inpatient hospital). CPS is a collaborative model designed to produce collaboration between parent and child or staff and child to improve outcomes and reduce aggressive and explosive behavior. Although the mechanisms of change have not explicitly been theorized, the model teaches parents and caregivers to use empathy and listening skills to communicate with frustrated and aggressive children. Through this model, the authors provided caregivers an understanding of their children’s explosive, aggressive, and maladaptive behaviors by conceptualizing these behaviors as symptoms of a lagging skill (e.g., a child who struggles to communicate their needs appropriately may throw an object or punch a wall to express frustration). The model postulated that lagging skills are responsible for negative adjustment and identified various types of...
problems in the domains of executive functioning, social skills, cognitive flexibility, language processing, and emotional regulation. Greene and Ablon (2006) suggested that without these necessary skills, children’s attempts to manage themselves often manifest as oppositional and disobedient behavior. Greene attested, however, that conceptualizing these children as oppositional or manipulative and implementing traditional behavior strategies to shape behavior does not always work. He reported these techniques are primarily designed to control behavior, but do not teach the underdeveloped skills.

Therapeutic Techniques of CPS

The principle component of CPS is what Greene and Ablon (2006) have coined a “plan B.” Plan B is a proactive strategy to assist the child in meeting the adult’s expectations. It first requires the adult to recognize what areas of cognitive abilities the child is lacking. Using this information the adult is able to develop empathy for the child and understand that their maladaptive behavior is the result of underdeveloped skills rather than malicious intent. The first step of a plan B is to learn what is getting in the way of the child meeting the adult expectations. This is generally done by asking a neutral observational statement, for example, “I noticed you didn’t do the dishes last night. What’s up?” The neutral statement allows the child to feel less defensive and more open to a dialogue about why they were unable to meet the expectations. The next step requires the adult to listen to what the child has to say. By listening and responding with empathy, the adult displays a willingness to understand the child’s perspective. When the adult has a thorough understanding of the child’s concern, they state their concern. When two concerns have been presented, the adult provides the child the first attempt at solving the problem. For example, “so what’s a way that you can watch your favorite show (child’s
concerns) and be able to pitch in around the house (adult concern)?” Once a mutual solution can be agreed upon the plan B is complete.

Greene (2005) explained two additional plans for communicating with children. “Plan A,” is when an adult imposes their will on a child. For example, “follow my directions for else,” or “my way or the highway.” According to Greene, this type of interaction usually leads to an explosive episode at the cost of damaging the parent-child relationship. A “plan C,” however, is dropping the parent’s expectation for the moment. The purpose of plan C is to decrease explosive behavior. By dropping an expectation, the adult does not engage in a plan A, which decreases the likelihood of an explosive outburst. An additional goal of a plan C is to reintroduce the expectation by attempting a plan B at a later time (when the child is less frustrated) and figuring out what got in the way of the child meeting the original expectation. Greene and Ablon (2006) stated that traditional parenting approaches operate from a plan A approach and that explosive behavior and tantrums are often exacerbated by an escalation in parental intensity when attempting to impose their will on their child.

**Empirical Support for CPS**

**Outpatient studies**

Greene et al. (2004) provided support for CPS in an outpatient population. The authors highlighted the model’s dual focus on parenting skills and cognitive deficits in children and compared it to Barkley’s Behavior Management Program, a well-established parent training (PT) model (Barkley, 1997). All children in the study were matched for age (9-12 years old) and diagnosis (Oppositional Defiant Disorder, Major Depressive Disorder); families were randomly assigned to either the PT group or the CPS group and treatment progress was tracked over 12-weeks. Greene et al. (2004) reported little difference in effect size between PT and CPS post-
treatment using the Oppositional Defiant Disorder Rating Scale (ODDRS), an unpublished rating scale developed by Greene that was used to measure parent-child conflict. However, clinically significant change was reported in 46% of the CPS group participants compared to 37% of the participants in the PT condition, based on a 25% reduction in ODD-type behaviors. At the 4-month follow-up the CPS condition produced a significant effect size in comparison to a moderate effect size found in the PT condition. Furthermore, 60% of CPS participants showed clinically significant change, compared with 37% for the PT participants. The authors illustrated that CPS was equivalent, if not superior, to a well-established evidenced based PT model.

Recognizing CPS’s utility in developing empathy, Epstein and Saltzman-Beraniah (2010) evaluated the feasibility and efficacy of CPS among parents of children with Tourette syndrome (TS) and Oppositional Defiant Disorder (ODD). Parents of 12 children were taught the fundamentals of CPS within a group format. The group met weekly for two-hours over the course of eight weeks. The authors used several instruments to measure the effectiveness of CPS. Significant changes were seen on a parent rating scale designed to assess the current frequency and intensity of disruptive behaviors at home, following the delivery of CPS. On this scale, the parents endorsed fewer and less intense disruptive episodes (Epstein & Saltzman-Beraniah, 2010). Following the parent group, parents endorsed significantly higher scores on a parent rating scale of social behavior than seen prior to the treatment group. Additionally, parental stress was significantly reduced when measured by an instrument that reflects the stress related to the parenting role.

Despite clinically significant changes in several of the measures, Epstein and Saltzman-Beraniah (2010) reported that some of the scores continued to be in the clinical range post intervention. Other limitations included a small sample size and an 8-week time frame, which
they indicated might not have been enough time for parents to make a shift in their parenting style. Additionally, the study relied on self-report measures versus observational data. Nonetheless, the study provided additional support for the effectiveness of CPS. Epstein and Saltzman-Beraniah recognized the pivotal role empathy plays in understanding children, and demonstrated that teaching parents the possible source of maladaptive behavior provides parents with more empathy, decreases stress and increases parent perceptions of a child’s positive behavior.

**Mixed inpatient-outpatient study.**

Stewart, Rick, Currie and Rielly (2009) demonstrated the effectiveness of CPS in reducing explosive behavior in a 9-bed residential treatment program in London, Ontario, and Canada. Between 2006 and 2009, 49 male youth between the ages of 9 to 13 were discharged from the treatment facility. The average stay for each youth was 3 months. The treatment team was trained in the CPS philosophy. CPS’s effectiveness was evaluated using several measures. The Child and Adolescent Functional Assessment Scale (CAFAS) was used to measure eight domains: school, home, community, behavior towards others, Moods and Emotions, Self-Harm, Substance use, and Thinking. The Parental Stress Index (PSI) was used to measure the level of parental distress and level of child difficulty rated by the parents. The Stress Index for Parents of Adolescents (SIPA) was used to examine the relationship of parenting stress to adolescent characteristics, and quality of parent-child interactions. Additional measures were included to assess the parent-child relationship, the child’s behavior at home and school, and the child’s social skills level. The results of the study were presented categorically. Significant differences were found in the number of meltdowns that each parent reported pre and post treatment phase. Furthermore, these improvements continued at a 6-month follow up. Improvements in social
skills were seen at pre-treatment; however, these improvements decreased at the follow-up. Stewart et al. (2009) proposed this might indicate that these behaviors require more continuous reinforcement. No significant results were found for community participation, nor were significant changes reported for academic changes. Significant changes were seen in the realm of family awareness. Measures of parent stress, limit setting, and support indicated significant improvement (Stewart et al., 2009). These improvements match the philosophy of CPS, as the premise is to improve the communication and relationship between parent and child. Stewart et al. (2009) reported that the changes observed in the study provide support for the effectiveness of CPS with a residential population. The researchers acknowledged several study limitations and provided suggestions for future research. Although significant changes were not found in all domains of the study, the domains directly related to CPS (e.g., social skills, decreasing meltdowns, and parent stress) were observed to have been significantly impacted by the implementation of CPS (Stewart et al., 2009).

**CPS effectiveness in reducing seclusion and restraint.**

To further support CPS as an effective intervention for working with children, Greene et al. (2006) demonstrated its use in reducing seclusion and restraint incidents in a child inpatient psychiatric hospital. For one year, the staff of a 13-bed unit received biweekly training and supervision in the use of CPS while learning to implement the model. The number of seclusion and restraint incidents were tracked during the 1-year training period and compared to a 9-month pre-training period and a 15-month post-training period. Greene et al. defined restraints as “any physical hold lasting longer than five minutes, involuntary administrations of psychotrophic medication, or use of mechanical restraint device, such as leather restraints or a restraint bed” (p. 1158). There was a significant decrease in the number of seclusions and restraints after the
implementation of CPS. In the 9 months prior to the implementation of CPS, the unit documented 281 episodes of restraints. Following the 15-month CPS training period, the unit documented one incident of restraint. Greene et al. noted that the factors that accounted for the significant reduction in seclusion and restraint incidents could not be specifically identified, which impact the study's external validity.

Martin et al. (2008) attempted to replicate Greene et al.’s (2006) results by investigating the use of CPS in reducing seclusion and restraint in a 15-bed child psychiatric inpatient unit. The authors collected data for 3 years prior to implementation of CPS, 6 months during implementation, and 18 months after implementation. They reported a total of 559 restraints and 1,671 seclusion events during the study period. However, after the use of CPS, the rate of restraint dropped from 263 incidents per year to seven incidents per year, with the mean duration of restraint decreasing from 41 to 18 minutes per incident. The incidents of seclusion decreased from 432 to 133 per year.

**CPS Summary and Limitations**

The authors of these four studies illustrated the effectiveness of CPS as an outpatient and inpatient treatment intervention for children with behavior disorders as well as in a group format for parents. Furthermore, data from two of the studies demonstrate that CPS is a successful model for reducing the frequency and duration of seclusion and restraint incidents in an inpatient psychiatric setting (Greene et al., 2006; Martin et al., 2008). Although the studies provided indications of seclusion and restraint reduction after CPS implementation, as Greene et al. (2006) noted, confounding variables may have accounted for this change. Given that CPS is a recently developed intervention, additional research is necessary to understand the mechanisms of change within the model that may in turn account for changes in staff and patient behavior.
Summary

In summary, the controversial nature of seclusion and restraint continues to be debated. Proponents of the use of seclusion and restraint believe that techniques can be used as therapeutic interventions to help children release anger (Day, 2002; Cotton, 1995), whereas, opponents suggest that seclusion and restraint can be traumatizing experiences for children and can have negative consequences (Finke, 2001; Steckley & Kendrick, 2008). Regardless of theoretical perspective, seclusion and restraint are frequently practiced techniques in many psychiatric and residential facilities. Guidelines have been proposed to regulate seclusion and restraint (AAP, 1997), stating their use should be a last resort option.

An increasing amount of research has focused on seclusion and restraint reduction. Researchers have been able to document reductions in seclusion and restraint by implementing new guidelines and providing staff training in de-escalation techniques (Donovan et al., 2003; Short et al., 2008; Steckley, 2010), while other researchers have focused on changing the culture of the environment to reduce incidents and improve staff safety (Barton et al., 2009). CPS focuses on staff and child interaction to reduce explosive behavior. By teaching empathy and a collaborative-interaction style with children, researchers have been able to reduce incidents of seclusion and restraint in two inpatient treatment facilities and one residential treatment program (Greene et al., 2006; Martin et al., 2008; Stewart et al., 2009). Additionally, CPS was effective in improving the parent-child relationship and decreasing externalizing behaviors in an outpatient child population (Greene et al., 2004).

Rationale for Current Study

Given the success of CPS, and the controversial nature of seclusion and restraint with children, it is important to generalize the results of previous studies and extend them. This study
attempts to examine the effectiveness of a CPS in reducing the use of seclusion and restraint on an inpatient child and adolescent psychiatric unit. Although similar studies have been conducted (Greene et al., 2006; Martin et al., 2008), this study differs in several ways. First, the previous two studies were conducted by or in association with the primary authors of CPS, Dr. Greene and Dr. Ablon. This evaluation study is free from direct supervision or oversight from the aforementioned researchers, decreasing experimenter bias. Second, this study utilizes eight years of seclusion and restraint data, compared to three and four years respectively (Greene et al., 2006; Martin et al., 2008). The populations in this study are male and female children and adolescents who range in age from 9 to 18 years old. Previous research focused on a younger group of children (mean age of 9.14), whom had an average hospitalization stay of 14 days compared to an average of seven days in the current study. Lastly, this study had the opportunity to investigate the effectiveness of CPS four years after it was introduced compared to 15 months.

**Current Study**

The purpose of this study was to investigate the effectiveness of a CPS at reducing seclusion and restraint in an inpatient psychiatric unit. Eight-years of seclusion and restraint data from an inpatient child and psychiatric unit was obtained. The data were analyzed using the Statistical Package for the Social Science (SPSS v 19.0) software to investigate whether the number of seclusion and restraint incidents decreased after the implementation of CPS. The following four hypotheses guided the current study.

**Hypotheses**

1. It was hypothesized that the implementation of CPS on a child and adolescent inpatient psychiatric unit would reduce the number of seclusions when compared to the years prior to the implementation of CPS.
2. It was hypothesized that the implementation of CPS on a child and adolescent inpatient psychiatric unit would reduce the length of time a patient remained in seclusion compared to the years prior to the implementation of CPS.

3. It was hypothesized that the implementation of CPS on a child and adolescent inpatient psychiatric unit would reduce the number of restraints when compared to the years prior to the implementation of CPS.

4. It was hypothesized that the implementation of CPS on a child and adolescent inpatient psychiatric unit would reduce the length of time a patient remained in restraint compared to the years prior to the implementation of CPS.

Method

Participants

The participants of this study included children and adolescents between the ages of nine to 17 who were hospitalized in an inpatient psychiatric unit beginning in January 2001 to December 2009. The inpatient unit was a 17-bed, locked, psychiatric unit in the Pacific Northwest. Specifically, the participants of this study were those individuals who during their hospitalization were either secluded, restrained, or both. Predominantly, participants were admitted to the unit for severe psychiatric conditions such as suicide attempts, parasuicidal behaviors, aggressive behaviors, and/or psychotic-related symptoms.

Procedure

The child and adolescent psychiatric unit where the study was conducted did not explicitly adhere to a theoretical orientation for managing their patients prior to the implementation of CPS. Interventions were used based on previous staff experience or on loose principles of behaviorism and token economy type programs (e.g., “if you do not follow our directions, you will have to go into the seclusion room,” “If you do what we want we will reward...
you.”). Staff were well-trained to work therapeutically with children and adolescents; however, the culture of the unit mirrored that of zero-tolerance for perceived unsafe behavior. Seclusion and restraint were used as a last resort option; however, these techniques often became a method of gaining control of the milieu. CPS was introduced to the psychiatric unit in 2005. Although lacking a large amount of empirical support, CPS was adopted because its philosophy and design were promising and had demonstrated effectiveness with an outpatient population (Greene et al., 2004).

Standard protocol at the child and adolescent inpatient psychiatric unit was to document each incident of seclusion or restraint, which became a part of the patient chart. The incident was also documented separately on a seclusion and restraint tracking form, which was completed each evening and reviewed. All documented incidents of seclusion and restraint were stored together from January 2001 to December 2009 in hard copy form, organized per month and year of incident.

Prior to the implementation of CPS on the psychiatric unit, four bachelor–trained therapists and one registered nurse manager were trained in the theoretical and practical tenets of CPS. They received their training by Stuart Ablon, Ph.D., co-author, and co-creator of the CPS model. These individuals disseminated their training to the rest of the staff on the unit, along with training videos and written material. Continual weekly supervision with Dr. Ablon was conducted with the five individuals who received his training, the program director, unit manager, and the unit psychiatrists. These individuals were also provided with training on how to prepare current and new staff to deliver CPS as intended. All current staff and new employees from this point received the same training materials. Adherence to the CPS model was reviewed
in real time on the unit, during weekly meetings, weekly supervision, and monthly staff meetings.

Once approval was received from the hospital Institutional Review Board (IRB) and Pacific University’s IRB, the documents were de-identified and then the data was entered into a spreadsheet. All patients were given a code number and no identifying information was included in the final data file. Data was missing for the month of July in 2001 and March and April in 2004. Due to the amount of data that were available (e.g., every month for 8 years) these data points were not expected to impact the statistical analyses, and were assumed to be missing at random.

**Measures**

The occurrence of seclusion and restraint was used to measure the effectiveness of CPS. All variables were taken from documented incidents of seclusion and restraint that were recorded and stored at the said psychiatric unit. The variables included the date and time of the seclusion and restraint, incident of seclusion, amount of time spent in seclusion, incident of restraint, and amount of time spent in restraint.

Multiple occurrences of seclusion and restraint from a specific patient were tracked over the length of the study and over separate hospitalizations for that patient. A high frequency of seclusion and restraint for any individual was taken into account during the statistical analysis. In order to address the possible impact of multiple incidents of seclusion and restraint from one patient, that may have inflated the monthly total of seclusion and restraint, the statistical analyses were conducted with and without multiple incidents. Multiple incidents did not impact the overall results, and were therefore kept in the final reported results.
Seclusion

Seclusion was defined as the involuntary confinement of a patient alone in a room or area from which the patient is physically prevented from leaving. The unit had one designated room that was used for seclusion procedures. The room was approximately 12 feet wide by 16 feet in length. It was a clean sparse room with a twin-sized mattress on the floor. The floor was polished concrete with six metal rings in the center of the room that were used for restraints. The walls were painted white and the bottom half carpeted. There was a large window with reinforced frosted plexiglass that allowed in natural light. A camera that was positioned in the corner of the ceiling monitored the room. The door into the room was heavy steel with two plexiglass windows that allowed for observation. These windows were covered from the outside with Velcro covers. The seclusion room had a connected bathroom with a lockable door. The bathroom had a toilet, sink and shower. Access to the bathroom was based upon patient safety and level of agitation.

The use of seclusion was used as an intervention when a patient is considered to be of potential harm to self or others. The psychiatric unit procedures required that the patient be first asked to enter the seclusion room of their own accord. If they refused, members of staff would escort them. If patients struggled or became aggressive, security was called to assist with the transporting of the patient into the seclusion room. Once in the room, patients were asked to sit on the mattress while basic expectations were provided (e.g., stay seated on the mattress until all staff members have exited). If staff members were unable to exit the room safely due to the patient’s behavior (e.g., running at the door, attacking staff members, engaging in severe self-harm behaviors), the patient was restrained. The psychiatric unit also had three additional rooms
that could be used as seclusion rooms. These rooms were similar to all other patient rooms; however, they had a steel door with the ability to be locked.

**Restraint**

Restraint was defined as any manual method, physical or mechanical device, material, or equipment that immobilizes or reduces the ability of a patient to move his or her arms, legs, body, or head freely. At the time the data were collected, the said unit used neoprene wrist and ankle restraints, leather waist restraints, and soft-cotton chest restraints. The neoprene restraints were attached with Velcro and tied to the metal rings on the floor of the seclusion room. The waist restraint wrapped around the patient’s abdomen and was secured on either side to the floor. Variables that dictated the use of restraint included violent and self-harming behavior, and extremely disorganized or agitated psychotic processes. As previously discussed, when a patient was unable to allow staff members to safely exit the seclusion room, or were engaging in aggressive or self-harming behaviors they were restrained. Patients were placed on a twin-mattress facing up. Staff members held them in place, one staff member was assigned per limb, another was assigned to monitoring the patient’s head, one was assigned to hold the chest, and two secured restraints. In addition, a registered nurse was assigned as the health and safety monitor. The length of time in restraints was variable and depended on the patient’s ability to calm and verbally commit to safe behaviors. Restraints were initially removed one at a time starting with one arm, then the opposite ankle. Once a patient had demonstrated safe behavior while in limited restraints, the rest of restraints were removed.

The use of restraints only occurred in conjunction with seclusion. A patient was never restrained without being secluded. If a restraint was initiated in the milieu, the patient was first
transported to a seclusion room. Restraints were used as a last resort option, only when there was imminent risk to the patient or to others.

**Statistical Analysis**

A segmented regression analysis (SRA) of interrupted time series (ITS) was used to analyze the data. Segmented regression analysis requires data to be summarized at regular intervals and continuous or counted outcome measures. Segmented regression analysis was used in this study for its ability to evaluate longitudinal effects in quasi-experimental research designs. It allowed us to assess statistically, how much the CPS intervention impacted the outcomes, immediately and over time (Wagner, Soumerai, & Ross-Degnan, 2002).

The least squares regression model in this study was: (Model 1) \( Y_t = \beta_0 + \beta_1(T) + \beta_2(DA) + \beta_3(PA) + \epsilon_t \) (Walthour, Symour, Tackett, & Perri, 2010; Michielutte, Shelton, Paskett, Tatum, & Velez, 2000); where \( Y_t \) was the mean monthly value for the dependent variable of interest at time \( t \), \( T \) was time in months from the start of the observational period, \( DA \) was the dummy variable for pre and post intervention (coded 0 prior to the CPS intervention, and 1 following the CPS intervention), \( PA \) was the time since the intervention (variable 0 = months prior to the intervention, and 1,2,3… = after the intervention, continuously coded each month following the implementation of CPS), and \( \epsilon_t \) was the random variation at time \( t \) not explained by the model. \( \beta_0 \) was the baseline level of the outcome (value at time zero). \( \beta_1 \) was the slope prior to the intervention (the change over the months prior to the implementation of CPS). \( \beta_2 \) was the change in level of the dependent variable immediately following the intervention, and \( \beta_3 \) was the change in slope from pre to post intervention (difference in the slope in the time period before CPS and the slope of the months following the implementation of CPS).
Further analyses were conducted to assess the assumptions of linearity and homoscedasticity required by SRA. These analyses included the White test for heteroskedasticity, the Durbin-Watson test for autocorrelation, and graphs of the residuals (White, 1980). No visible patterns were detected within the plot. These assumptions are addressed for each dependent variable below.

**Results**

The data was prescreened for outliers. Potential outliers were identified in monthly seclusion and restraint rates, individual incidents of seclusion and restraints, and time of year. Aggregated monthly seclusion and restraint rates were converted to z-scores. Z-scores three standard deviations above or below the mean were used to identify outliers, and then, separate analyses were run with these subjects included and without these subjects in the analysis. The second analysis revealed that the outliers did impact the results of the first hypothesis. Aggregated monthly rates were further analyzed to identify the cause of inflated data. In some cases, high rates of seclusion and restraint for a specific patient inflated the monthly total, however, in other cases it was the result of high rates of seclusion and restraint alone. No individual patient(s) impacted the monthly data that changed the study results; therefore, all outlier scores were retained in the final data analysis.

**Seclusion Rate**

A SRA was conducted to evaluate the rate of change in seclusions prior to the implementation of Collaborative Problem Solving (CPS; T), the rate of change immediately following the implementation of CPS (DA), and the rate of change in the months following (PA) the implementation of CPS.
SRA revealed that Model 1 was not significant. No significant change ($p > .05$) was observed in any of the independent variables (T, DA, PA) on seclusion rate (see Table 1). A 5% decrease in seclusion rate was observed immediately following the implementation of CPS ($\beta_2 [DA]$), however, this was not significant ($p = .06$) at the alpha .05 level. Furthermore, a .06% increase in seclusion rate was observed following the implementation of CPS to the end of the study period ($\beta_1 -.06 + \beta_3.12 = .06$). The Durbin-Watson test statistic was not significant, and thus, indicated no autocorrelation (Durbin-Watson = 1.9). The White test, ($p = 7.78$) was not significant, thus it did not indicate a pattern of heteroskedasticity within the residuals.

Using the SRA, the impact of CPS on the number of seclusions was estimated in absolute and relative terms at 6 months, 12 months, and at the end of the study period (43 months). To estimate the absolute difference (AD), the value of seclusion rate was computed at 6 months ($Y_t = \beta_0 + \beta_1 * 62 + \beta_2 * 1 + \beta_3 * 6 =$), 12 months ($Y_t = \beta_0 + \beta_1 * 68 + \beta_2 * 1 + \beta_3 * 12 =$), and 43 months ($Y_t = \beta_0 + \beta_1 * 99 + \beta_2 * 1 + \beta_3 * 43 =$) post intervention, and subtracted from the value of seclusion rate at each time interval assuming as if the intervention had not been implemented (e.g., $[Y_t = \beta_0 + \beta_1 * 62 + \beta_2 * 0 + \beta_3 * 0 =$]; AD = $[\beta_0 + \beta_1 * ($total months$) - \beta_3 * ($post-period months$)] - [\beta_0 + \beta_1 * ($total months$)])]. Six months following the CPS intervention (post implementation month 6, study month 62), the AD was 4.16. Twelve months following the CPS intervention (post implementation month 12, study month 68), the AD was 3.48. Lastly, 43 months following the CPS intervention (post implementation month 43, study month 99), the AD was -0.24.

The relative change was expressed by dividing the AD by the value of seclusion rate if CPS had not been implemented. The relative difference (RD) model was specified as $RD = [(AD_{(months)}/(\beta_0 + \beta_1 * ($total months$))] * 100. The RD for month 6 was 42%, indicating that the
number of seclusions decreased by 42% in month 6 compared to what it would have been if CPS had not been implemented. The RD for month 12 was 36%, indicating that the number of seclusions decreased by 36% in month 12 compared to what it would have been if CPS had not been implemented. The RD for month 43 was -3.11%, indicating that the number of seclusions increased by 3.11% in month 43 compared to what it would have been if CPS had not been implemented.

Table 1

<p>| Unstandardized &amp; Standardized Regression Coefficients for Seclusion Rate (N =105) |
| Unstandardized Coefficients | Standardized Coefficients |</p>
<table>
<thead>
<tr>
<th>B</th>
<th>Std. Error</th>
<th>( \beta )</th>
<th>t</th>
<th>r</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. T</td>
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<td>0.058</td>
<td>-0.24</td>
<td>-0.97</td>
</tr>
<tr>
<td>2. DA</td>
<td>-4.92</td>
<td>2.61</td>
<td>-0.35</td>
<td>-1.89</td>
</tr>
<tr>
<td>3. PA</td>
<td>0.12</td>
<td>0.09</td>
<td>0.289</td>
<td>1.42</td>
</tr>
</tbody>
</table>

\( T = \) rate of change prior to the intervention, \( DA = \) rate of change immediately following the intervention, \( PA = \) rate of change in the months following the intervention

Average Time in Seclusion

Segmented regression analysis revealed that Model 1 was not significant. No significant change (\( p > .05 \)) was observed in any of the independent variables (T, DA, PA) on amount of time in seclusion (Table 2). A 0.9% increase in time spent in seclusion was observed immediately following the implementation of CPS (\( \beta_2 [DA] \)), however, this was not significant (\( p = .09 \)) at the alpha .05 level. Furthermore, a .01% decrease in time spent in seclusion was observed following the implementation of CPS to the end of the study period (\( \beta_1 \cdot -0.06 + \beta_3 \cdot 0.12 = .01 \)). The Durbin-Watson test statistic was not significant, and thus indicated no autocorrelation
(Durbin-Watson = 1.7), and the White test, \((p = 5.97)\) was nonsignificant, thus it did not indicate a pattern of heteroskedasticity within the residuals. Using the SRA, the impact of CPS on the average time in seclusion was estimated in absolute and relative terms at 6 months, 12 months, and at the end of the study period (43 months). Again the AD model \([\beta_0 + \beta_1 \times \text{(total months)} - \beta_3 \times \text{(post-period months)}}\) \(\) – \([\beta_0 + \beta_1 \times \text{(total months)}]\) was used to estimate the absolute difference. Six months following the CPS intervention (post implementation month 6, study month 62), the AD was -0.71. Twelve months following the CPS intervention (post implementation month 12, study month 68), the AD was -0.8. Lastly, 43 months following the CPS intervention (post implementation month 43, study month 99), the AD was -0.64.

The RD \([\text{AD(months)} / (\beta_0 + \beta_1 \times \text{(total months)})] \times 100\) for month 6 was -44\%, indicating that the average time in seclusion increased by 44\% in month 6 compared to what it would have been if CPS had not been implemented. The RD for month 12 was -51\%, indicating that the average time in seclusion increased by 51\% in month 12 compared to what it would have been if CPS had not been implemented. The RD for month 43 was -45\%, indicating that the average time in seclusion increased by 45\% in month 43 compared to what it would have been if CPS had not been implemented.
Table 2

*Unstandardized & Standardized Regression Coefficients for Average Time in Seclusion (N = 105)*

<table>
<thead>
<tr>
<th></th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
</tr>
<tr>
<td>1. T</td>
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<tr>
<td>2. DA</td>
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</tr>
<tr>
<td>3. PA</td>
<td>-.005</td>
<td>.02</td>
</tr>
</tbody>
</table>

**Restraint Rate**

A segmented regression analysis was conducted to evaluate the rate of change in restraint prior to the implementation of Collaborative Problem Solving (CPS; T), the rate of change immediately following the implementation of CPS (DA), and the rate of change in the months following (PA) the implementation of CPS.

The SRA for Model 1 was significant. A summary of regression coefficients is presented in Table 3 and indicates that one (DA) of the three variables significantly contributed to the prediction equation. An 8.13% decrease in restraint rate was observed immediately following the implementation of CPS (β2 [DA]), and was significant (p = .04) at the alpha level of .05. Furthermore, a 0.13% increase in restraint rate was observed following the implementation of CPS to the end of the study period (β1 -.04 + β0.17 = 0.13). The Durbin-Watson test statistic was not significant and thus indicated no autocorrelation (Durbin-Watson = 1.8). The White test (p = 9.29) was nonsignificant, thus it did not indicate a pattern of heteroskedasticity within the residuals. Using the SRA, the impact of CPS on the number of restraints was estimated in absolute and relative terms at 6 months, 12 months, and at the end of the study period (43
months). The AD =\([\beta_0 + \beta_1 \times \text{total months} - \beta_3 \times \text{post-period months}] - [\beta_0 + \beta_1 \times \text{total months}]\) 6 months following the CPS intervention (post implementation month 6, study month 62) was 7.11. Twelve months following the CPS intervention (post implementation month 12, study month 68), the AD was 6.09. Lastly, 43 months following the CPS intervention (post implementation month 43, study month 99), the AD was 0.82.

The RD for month 6 was 41%, indicating that the average number of restraints decreased by 41% in month 6 compared to what it would have been if CPS had not been implemented. The RD for month 12 was 36%, indicating that the number of restraints decreased by 36% in month 12 compared to what it would have been if CPS had not been implemented. The RD for month 43 was 5%, indicating that the number of restraints decreased by 5% in month 43 compared to what it would have been if CPS had not been implemented.

Table 3

Unstandardized & Standardized Regression Coefficients for Restraint Rate \((N = 105)\)

<table>
<thead>
<tr>
<th>Unstandardized Coefficients</th>
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</tr>
<tr>
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<tr>
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</tr>
<tr>
<td>3. PA</td>
<td>0.17</td>
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</tbody>
</table>

\(^*p < .05\)

Average Time in Restraint

A segmented regression analysis was conducted to evaluate the rate of change in time in restraint prior to the implementation of CPS (T), the rate of change immediately following the
implementation of CPS (DA), and the rate of change in the months following (PA) the implementation of CPS.

Segmented regression analysis revealed that Model 1 was not significant. No significant change \( (p > .05) \) was observed in any of the independent variables (T, DA, PA) on average time in restraint (Table 4). A 0.8% increase in time in restraint was observed immediately following the implementation of CPS \( (\beta_2 [DA]) \), and was not significant \( (.033) \) at the alpha .05 level. In contrast, a .003% decrease in time spent in restraint was observed following the implementation of CPS to the end of the study period \( (\beta_1 .00 + \beta_.003 = .003) \). The Durbin-Watson test statistic was not significant and thus indicated no autocorrelation \( (\text{Durbin-Watson} = 2.12) \). The White test, \( (p = 4.78) \) was nonsignificant, thus it did not indicate a pattern of heteroskedasticity within the residuals. Using the segmented regressions model, the impact of CPS on the average time spent in restraints was estimated in absolute and relative terms at 6 months, 12 months, and at the end of the study period (43 months). The \( AD = [\beta_0 + \beta_1 * (\text{total months}) - \beta_3 * (\text{post-period months})] - [\beta_0 + \beta_1 * (\text{total months})] \) 6 months following the CPS intervention (post implementation month 6, study month 62), was -0.74. Twelve months following the CPS intervention (post implementation month 12, study month 68), the AD was -0.74. Lastly, 43 months following the CPS intervention (post implementation month 43, study month 99), the AD was -0.72.

The RD for month 6 was -42%, indicating that the average time in restraint increased by 42% in month 6 compared to what it would have been if CPS had not been implemented. The RD for month 12 was -41%, indicating that the average time in restraint increased by 41% in month 12 compared to what it would have been if CPS had not been implemented. The RD for
month 43 was -35%, indicating that the average time in restraint increased by 35% in month 43 compared to what it would have been if CPS had not been implemented.

Table 4

*Unstandardized & Standardized Regression Coefficients for Average Time in Restraint N =105*)

<table>
<thead>
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<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
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<tbody>
<tr>
<td></td>
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<td>2. DA</td>
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<tr>
<td>3. PA</td>
<td>-.003</td>
<td>.03</td>
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Discussion

The purpose of this study was to evaluate the effectiveness of Collaborative Problem Solving (CPS), a cognitive behavioral model for working with explosive children, in reducing seclusion and restraint incidents in children on an inpatient psychiatric unit. Seclusion and restraint are associated with several negative consequences for both staff and patients (Martin et al., 2008; Bush & Shore, 2000; Tazis, 2002); however, these techniques continue to be used as methods of control and to promote safety in many inpatient and residential treatment facilities. CPS has demonstrated promising results in reducing the incident rates of seclusion and restraint, as well as the amount of time children spend in seclusion and restraint (Greene et al., 2006; Martin et al., 2008). The present study attempted to replicate the aforementioned results by hypothesizing that the implementation of CPS would significantly reduce the incident rate and
time spent in seclusion and restraint on a child and adolescent inpatient psychiatric unit. There were four hypotheses regarding CPS and seclusion and restraint.

The first hypothesis was not supported using a segmented regression time series analysis to evaluate the change in seclusion rate. Although there was an observable decrease in the rate of seclusion (see Figure 1), the change was not statistically significant. Similarly, the second hypothesis was not supported. No significant change was found in the amount of time spent in seclusion immediately following the implementation of CPS or in the months after the model had been in effect. It was also hypothesized that the implementation of CPS would significantly reduce the incidence of restraint use on the unit. This hypothesis was supported. There was a significant change in the incidence of restraint use immediately following the implementation of CPS. However, the results did not sustain through the end of the study period (see Figure 2). Finally, the fourth hypothesis was not supported. The amount of time spent in restraint following the implementations of CPS was not significantly different at the end of the study period.

Overall, the hypothesized reduction in amount of seclusion and time spent in seclusion after the implementation of CPS was not supported; however, the staff and patients of the psychiatric unit did benefit early in the study period from a significant reduction in use of restraints. The results, although not expected, are still positive. The use of restraints is associated with staff and patient injury, psychological distress, and even death (Bush & Shore, 2000; Tazis, 2002). The implementation of CPS temporarily impacted the frequency of restraint used to safely control and protect a child from hurting themselves and others, therefore, reducing the likelihood that such events occurred. The results are similar to those found by Martin et al.
(2006). Martin et al. found that restraint was observed to make the fastest reduction and suggested the reduction in restraint use should be a primary goal.

**Implications**

A number of implications and conclusions can be drawn from this pattern of results. One possible consideration is that CPS is not effective for reducing seclusion and restraint rates. Another implication is that it is difficult to sustain treatment effects and treatment adherence over time. These findings underscore the need for long-term follow-up as what appears to be a positive result at one year dissipates by year four. A third conclusion is that these results require further analysis to understand the what, where, why, and how of CPS effectiveness. For this we turn to a detailed look at the limitations of the current study and possible future directions for research.

This study differed from previous research in its statistical analysis of the data. The ability to assess the impact of CPS at different time points was pivotal and allowed us to account for staff training and mastery of the CPS model within the first year of implementation. It also provided support for continuous training and supervision for milieu staff on an ongoing basis as the results indicated an increase in all independent variables by the end of the study period. Encouraging tenured nursing staff and mental health therapists to fundamentally change the way they work was a challenging aspect in implementing CPS. CPS requires mental health professionals to shift “conventional” ways of thinking about children. This shift is difficult to measure. Unlike training an individual in a specific skill set, CPS required professionals to adjust the way they conceptualize behavior, and in turn alter the way they respond to youths’ frustration, noncompliance and opposition. Given the importance of this adjustment in thinking for staff, it is critical to note that this study did not assess staff mastery and ability to implement
CPS. Furthermore, objective measures of the understanding of CPS were not implemented and formal continuous training for all staff was not provided. Although supervision was provided during the study period, this supervision was with a small group of mental health professionals and the information was may not have been regularly disseminated to the rest of the unit staff.

**Limitations**

There are a number of limitations to this study that should be considered when interpreting the results. First is the experimental design. Inherent in quasi-experimental designs is the inability to demonstrate a cause and effect relationship. Time series analysis is the strongest quasi-experimental design for evaluating long-term effects of an intervention over time (Wagner et al., 2002). It does, however, aggregate the scores of each individual in the study, and in this case, seclusion and restraint rates per month. This limits the ability to evaluate individual scores directly and understand their impact on the data and overall analysis (Wagner et al., 2002).

The next limitation addresses the method of seclusion and restraint incident documentation. The unit policy was to document each incident of seclusion and restraint. This would occur both in the patient chart, indicated by an incident report, as well as on a seclusion and restraint record form that did not include any patient demographic information with the exception of the medical record number. Each day, incidents of seclusion and restraint were identified from the chart and documented in the tracking form. This double tracking system allowed for potential incidents to be missed for documentation in both places (chart and tracking form). This study utilized the tracking form to gather data and did not match incidents with individual patient medical charts. Therefore, it is possible that events of seclusion and restraint occurred that were not accounted for in this study, which would have increased seclusion and restraint rather than decreased them, further disconfirming the effectiveness of the CPS treatment.
intervention. Another limitation of the tracking form was the lack of demographic data available. We were unable to identify gender, age, ethnic, and diagnostic trends in the data. The ability to understand the relationship of confounding variables is important and has clinical implications. This data set does not allow us to make generalizations or draw conclusions as to what gender, age, ethnicity group, and primary diagnosis was likely to be secluded or restrained. Further, we were unable to determine if the effects of CPS differed across subgroups.

Lastly, the influence of the economic pressure and recession of 2007 may have impacted the results of the study. The 2007 economic recession forced changes in healthcare throughout the United States (Mitka, 2009). The impact of this national problem was observed on the psychiatric unit during the study period. This impacted the unit in several ways. Staff to patient ratio decreased. Some patients require constant supervision and therefore at times are provided with an individual staff member (i.e., one-to-one supervision). Budget cuts and financial pressure influenced the ability to schedule an individual staff member for one patient and the overall amount of staff on the unit. The number of staff on a psychiatric unit is negatively correlated with patient aggression and seclusion and restraints (Scanlan, 2010; Witte, 2008). Furthermore, the ability for continued staff training and meetings were impacted by the systemic organizational staffing problems and budget cuts. Regular staff meetings and ongoing trainings are also associated with improved staff morale, and overall satisfaction with work (Curran, 2007). Less staff means more work per person, which often leads to staff burnout and exhaustion. CPS is built on the ability to empathize and listen to a child. This is a difficult task when staff have little time and increased frustration with their work environment.
Future Research

Future research could benefit from an implementation design that takes into account standardized training and a measure of training mastery prior to implementation. Furthermore, future research would benefit from evaluating the impact of CPS compared to other studies that were previously discussed that successfully reduced seclusion and restraint rates. If CPS is to be considered an effective method for this purpose, research is needed to understand the mechanisms behind the model. The field would benefit from continued experimental studies that compare the use of CPS as an effective treatment option for explosive children compared to already well-established behavior protocols. Cultural considerations should also be considered when evaluating this model. Does the collaborative nature align with all children, or is this a primarily Caucasian, westernized approach? The parental, cultural, and religious roles of some groups may not benefit from a collaborative approach. Can CPS be adapted to meet these needs?

Future research is needed to understand the theoretical and clinical implications of secluding and restraining a child. As Finke (2001) reported above, evidenced-based practice is grounded in theory, and currently there is little theoretical support for the use of such interventions. With that said, the question arises, what can mental health staff do with violent, aggressive and psychotic patients? Clearly, seclusion and restraint can have negative physical and psychological consequences, but they also protect some patients from hurting themselves and others. The balance may be found in training staff to avoid such interventions via de-escalation techniques (Steckley, 2010), problem-solving skills (Greene et al., 2006), and systemic organizational changes (Curran, 2007; Steckley, 2010) but also to empower staff to safely and effectively manage violent patients without feeling as though such an event is a failure (Lindsey, 2010). It may be more important to compare CPS to organizational change and staff
training in de-escalation, rather than parent training, to determine which is more effective in reducing seclusion restraint.

**Conclusions**

In summary, the results of this study were unexpected. Although the psychiatric staff significantly decreased the use of restraints following the implementation of Collaborative Problem Solving (CPS), these results did not sustain over time. A reduction in the rate of seclusion was observed, yet not significant. Regardless of why a reduction in restraint was initially found, the results speak to the ability of psychiatric units to reduce the deleterious effects of seclusion and restraint by changing the status quo. We are unable, however, to say with certainty whether simply changing the status quo is responsible for the results, or can some of the change be credited to CPS? Furthermore, the need for continued training, interest, and enthusiasm around a new model cannot be overlooked. The impact of the CPS model on this particular unit may have continued its momentum in its reduction of seclusion and restraint if the aforementioned variables were annually assessed and implemented. Although it is impossible to say with certainty why the results were not sustained, it is clear that continued research is needed for this critical topic.
References


Figure 1. Aggregate monthly seclusion rate over the study period. The implementation of the CPS model is represented in the figure by the bold vertical line. There was no significant difference in the monthly seclusion rate immediately following the implementation of CPS.
Figure 2. Aggregate monthly restraint rate over the study period. The implementation of the CPS model is represented in the figure by the bold vertical line. There was a significant difference in the monthly restraint rate immediately following the implementation of CPS.