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Collaborative & Proactive Solutions (CPS): A Review of Research Findings in Families, Schools, and Treatment Facilities

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Abstract
Collaborative & Proactive Solutions (CPS) is a psychosocial treatment model for behaviorally challenging youth, which has been applied in a diverse array of settings, including families, schools, and therapeutic facilities. Numerous studies have documented its effectiveness and examined factors that mediate and moderate the effectiveness of the model. Data have thus far shown that, with regard to behavioral improvements, CPS is at least the equivalent of the standard of care for externalizing youth, Parent Management Training, and that CPS may hold additional benefits as regards parent–child interactions and children's skill enhancement.

Keywords Collaborative & Proactive Solutions · Research · Oppositional defiant disorder · Psychosocial treatment · Cognitive-behavioral treatment · Parent Management Training · Incompatibility

Introduction

Collaborative & Proactive Solutions (CPS) is a psychosocial treatment model for behaviorally challenging youth first articulated in published form in the book *The Explosive Child* (Greene 1998). Over the last 20 years, the CPS model has been applied and studied in a diverse array of settings, including families, general and special education schools, inpatient psychiatry units, and residential and juvenile detention facilities. Numerous studies have been published documenting its effectiveness and supporting its status as "evidence-based," and additional studies have examined mediating and moderating factors. This paper provides a review of these studies.

The CPS approach falls under the broad umbrella of cognitive-behavioral therapy (CBT), and fits within what has been referred to as the "third wave" of CBT (Hayes 2004; Hayes and Hoffman 2017). CPS can be considered a "hybrid" model drawing from multiple theoretical influences. For example, CPS is rooted, at least partially, in social learning theory, particularly Walter Mischel's (1989) work on frustration tolerance and delay of gratification in children. The model also relies heavily on vast findings in neuropsychology delineating the skills frequently found lagging in youth with social, emotional, and behavioral challenges (e.g., Stifter et al. 1999; Kopp 1989; Moffitt 1990; Moffitt and Lynam 1994; Pennington and Ozonoff 1996; Loeber and Keenan 1994; Garland and Weiss 1996; see Greene and Doyle 1999, for a review) and draws from transactional models of development (Bell 1968; Belsky 1984; Chess and Thomas 1984; Cicchetti and Lynch 1993, 1995; Gottlieb 1992; Sameroff 1975, 1995) emphasizing the "fit" or "match" between characteristics of an individual and characteristics of his or her environment. Along these lines, challenging behaviors are said to occur under conditions in which the expectations being placed upon a child outstrip his or her skills, and the resulting behavior is referred to as an "incompatibility episode." Transactional models of development have also influenced the CPS model's emphasis on finding solutions that are mutually satisfactory (i.e., solutions that address the identified concerns of both children and caregivers). Finally, in its de-emphasis on overt behavior and psychiatric diagnoses, the CPS model is in synchrony with the field of developmental psychopathology, which posits that behavior should not be distinguished primarily

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by severity or category (e.g., Cicchetti 1984; Rutter and Garmezy 1983). In the CPS model, behavior—whether crying, withdrawing, screaming, swearing, hitting, or biting—is simply the means by which a child is communicating that there is incompatibility between expectations and skills.

CPS Treatment Ingredients

Irrespective of the setting in which the CPS model is implemented—families, schools, or treatment facilities—the model involves two primary components: (1) engaging caregivers in the process of identifying a child's lagging skills and unsolved problems, using an instrument called the *Assessment of Lagging Skills and Unsolved Problems (ALSUP)*; and then (2) helping caregivers and youth solve those problems collaboratively and proactively.

The ALSUP (see Appendix) is neither a behavior checklist nor a rating scale, but is instead utilized as a discussion guide, the purpose of which is to help caregivers identify a child's lagging skills and unsolved problems. Unsolved problems are defined as expectations that a child is having difficulty reliably meeting. The ALSUP is intended to help caregivers move away from focusing on overt behavior and the diagnostic categories summarizing those behaviors and focus instead on the factors (lagging skill and unsolved problems) that are contributing to that behavior. The premise is that when assessment is focused primarily on overt behaviors, intervention is focused primarily on modifying overt behaviors. However, doing so does not solve the problems that are causing those behaviors. The corresponding premise is that solving the problems that are causing challenging behaviors will reduce or eliminate those behaviors.

When the ASLUP is first completed, several dozen unsolved problems may be identified. The role of the clinician is to help caregivers and children prioritize the problems that are to be solved first (so as to avoid the common misstep of trying to solve all problems at once) and then to become proficient in the problem-solving process so that they can solve problems independently. There is another advantage in using the ALSUP: when caregivers identify unsolved problems proactively, those problems become highly predictable, and can therefore be prioritized and solved proactively.

The problem-solving process involves three steps:

- the Empathy step, in which caregivers gather information from the child about his or her concern or perspective about a given unsolved problem (especially, what's making it difficult for the child to meet the expectation);
- the Define Adult Concerns step, in which caregivers articulate their concern or perspective on the same unsolved problem (why it's important that the expectation be met, especially in terms of the impact on the child and/or others); and
- the Invitation step, in which child and caregivers collaboratively arrive at a solution that addresses the concerns of both parties.

For example, if a child was having difficulty brushing his or her teeth before going to bed at night—a fairly common unsolved problem—the Empathy step would begin with, "I've noticed you're having difficulty brushing your teeth before going to bed at night. What's up?" The caregiver would ask probing questions—using eight strategies specified in the model until a comprehensive understanding has been achieved related to the difficulties the child is having in meeting that expectation. Perhaps caregivers would discover that the child does not like the taste of the toothpaste (one of several typical concerns for children struggling with this expectation). Caregiver concerns fall into one or both of two categories: how the unsolved problem is affecting the child, and/or how the unsolved problem is affecting others. In the Define Adult Concerns, that might be expressed by a caregiver as follows: "My concern is that you might get cavities and it would hurt a lot to get them filled and it would also cost me a lot of money." In the Invitation step, caregiver and child collaboratively generate and evaluate solutions that address both sets of concerns (e.g., trying a different toothpaste with a more palatable flavor.) Note that this conversation is taking place proactively (rather than reactively), it is focused on a specific unsolved problem (rather than on the behaviors that are being caused by the unsolved problem), and there is no attempt to incentivize the child to meet the expectation or punish the child if the expectation is unmet.

Hypothesized Mechanisms of Change in CPS

The process of identifying lagging skills and unsolved problems and engaging children and caregivers in the process of solving problems collaboratively and proactively contributes to an array of potential mechanisms of change.

Paradigm Shift

Helping caregivers come to view a child's challenging behavior through the prism of lagging skills—rather than through the prism of coercion or poor motivation—often leads to a paradigm shift, both in how the caregivers are viewing both the child and themselves. The logic of popular characterizations of behaviorally challenging kids—such as attention-seeking, unmotivated, manipulative, coercive, and limit-testing—make less sense when they are juxtaposed against the view that lagging skills are the primary contributor to challenging behavior. Characterizations of

parents as passive, permissive, inconsistent, noncontingent, inept disciplinarians make less sense as well (and any may explain why, in many families of behaviorally challenging children there are well-behaved siblings). Moreover, it may become clear why motivational procedures—contingency contracts, incentives, punishment, time-out from reinforcement—may not have produced the desired or durable treatment effects: aside from the fact that many parents do not apply these interventions reliably over time or drop out of treatment (Kazdin 1997), these interventions do not solve the problems that are causing challenging behavior. Rather, caregivers come to recognize that incompatibility episodes occur in response to discrete and predictable unsolved problems, that children have important and legitimate concerns that are making it difficult for them to meet certain expectations, and that these concerns need to be heard and addressed for the problems to be solved.

Organizing the Effort

As noted above, proactively identifying and prioritizing unsolved problems helps caregivers (a) come to appreciate that a child's incompatibility episodes are highly predictable and can therefore be solved in a planned, proactive manner; (b) identify the precise conditions in which incompatibility arises, and give thought to whether certain expectations are truly realistic; (c) pinpoint specific problems as the target of intervention rather than behaviors or noncompliance that occur across a wide variety of conditions; (d) determine which unsolved problems are to be solved first and which are to be set aside for now, thereby reducing the likelihood that caregivers will attempt to address dozens of unsolved problems simultaneously; (e) ensure that problem-solving discussions take place under more optimal circumstances (proactively, when caregivers and children are less aroused emotionally); and (f) greatly reduce the likelihood of heat-of-the-moment conflict.

Collaborative, Not Unilateral

When solving problems collaboratively, caregivers often obtain new information from a child about the factors that have been making it difficult for the child to meet a given expectation. This promotes empathy and communication. When adults are expressing their concerns—rather than imposing unilateral solutions and consequences—kids become more aware of the caregivers' point of view. This, too, promotes empathy and communication. And when kids and caregivers are collaborating on realistic and mutually satisfactory solutions, they are trying hard to address one another's concerns, develop problem-solving skills that can be utilized for other areas of incompatibility, enhance the caregiver–child relationship, and end caregivers' reliance on incentives and punitive practices that may have historically fueled conflict. Both parties become confident that their concerns will be heard and addressed. Both parties participate in generating and approving agreed-upon solutions. As problems are solved, incompatibility episodes subside. There is no focus on replacement behaviors, only on solutions that address the concerns of both parties.

Differences Between CPS and PMT

For quite some time, Parent Management Training (PMT) has been the standard of care for youth with externalizing behavior problems. For this reason, PMT—specifically, Barkley's Defiant Children (1997) model—was employed as the comparison treatment in evaluating the effectiveness of CPS in many of the studies described herein.

PMT programs have become ubiquitous since Boardman (1962) first described its core intervention practices and Patterson (1982) articulated the presumed coercive adult–child interaction processes driving the application of these practices. There is no singular "PMT"; different PMT programs utilize vastly different mixes of treatment ingredients. That said, to varying degrees, the majority still maintain an emphasis on training parents to apply operant methodologies aimed at modifying children's challenging behaviors and ensuring compliance with adult directives. For example, the Incredible Years model (Webster-Stratton 2011) includes not only core PMT intervention practices but also, depending on the age of the child, additional components aimed at helping children develop language processing and social skills, a sense of self, school-readiness skills, social skills, and emotion-regulation skills, and helping parents with stress management, marital discord, and solving problems with educators.

Although the diversity of PMT programs makes it difficult to draw concrete comparisons between CPS and PMT, there are some general differences between the two models. These differences apply to at least three important realms: (1) notions regarding the etiology of challenging behavior; (2) foci of assessment and intervention; and (3) intervention practices.

As regards the etiology of challenging behavior, many PMT models posit that such behaviors stem primarily from inept parental disciplinary practices and that children's challenging behavior is "functional" in coercing caregivers to capitulate to a child's wishes, although some (e.g., Webster-Stratton 2011) also pay heed to child characteristics that may contribute to coercive cycles. By contrast, as noted above, CPS posits that children's lagging cognitive skills—particularly in the domains of flexibility/adaptability, frustration tolerance, and problem solving—are the primary contributor to children's behavioral challenges, and postulates that

challenging behavior occurs in conditions under which the expectations being placed upon a child outstrip his or her skills. According to this view, a child's challenging behavior is "functional" only insofar as it communicates that a child is having difficulty meeting a particular expectation.

As regards the foci of assessment and intervention, in many PMT models, the emphasis is on the specific behaviors that are to be targeted for intervention. In some instances, there may also be an emphasis on the specific directions a child is having difficulty following. As noted above, in the CPS model, overt behavior is de-emphasized; caregivers are instead helped to identify a child's lagging skills and the specific expectations (unsolved problems) that a child is having difficulty in meeting. Proactively identifying unsolved problems proactively facilitates their proactive resolution.

Finally, with regard to intervention, in many PMT models, intervention involves the application of contingent reinforcement procedures (e.g., contingency contracting and time-out from reinforcement) for purposes of ensuring compliance with adult directives and modifying overt challenging behaviors. CPS does not involve contingent reinforcement procedures; instead, through the process described above, caregivers and their children are taught to solve problems collaboratively and proactively. This is a treatment ingredient that is not included in the vast majority of PMT programs.

Thus, returning to the teeth-brushing example above, in PMT programs such as Parent Child Interaction Therapy (PCIT; Eyberg and Boggs 1998; Hembree-Kigin and McNeil 1995) and Barkley's Defiant Children program (1997, 2013), the emphasis would be on incentivizing teeth brushing and potentially punishing noncompliance with teeth brushing (perhaps through response cost and/or time-out from reinforcement). Both of the above programs include additional treatment ingredients aimed at helping parents positively attend to children's prosocial behaviors, but neither would involve efforts to proactively engage the child in identifying the factors making it difficult to meet the expectation, and no attempt to solve the problem collaboratively with a mutually satisfactory solution. Barkley and Robin's Defiant Teens program (2014)—developed for adolescents—represents a combination of both PMT and the problem-solving communication training program (PSCT) of Robin and Foster (1988), but the authors discourage the use of this program with youth under the age of 13.

Why has PMT historically been primarily focused on inept parenting practices rather than on children's lagging skills as the central contributors to challenging behavior? Perhaps because PMT became popularized well before researchers in neuropsychology began focusing on and accentuating lagging skills. The fact that PMT is evidence based and has become the gold standard of intervention for behaviorally challenging youth may have discouraged examination of its guiding assumptions. Why has PMT been focused primarily on overt behavior rather than unsolved problems? Perhaps because B.F. Skinner taught that only overt behavior is observable, objective, and quantifiable. In CPS, the conditions in which challenging behavior occurs—unsolved problems—are considered to be equally observable, objective, and quantifiable.

Studies Included in this Review

Until 2013, the CPS model—based on the books *The Explosive Child* and *Lost at School*—was referred to as "Collaborative Problem Solving," and the published research on the model prior to 2013 referred to the model by that name. However, in 2013, the originator of the CPS model was legally prohibited from continuing to refer to the model as "Collaborative Problem Solving," and changed the name of the model to *Collaborative & Proactive Solutions*. Papers on the model subsequent to 2013 refer to the model by the name "Collaborative Problem Solving." Massachusetts General Hospital, the adjudicated owner of the "Collaborative Problem Solving" trademark, continues to market a product called "Collaborative Problem Solving" that is derived from Dr. Greene's original work, but differs in significant and fundamental ways from the model now called *Collaborative & Proactive Solutions*. This situation is described more fully elsewhere (Greene 2019).

As noted above, the CPS model has been studied in families, schools, inpatient psychiatry units, and residential and juvenile detention facilities in North America and abroad. To identify relevant studies on the model, we conducted a search in PsychARTICLES and PsychINFO for Collaborative and Proactive Solutions and Collaborative Problem Solving approach. We utilized a snowball approach, searching references of these references. We have included in this review only studies in which the intervention under study was based on the content of the books *The Explosive Child* and/or *Lost at School*, as these are the books that provide the foundation for the model known prior to 2013 as *Collaborative Problem Solving* and subsequent to 2013 as *Collaborative & Proactive Solutions*. Table 1 summarizes the published studies included in the review. We have also included unpublished data so as to provide readers with the broadest possible scope of the research that has been conducted to date in various settings. This is the first review of the research base specifically related to the model now known as Collaborative & Proactive Solutions.

Table 1 Published studies of collaborative and proactive solutions included in review

Article	Study	Population	Sample size
CPS in families of children with oppositional defiant disorder (ODD)			
Greene et al. (2004)	Effectiveness of CPS in comparison with Parent Training in children with ODD. Children were randomly assigned to CPS or PT	Families of children aged 4–12 years with oppositional defiance disorder received a CPS model of psychosocial treatment	28 children completed Collaborative and Proactive Solutions (CPS) treatment known at that time as Collaborative Problem Solving treatment; 19 children completed treatment in the parent training condition
T. H. Ollendick et al. (2015)	Efficacy of CPS compared to PMT in treating ODD in youth. Youth were randomized to CPS, PMT, or a waitlist control group	Youth 7–14 years of age with oppositional defiance disorder and their families	134 youth randomized: 60 CPS, 63 PMT, 11 Waitlist Control
Mediators and moderators of effectiveness of CPS			
Miller-Slough et al. (2015)	Parent synchrony among families with children diagnosed with oppositional defiant disorder (ODD)	Children 7-12 years of age who received treatment for oppositional defiant disorder and their parents	75 children and their parents (55 mothers, 20 fathers)
Dunsmore et al. (2016)	Maternal emotion coaching as a predictor of children's treatment response to a 12-week program addressing children's oppositional defiant disorder (ODD) symptoms	Children 7–14 years of age who received treatment for oppositional defiant disorder and their parents	89 families, 28 had both mother and father participate, for 61 families only the mother participated
Booker et al. (2016)	Examination of the moderating influence of parent–child relationship quality (as viewed by the child) on associations between conduct problems and treatment responses for children with oppositional defiant disorder (ODD)	Children 7–14 years of age who received treatment for oppositional defiant disorder and their parents	123 treated children and their parents
Booker et al. (2018)	Change in Maternal Stress for Families in Treatment for their Children with oppositional defiant disorder	Children 7–14 years of age who received treatment for oppositional defiant disorder and their mothers	134 youth and their mothers
Effectiveness of CPS in ODD youth with comorbid conditions			
Epstein and Saltzman-Benaiah (2010)	Evaluation of feasibility and preliminary efficacy of CPS for parents of children with disruptive behaviors (Tourette syndrome and oppositional defiant disorder)	Parents of children aged 6–12 years with Tourette syndrome and oppositional defiant disorder	19 parents of 12 children with Tourette syndrome and oppositional defiant disorder
Effectiveness of CPS in restrictive therapeutic facilities			
Greene et al. (2006)	Study of reduction in seclusion and restraint in an inpatient psychiatric unit implementing CPS	Staff members working with children aged 3–14 years in an inpatient psychiatric unit	34 staff members participated in training 100 children admitted during the staff training period
Martin et al. (2008)	Examination of usage patterns of restraint and seclusion in a psychiatric inpatient unit for school-age children before and after the implementation of CPS	School-age children within a psychiatric inpatient unit	755 children were admitted to the service during the 5-year study period and accounted for 998 separate admissions

Table 1 (continued)

Article	Study	Population	Sample size
Sams et al. (2016)	Description of the integration of a strength-based approach with a traditional, medical model of psychiatric care on an acute child and adolescent inpatient psychiatric unit	Unit staff in an inpatient psychiatric unit serving children and adolescents aged 5–18 years	The 24-bed Child and Adolescent Psychiatric Inpatient Unit implemented strength-based care
Ercole-Fricke et al. (2016)	Comparative quasi-experimental study of collaborative problem solving (CPS) on an inpatient adolescent psychiatric unit. This was a retrospective data review of discharged patients pre- and post-CPS implementation on the unit	Staff and patients on an inpatient adolescent psychiatric unit (12–17 year olds)	242 patients preimplementation 322 patients postimplementation

CPS in Families of Children with Oppositional Defiant Disorder (ODD)

The CPS model has been assessed in three randomized controlled trials (RCTs) involving families of children meeting full diagnostic criteria for oppositional defiant disorder (ODD). In the seminal study (Greene et al. 2004), families of 47 children aged from 4 to 12 years meeting full diagnostic criteria for ODD and at least partial criteria for severe major depression or bipolar disorder were randomly assigned to receive either CPS or parent management training (PMT) in a hospital outpatient setting (Greene et al. 2004). The PMT condition used Barkley's 10-week behavior management program (Barkley 1997). The CPS condition followed the model of psychosocial treatment described in *The Explosive Child* (Greene 1998). In this study, clinicians were experienced doctoral-level clinical psychologists. Therapists in both treatment conditions received weekly supervision from the principal investigator, Dr. Greene, to ensure adherence to treatment manuals. A rater listened to 20% of the recordings of the therapy sessions and rated the degree to which the content was consistent with the treatment approaches using a treatment adherence scale; analyses showed that the CPS condition was characterized exclusively by CPS-specific treatment ingredients.

Parent and therapist ratings were completed at posttreatment and at 4-month follow-up. The CPS model was found to have significant positive effects on an array of indicators of a child's behavior, parent–child interactions, and parental competence, and was found to be at least the equivalent of the PMT approach in all realms. Specifically, the CPS condition produced significant improvements in parents' assessment of children's oppositional behaviors [using the ODD Rating Scale (Greene et al. 2004) completed by parents] from pretreatment to posttreatment as well as from pretreatment to 4-month follow-up. CPS also produced improvements on therapist and parent ratings of children's overall functioning (using a Clinical Global Impression [CGI] instrument). The behavior of children in the CPS condition was rated by both therapists and parents as having improved to a significantly greater degree than children in the PMT condition. The CPS condition also produced significant improvement in parenting stress (measured by the Parenting Stress Index (PSI, Abidin 1995) from pretreatment to posttreatment. Within the PSI subscales, the CPS condition produced significant improvement in the domain of parental competence as well as within three child domains (distractibility–hyperactivity, adaptability, and reinforces parent). The CPS condition also produced significant improvements in parent–child interactions (assessed using the Parent–Child Relationship Inventory [PCRI, Gerard 1994) on both the limit-setting and communication subscales. Large effect

sizes were found in parents' assessment of oppositional behaviors for those in the CPS group from pretreatment to posttreatment (1.19) and from pre-treatment to 4-month follow-up (1.19). Almost half (46%) of children the CPS condition evidenced clinically significant improvement, compared with 37% of children in the PMT condition. At 4-month follow-up, 60% of the children in the CPS condition evidenced clinically significant improvement compared with 37% of those in the PMT condition. This initial study provided promising findings of the effectiveness of the CPS model in families, but was conducted on a relatively small sample. In addition, the originator of the CPS approach supervised the delivery of both intervention conditions, a possible limitation of this study. As such, there was a need for replication using a significantly larger sample with independent oversight of the two treatment conditions.

In the second RCT of CPS (Ollendick et al. 2015), 134 youth aged 7–14 years meeting full diagnostic criteria for ODD and their families were randomized to CPS, PMT, or to a waitlist control group. In the PMT condition, treatment was again based on Barkley's 1997 training program (Barkley 1997). In the CPS condition, treatment was again based on *The Explosive Child* (Greene 1998). In this study, clinicians were graduate students in clinical psychology in an APA-approved clinical scientist doctoral training program, or postdoctoral fellows. Thus, aside from sample size, one important difference between this study and the original study is the experience level of the clinicians. Clinicians providing PMT received a 4-h training workshop in PMT prior to the beginning of the project and supervision for 75 min each week from the principal investigator. Clinicians implementing CPS received a 4-h training workshop in CPS prior to the beginning of the project and supervision via teleconference for 75 min each week from Dr. Greene. Supervisors assessed treatment adherence with a six-item checklist including prescriptive and proscriptive items for each treatment. Adherence data indicated that treatments were delivered as specified with limited crossover in the therapeutic strategies used.

The sample consisted of 83 boys and 51 girls; the average age was 9.58 years; approximately 55% had comorbid ADHD, 45% had a comorbid anxiety disorder, and 94% had at least one comorbid disorder; 72% of the sample was Caucasian, 8% was African-American, 5% were Hispanic, and 2% were Asian-American. Effectiveness of both treatments was assessed with semistructured diagnostic interviews, clinical global severity and improvement ratings, and parent report measures, including the Anxiety Disorders Interview Schedule for DSM–IV, child and parent versions (ADIS-C=P); the Disruptive Behavior Disorders Rating Scale ODD Symptoms (DBRS; Barkley 1997; Pelham et al. 1992); and the Behavior Assessment System for Children Aggression subscale (BASC; Reynolds and Kamphaus 1992). Assessments were completed at pretreatment, posttreatment, and 6 months posttreatment. Responder and remitter analyses were undertaken using intent-to-treat mixed-models analyses.

CPS and PMT were found to be of equivalent effectiveness, with large treatment effects compared to waitlist controls. This was true irrespective of chronological age, gender, receptive and expressive verbal ability, and the presence of cooccurring attention deficit/hyperactivity disorder (ADHD) and anxiety disorder (AD). Both treatment conditions were superior to the WLC condition but did not differ from one another in the responder or remitter analyses. Approximately 50% of youth in both active treatments were diagnosis free and were judged to be much or very much improved at posttreatment, compared to 0% in the waitlist condition. Younger age and the presence of an anxiety disorder predicted better treatment outcomes for both PMT and CPS. Treatment gains were maintained at 6-month follow-up.

In another replication study recently completed at the University of Technology Sydney in Australia, CPS was again compared with PMT (see Dedousis-Wallace et al. 2016, 2019, and Murrihy et al. 2019, for preliminary findings). This study also examined variables that may mediate and moderate the effectivenesses of both CPS and PMT, including permissive parenting and children's lagging skills. While preliminary, the most striking results thus far are (a) the fact that improvements in challenging behavior correspond quite closely to the earlier studies by Greene et al. (2004) and Ollendick et al. (2015), (b) the suggestion that, in addition to reducing challenging behavior, CPS may also be effective in improving the lagging skills thought to contribute to oppositional behavior, (c) the finding that various factors were shown to predict but not moderate response to treatment, including parenting style, parental attributions, and the child's lagging skills.

Mediators and Moderators of the Effectiveness of CPS

Numerous studies have also examined the various factors that may be associated with treatment outcome, using the full sample or subsamples drawn from the Ollendick et al. (2015) study. In one study (Booker et al. in press), parenting and family engagement were examined as predictors of response to PMT and CPS. Four aggregates of parenting and parent–child interaction were examined: Intrusive; Warm; Rejecting; and Low Engagement. It was hypothesized that children of parents who were more warm, less rejecting, and less intrusive would demonstrate greater improvements in adaptive skills over time. Baseline reports of externalizing problems and adaptive skills were significantly poorer among Rejecting families compared to both Warm and

Intrusive families. Across time, all family groups reported improvements in children's externalizing problems and adaptive skills; however, significant differences were found in children from Warm and Intrusive families compared to Rejecting families. Findings were also conditional, with lesser adaptive skill improvements reported by Rejecting families that received PMT and greater improvements in adaptive skills reported by Intrusive families that received CPS treatment compared to Intrusive families that received PMT.

Another study examined parental emotion coaching as a predictor of changes in families' effective problem-solving and overall cohesion from pre- to posttreatment (Dunsmore et al. 2015). Emotion coaching is a socialization style validating children's negative emotions and instructing about appropriate emotional expression (Gottman et al. 1997) and has been associated with emotional competence in both typically developing and at-risk samples (Katz et al. 2012). Because emotion coaching involves acceptance of and effective engagement with children's negative emotion, it was hypothesized that (a) families with a parent high in emotion coaching might be more effective at resolving conflicts and maintaining relationships, and (b) this might enhance improvements in family emotional functioning across treatment. Maternal emotion coaching was assessed at pre-treatment through self-report of emotion-related beliefs and observational coding of an emotion talk task. Families engaged in a problem-solving task at pre-, mid-, and post-treatment, and mothers provided reports on family cohesion and conflict at pre- and posttreatments. Families receiving CPS showed greater increases than families receiving PMT in children's positive involvement in problem solving across treatment. Families with mothers who were higher in emotion coaching at pretreatment showed greater increases in children's positive involvement in problem-solving and in family cohesion over the course of treatment.

In another study, changes in maternal stress were examined over the course of treatment with both CPS and PMT (Booker et al. 2018). This study also examined whether children's self-reported positive relations with their parents impacted responsiveness to treatment, which in turn impacted maternal stress. Hierarchical linear models tested changes in children's reports of positive relations with parents, clinician reports of ODD severity, and maternal reports of parenting stress. Models then tested multilevel mediation from positive relations with parents, through ODD severity, onto maternal stress. Hypothesized indirect effects were supported: children's reports of positive views toward parents uniquely predicted reductions in ODD severity over time, which in turn uniquely predicted reductions in maternal stress. These results highlight the potential secondary benefits for parents following interventions for children with oppositional problems. Furthermore, results underscore the importance of the parent–child relationship as both a protective factor and as an additional target to complement interventions for child's disruptive behaviors.

Another study examined parent synchrony as a predictor of children's emotional lability, aggression, and overall functioning following treatment with either CPS or PMT (Miller-Slough et al. 2015). As noted by Leclère et al (2014), synchrony describes the intricate 'dance' that occurs during short, intense, playful interactions between parents and children, builds on familiarity with the partner's behavioral repertoire and interaction rhythms, and depicts the underlying temporal structure of highly aroused moments of interpersonal exchange that are clearly separated from the stream of daily life. Synchrony encompasses both the responsivity of both parent and child and their emotional capacity to respond each other. During early development, synchrony involves a matching of behavior, emotional states, and biological rhythms between parents and infants that together forms a single relational unit (dyad). This sample included a subset of 75 families. Findings indicated that pretreatment parent–child synchrony was associated with decreased emotional lability and aggression following treatment with both PMT and CPS, as well as improvement in overall functioning, and that treatment of ODD behaviors is more difficult when the initial relationship between child and parent is viewed negatively by oppositional children. These results reflect the importance of parent–child relations at the onset of treatment in predicting response to treatment.

Effectiveness of CPS in Parenting Groups

The effectiveness of CPS has been evaluated in children with ODD and comorbid Tourette syndrome (Epstein and Saltzman-Benaiah 2010). In a study of 19 parents of 12 children aged from 6 to 12 years, parents participated in 8 weekly 2-hour group sessions using a manualized binder that was created to help parents learn the CPS model. A distinguishing factor in this study was the fact that treatment was delivered in group format; in all of the above studies, treatment was delivered to individual families. There was no comparison group in this study. Both mothers and fathers reported significant improvement over time on the Intensity scale and the Problem scales of the Eyberg Child Behavior Inventory (ECBI; Eyberg and Pincus 1999). Both mothers and fathers also reported improvements in emotional regulation of their children (using the Social Competence Scale; Conduct Problems Prevention Research Group 1995), although this finding was statistically significant for mothers only. On the ODD Rating Scale, mothers also reported improvements in their assessment of their child's oppositional behavior. Parents also completed ratings of their children's general behavioral improvement using the CGI

(National Institute of Mental Health 1985) and CGI scores from both mothers and fathers showed significant improvement over time. Mothers also demonstrated significant declines in parenting stress using the PSI (Abidin 1995); there were no changes in parenting stress among fathers. Since those providing CPS in this study did not receive ongoing, formal training and supervision, and because there was no formal measure of treatment fidelity, adherence to the CPS model is unknown.

Effectiveness of CPS in Restrictive Therapeutic Facilities

The effectiveness of CPS has also been evaluated in psychiatric inpatient units for children and youth. One study explored the reduction and seclusion and restraint in an inpatient psychiatric unit implementing CPS (Greene et al. 2006). Thirty-four staff members working with youth aged 3–14 years in an inpatient psychiatric unit received CPS training. These staff members attended supervision sessions for a year on a twice-weekly basis on the implementation of CPS. The study tracked injuries requiring any form of medical attention and restraint (defined as any physical hold lasting longer than 5 min, involuntary administration of psychotropic medication, or use of a mechanical restraint device, such as leather restraints or a restraint bed) in the 9 months before the training phase and the 15 months after the training period. In the 9 months prior to the training period, 281 episodes of restraint were documented, while just one episode occurred in the 15 months following training. Injuries dropped from an average of 10.8 staff and patient injuries each month prior to staff training, to an average of 3.3 injuries each month after training.

Another study evaluated usage patterns of restraint and seclusion before and after the implementation of CPS in a psychiatric inpatient unit for school-age children within Yale-New Haven Children's Hospital (Martin et al. 2008). In this study, data were abstracted from all children hospitalized during the fiscal years from 2003 to 2007. Seven hundred and fifty five children were admitted to the service during the 5-year study period accounting for 998 separate admissions. Children ranged from 3 to 11 years of age with a mean age of 11 years. CPS was implemented during a 6-month period in 2006. Staff-wide training included an initial 3-h overview lecture of the conceptual model and dissemination of written materials, followed twice weekly by 90-min videoconference-based supervision sessions with a CPS provider. In this setting, a concurrent process was initiated to revise and update routine clinical chart documentation to incorporate the principles of the CPS model (particularly the identification of lagging skills, unsolved problems, and ensuing interventions) This study found a reduction in use of restraints before and after the implementation of CPS (from 263 events per year to 7 events per year) and a reduction in seclusion (from 432 events per year to 133 events per year). There were also reductions in the mean duration of restraints (from 41 ± 8 to 18 ± 20 min) and in cumulative unit-wide restraints (from 16 ± 10 to .3 ± .5 h per month). The mean duration of seclusions dropped from 27 ± 5 to 21 ± 5 min. Cumulative unit-wide seclusion dropped from 15 ± 6 to 7 ± 6 h per month. There were 55 staff injuries in 2005, 101 in 2006, and 24 in 2007.

In another child and adolescent psychiatric unit, CPS was implemented among unit staff of a 24-bed inpatient psychiatric unit serving children and adolescents between the ages of 5 and 18 years (Sams et al. 2016). The unit staff received formal didactic training, weekly team consultation meetings, and real-time and in vivo coaching and mentoring by clinical leadership, but did not receive formal supervision from a certified CPS provider. Managers identified nursing staff and clinicians as demonstrating greater empathy, teaching collaborative skills, and seeking mutually beneficial solutions with patients. This was contrasted by the preexisting approach of using rewards and punishments, which they noted often led to increased conflict between patients and staff. A 75% reduction in total hours of seclusion and restraint occurred over the course of the year following the implementation of the strength-based focused program revisions.

In yet another study, CPS was implemented within an inpatient adolescent psychiatric unit with 12–17 year old patients (Ercole-Fricke et al. 2016). Staff received a formalized training program including attending a conference on CPS and viewing various video presentations on the CPS model. A team then developed a "trainers training trainers" curriculum. The authors note that "some modification of CPS strategies and methods" was made to accommodate the short-stay environment, the population, and objectives, but do not detail these modifications. As such, and because staff received no formal ongoing supervision from a CPS provider, adherence is unknown. A retrospective data review of patients discharged pre- and post-CPS implementation on the unit was conducted. Self-inflicted injury significantly decreased, from 89 incidents among 242 patients and 3156 patient care days pre-CPS implementation to 38 incidents among 322 patients and 2823 patient care days post-CPS implementation. Restraint episodes, which were low initially, did not show a significant decline, but continued to trend downward.

Finally, the CPS model has also been implemented in two juvenile detention facilities in the state of Maine. While some staff in both facilities received formal training from Dr. Greene, the training was not provided to all staff and therefore facility-wide adherence to the CPS model is unknown. Further, both facilities implemented other interventions

concurrently with implementation of the CPS model, so outcomes cannot be solely attributed to CPS. However, between 2003 and 2008 (the first 5 years of implementation), the facilities demonstrated dramatic reductions in (a) youth conduct resulting in injury, confinement, and/or physical restraint; (b) isolation, room confinement, segregation, and solitary confinement; (c) percentage of staff reporting that they fear for their safety; (d) staff and resident injuries; and (f) recidivism, from 65 to 15% over a 13-year period.

Effectiveness of CPS in Schools

In two projects, the CPS model was implemented in numerous public elementary schools in Maine (Greene and Winkler 2018). Core groups (consisting of 8–10 staff each) were established in participating schools to train subsets of teachers in the CPS model. Core groups received ongoing supervision from certified CPS providers. Due to staffing and administrative changes, variable levels of commitment, and the intensity of the implementation design and competing priorities, only about half of the schools participated fully. However, those schools that did participate fully saw significant reductions in discipline referrals, detentions, and suspensions.

Strengths and Limitations

This review—and the studies cited herein—possess both strengths and weaknesses. The small number of studies in each setting—making meta-analysis or other more sophisticated review techniques impossible—limits this review. However, the breadth of the information available demonstrates evidence of the effectiveness of CPS across settings and populations. Each of the study designs has its own limitations; for example, the data on mediators and moderators of CPS are drawn from substudies of the same randomized trial. A strength of this review is that it does include two randomized control trials with randomization of the sample to a CPS and alternate treatment condition.

Summary

Collaborative & Proactive Solutions (CPS) has demonstrated effectiveness in families (in outpatient settings), schools, and restrictive therapeutic facilities. In families, CPS has been shown to reduce challenging behavior to a degree that is at least the equivalent of the evidence-based PMT approach. The California Evidence-Based Clearinghouse for Child Welfare has classified CPS as supported by research evidence for Disruptive Behavior Treatment (Child & Adolescent). There is also suggestion that the CPS model is beneficial in helping children acquire various skills in ways that PMT does not. As noted by Ollendick et al. (2015), it is encouraging that an evidence-based alternative like CPS is available for the families that may not benefit from PMT. It is also promising that schools and restrictive therapeutic facilities—which have traditionally relied on operant procedures as the hallmark of their discipline programs—have an effective available alternative as well. Future research will continue to focus on factors that predict positive and negative responses to both treatments so as to better guide treatment decision-making by mental health clinicians and other caregivers, and on comorbidities that may differentially affect the effectiveness of, and be differentially affected by, the CPS model.

As might be expected, implementation of the CPS model in schools and facilities requires a variety of structural and logistical changes in disciplinary structures, paperwork, and assessment practices, and these challenges are also a focal point of ongoing efforts (e.g., Greene and Wilmot 2018).

Appendix

ALSUP ASSESSMENT OF LAGGING SKILLS & UNSOLVED PROBLEMS

Collaborative & Proactive Solutions
THIS IS HOW PROBLEMS GET SOLVED

CHILD'S NAME _____ DATE _____

INSTRUCTIONS: The ALSUP is intended for use as a discussion guide rather than as a freestanding check-list or rating scale. It should be used to identify specific lagging skills and unsolved problems that pertain to a particular child or adolescent.

If a lagging skill applies, check it off and then (before moving on to the next lagging skill) identify the specific expectations the child is having difficulty meeting in association with that lagging skill (unsolved problems). A non-exhaustive list of sample unsolved problems is shown at the bottom of the page.

	LAGGING SKILLS	UNSOLVED PROBLEMS
☐	Difficulty handling transitions, shifting from one mindset or task to another	
☐	Difficulty doing things in a logical sequence or prescribed order	
☐	Difficulty persisting on challenging or tedious tasks	
☐	Poor sense of time	
☐	Difficulty maintaining focus	
☐	Difficulty considering the likely outcomes or consequences of actions (impulsive)	
☐	Difficulty considering a range of solutions to a problem	
☐	Difficulty expressing concerns, needs, or thoughts in words	
☐	Difficulty managing emotional response to frustration so as to think rationally	
☐	Chronic irritability and/or anxiety significantly impede capacity for problem-solving or heighten frustration	
☐	Difficulty seeing "grays"/concrete, literal, black & white, thinking	
☐	Difficulty deviating from rules, routine	
☐	Difficulty handling unpredictability, ambiguity, uncertainty, novelty	
☐	Difficulty shifting from original idea, plan, or solution	
☐	Difficulty taking into account situational factors that would suggest the need to adjust a plan of action	
☐	Inflexible, inaccurate interpretations/cognitive distortions or biases (e.g., "Everyone's out to get me," "Nobody likes me," "You always blame me, "It's not fair," "I'm stupid")	
☐	Difficulty attending to or accurately interpreting social cues/ poor perception of social nuances	
☐	Difficulty starting conversations, entering groups, connecting with people/lacking other basic social skills	
☐	Difficulty seeking attention in appropriate ways	
☐	Difficulty appreciating how his/her behavior is affecting others	
☐	Difficulty empathizing with others, appreciating another person's perspective or point of view	
☐	Difficulty appreciating how s/he is coming across or being perceived by others	
☐	Sensory/motor difficulties	

UNSOLVED PROBLEMS GUIDE:
Unsolved problems are the specific expectations a child is having difficulty meeting. Unsolved problems should be free of maladaptive behavior; free of adult theories and explanations; "split" (not "clumped"); and specific.

HOME EXAMPLES
- Difficulty getting out of bed in the morning in time to get to school
- Difficulty getting started on or completing homework (specify assignment)
- Difficulty ending the video game to get ready for bed at night
- Difficulty coming indoors for dinner when playing outside
- Difficulty agreeing with brother about what TV show to watch after school
- Difficulty with the feelings of seams in socks
- Difficulty brushing teeth before bedtime

SCHOOL EXAMPLES
- Difficulty moving from choice time to math
- Difficulty sitting next to Kyle during circle time
- Difficulty raising hand during social studies discussions
- Difficulty getting started on project on tectonic plates in geography
- Difficulty standing in line for lunch

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