



The Collaborative Problem Solving Approach: Outcomes Across Settings

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In the last decade, Collaborative Problem Solving (CPS) has become a popular approach to managing the challenging behaviors of children and adolescents, and has established a growing evidence base for reducing oppositional behavior and related outcomes. In contrast with standard behavioral methods that provide incentives for meeting adult expectations, CPS focuses on identifying and treating lagging cognitive skills that interfere with children's ability to meet these expectations. Since the majority of CPS outcomes have been evaluated in clinical and educational settings as part of internal quality-improvement efforts, only a small proportion of these findings has been published in peer-reviewed academic journals. Here, we describe the CPS approach and provide a summary of all known published and unpublished findings related to its implementation in outpatient, inpatient, residential, juvenile justice, and educational settings. Finally, we provide specific recommendations for future research on the model.

Keywords: children, Collaborative Problem Solving, externalizing, family, inpatient, juvenile justice, oppositional defiant disorder, residential, school, Think Kids

Externalizing behaviors, including temper outbursts, defiance, deceit, destruction of property, and verbal or physical aggression are relatively common in children, with 5% to 13% of mothers of preschoolers reporting that their children exhibit moderate to severe externalizing behaviors,¹⁻³ and epidemiologic studies reporting a 19% lifetime prevalence of childhood disruptive behavior disorders.⁴ Children exhibiting externalizing behaviors are frequently referred to as oppositional, challenging, explosive, difficult, defiant, or aggressive. They may carry diagnoses of attention-deficit/hyperactivity disorder (ADHD), conduct disorder (CD), oppositional defiant disorder (ODD), or intermittent explosive disorder, or these challenging behaviors may be one part of a larger set of symptoms identified as a mood, anxiety, or developmental disorder.

The negative impact of children's externalizing symptoms on their caregivers and the community is significant. For example, parents of externalizing children often experience clinically significant levels of stress,⁵ and student

misbehavior is consistently identified as a primary source of teacher stress.⁶⁻⁸ This stress is exacerbated when teachers are not adequately trained or have insufficient resources available to work effectively with externalizing children.⁹ Furthermore, managing challenging behavior can cause a strain on both the relationships and interactions between children and adult caregivers.^{10,11} Considering the individual and familial costs of externalizing behaviors, as well as societal costs associated with government-subsidized juvenile detention centers, specialized school programs, residential facilities, inpatient psychiatric units, and outpatient community agencies, it is no surprise that significant research has been devoted to evaluating the efficacy of interventions targeted at reducing these behaviors.

Clinical and educational settings that specialize in treating disruptive behavior disorders have historically used methods of intervention that are based on operant theories of behavior modification.¹² These methods, including point and level systems, quiet rooms, physical restraints, and seclusion, are typically believed to help patients develop greater self-control and coping, to increase positive behavior, and to decrease negative and aggressive behavior.¹³ However, the efficacy of some of these behavioral methods has recently been called into question.¹⁴⁻¹⁷

Of particular concern recently has been the use of physical restraint and seclusion in managing externalizing behavior. First, there is growing evidence that restraint and seclusion procedures may actually heighten aggressive behavior in children.¹⁸ Second, these procedures can be dangerous for both the patients and staff involved^{18,19} and, in

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very extreme cases, have led to death.^{20,21} As a result, legislation has been introduced with the goal of reducing or eliminating these types of restrictive interventions.^{22,23} Interestingly, while the motivation to reduce the use of restrictive interventions has been to improve educational and mental health services, one analysis in a single inpatient agency found an annual cost savings of over \$1 million resulting from the decreased use of physical, mechanical, and medication-based restraint.²⁴ Thus, decreasing use of restrictive interventions may make sense not only from a psychological, but also from an economic, perspective.

Due to the potential for tragic outcomes related to restrictive behavioral interventions, the last decade has seen a movement away from these traditional behavioral practices and toward the development of alternative methods that pose fewer risks to staff and patients and that effectively decrease externalizing behaviors. One of these new approaches is *Collaborative Problem Solving* (CPS). As described by Drs. Ross Greene and J. Stuart Ablon in their treatment manual,²⁵ the CPS model reconceptualizes the reasons for children's externalizing behaviors, and offers specific techniques for intervention. The CPS approach has been implemented in a variety of outpatient, inpatient, residential, juvenile justice, and school settings, and there have been multiple formal and informal attempts to evaluate and validate this treatment model.

In this article, we first describe how CPS differs from conventional approaches in conceptualizing and treating externalizing disorders in children. Next, we summarize all known published and unpublished evaluations of the treatment model from the time of its introduction up through 2012. Finally, we make recommendations for future comprehensive evaluation of the CPS model, with the ultimate goal of improving the treatment of childhood externalizing disorders.

CONVENTIONAL INTERVENTIONS FOR EXTERNALIZING BEHAVIORS: OPERANT APPROACHES

The procedures and tools that are typically used to reduce oppositional behavior are based upon common beliefs about its causes. Behavioral theories suggest that children learn to behave disruptively because those behaviors effectively get them something (e.g., attention) or allow them to avoid something (e.g., work). This understanding assumes that children have control over whether they behave in compliance with, or in opposition to, adult expectations. This understanding also implies that these children will behave well if they believe that good behavior will result in a desired outcome. Consistent with this theory, many common interventions for disruptive behavior aim to motivate oppositional children to *want to* behave better. In sum, behavioral theories posit that children will do well if they want to, and corresponding interventions aim to increase children's motivation such that they will want to behave well.

Based on this understanding, many conventional behavioral interventions with externalizing children have sought to motivate compliant behavior through operant methods. Such methods date back to the famous behaviorist studies of B. F. Skinner (1904–90), who demonstrated that target behaviors could be elicited, and unwanted behaviors diminished, through an intensive and consistent menu of rewards and punishments. Behavioral approaches, including reward charts and time-outs, are now used worldwide and are applied in a wide range of settings. Indeed, considerable empirical research supports a number of treatment approaches that use operant behavioral methods to increase compliance with adult expectations.²⁶

Behavioral approaches typically achieve two primary objectives related to the management of behavior. First, they reinforce basic lessons, such as what the acceptable and unacceptable behaviors are in a given situation. Second, they facilitate extrinsic, or external, motivation. The motivation to receive a reward or avoid a punishment can tip the scales in favor of exhibiting a desired behavior, assuming one has the skills needed to perform that behavior. As an example, a recent meta-analysis suggests that conventional behavioral approaches can be moderately successful in decreasing externalizing behavior, though effect sizes are not as robust as once assumed,²⁷ and positive effects may not be sustained in the long term.^{14,16,28}

While behavioral methods are useful in some cases, problems arise when attempting to use these operant approaches with children who know what is expected of them and who are motivated to do well, but who lack skills to do so due to deficits in impulse control, frustration tolerance, flexibility, problem solving, or other adaptive skills. For children who are aware of the consequences of their maladaptive behaviors but who lack the skills to inhibit these behaviors, the operant approach falls short. In fact, these approaches can sometimes do more harm than good: first, by increasing behavioral performance only in response to promise of reward; second, by negatively affecting the self-esteem of children who want to do well but lack the skills to do so, and who are told repeatedly that they are failing to meet expectations because they are not trying hard enough; and third, by increasing power struggles between adults and children that can be detrimental to the relationship.^{29,30} In sum, through increase of motivation, operant approaches can make the possible more probable, but they simply cannot make the impossible possible. In an attempt to rectify the shortcomings of traditional operant approaches, a new approach to understanding challenging children has emerged: Collaborative Problem Solving.

AN UNCONVENTIONAL APPROACH: FOCUS ON SKILLS, NOT BEHAVIORS

CPS is a conceptual and therapeutic model that posits that chronic and severe externalizing behavior is the product of lagging cognitive skills that interfere with a child's ability

to comply with adult expectations. Consider this: in order to meet adult expectations, a child must have an adequately developed set of cognitive skills allowing him to accurately comprehend and interpret the expectations, to flexibly respond to different expectations in different situations, to consider a range of responses, to predict consequences of each of those responses, to express his or her needs or difficulties in meeting expectations, and to tolerate frustration in the face of unexpected results. CPS asserts that if a child is lacking one or more of these skills, he or she will be unable to adaptively respond to demands and that, as a result, maladaptive behavior (defiance, outbursts, and so on) will ensue.

Therefore, contrary to the belief that “children do well if they want to”—which underlies most behavioral approaches and also corresponding interventions that focus on increasing motivation—the philosophy of CPS is that “children do well if they can.” Analogous to the contemporary view of children with learning disabilities who are performing below their potential in academic areas, CPS asserts that children who are not successful in complying with behavioral demands have one or more skill deficits in critical areas such as flexibility, social perception, executive functioning, language processing, or emotion regulation. Thus, in contrast to behavioral approaches, the corresponding intervention focuses on improving these skills, rather than on increasing the motivation to comply. In fact, an underlying assumption of the CPS model is that all children start out motivated to comply, until experience teaches them that they do not have the skills to meet the demands; motivation wanes as a direct result.

CPS IN BRIEF: IDENTIFYING AND TRAINING LAGGING SKILLS

Under the CPS approach, externalizing behaviors are treated in much the same way as any other learning disability. For each child, specific skill deficits are identified, along with the situations in which these lagging skills cause difficulty meeting adult expectations. Then the intervention assists the child in developing the skills that are lagging. This skill building occurs in natural settings through problem solving and is tailored to the child’s development level. As skills improve, externalizing behaviors are no longer triggered, and thus decrease.

Identifying Lagging Skills

In order to assess the specific cognitive-skills deficits for a particular child, it is first necessary to identify the demands or expectations that trigger their externalizing behaviors. Because the same challenging behavior (e.g., verbal outbursts) could be caused by a wide range of lagging skills, the specific type of challenging behavior is of little importance. The focus is on identifying the demands that trigger the behavior (e.g., transitions or spelling homework). Once a list of triggers is identified, the caregiver or clinician can use this list to inform hypotheses about lagging skills. For

example, a child who frequently overturns his or her school desk (the challenging behavior) in response to the end of free time and the start of work (the trigger) may have difficulty with transitions/set-shifting (executive functioning) or with tolerating frustration (emotion regulation). Use of parent-report measures such as the Thinking Skills Inventory can aid in identifying triggers and lagging skills (originally available as the Pathways Inventory in the CPS treatment manual;²⁵ an updated version is available upon request from the present authors).

Training Lagging Skills

Skill development in the CPS model occurs through the process of collaborating with the child to solve chronic problems in a more adaptive manner. After identifying the situations in which externalizing behaviors are triggered by demands that overwhelm the child’s skills, the adult decides, for each situation, which of three ways to respond. In the CPS approach, these are named *Plan A*, *Plan B*, and *Plan C*.

Plan A is used when adults pursue their original expectation by imposing their will upon the child, despite understanding that doing so may trigger externalizing behavior. For example, due to safety concerns, the adult might say, “If you don’t put that life jacket on, you will not be able to go in the water.” The adult has decided that this is a non-negotiable situation and that this instruction must be followed; thus, he or she is using Plan A.

Plan C is used when the adult chooses to withdraw the expectation, at least for a short time, in order to decrease externalizing behavior (e.g., by allowing the child to continue in free time while the rest of the students transition to work). This approach can be useful in stabilizing the situation while prioritizing other problems. Of note, Plan C is a preemptive strategy, communicated ahead of time to the child and should not be confused with “giving in,” which occurs when an adult pursues an expectation only to drop it later in an attempt to reduce the challenging behavior that ensues. In treatment settings, deciding which expectations to pursue and which to temporarily suspend is part of individualized treatment planning.

Plan B—a seminal element of CPS—is used when the adult attempts to solve the problem collaboratively with the child. Implementation of Plan B consists of three components, performed sequentially. In the first component, the adult gathers information in order to gain a clear understanding of the child’s concerns about a particular recurring problem or issue (e.g., “I don’t like stopping free time when I’m in the middle of reading, because it’s hard for me to find my place again later.”) In the second, the adult states his or her concern or perspective (“My concern is that we need to move on to math at that time. I don’t want you to miss out on the beginning of math, because it will be hard to catch up later.”) When both the child’s and adult’s concerns are clear, the third component can be implemented: the

adult and child brainstorm solutions that will address both their concerns. The child is given the first opportunity to generate a solution (e.g., “What if you warn me when we have a few minutes left, so I can find a good stopping point?”). No solutions are dismissed outright, and the adult helps the child to think through whether each solution addresses the concerns of both parties and whether it is realistic and feasible. Plan B is successfully completed when both adult and child have agreed on a mutually satisfactory and realistic solution. This process, however, is iterative; after a Plan B conversation, the child and adult implement the solution and return to discuss whether it was successful. If it was not, they discuss what other concerns arose, and they try again with another solution until they have found one that works.

In CPS, the development of lagging skills are taught implicitly through the Plan B problem-solving process. The adult’s empathy and understanding in component 1, along with the child’s practice of empathy and understanding in component 2, teach the child to take another person’s perspective, to clarify and express his or her own concerns, and to separate affect (all of which build skills in social thinking, language processing, and emotion regulation). Guided brainstorming of solutions in component 3 trains the child to solve problems by generating solutions and by anticipating and considering the likely outcomes (which builds cognitive flexibility and executive-functioning skills). Thus, with Plan B, an adult can achieve five main objectives that are frequently targeted in the treatment of externalizing disorders: increasing adherence with adult expectations, reducing externalizing behaviors, creating (or restoring) a helping relationship between the adult and child, resolving chronic problems, and identifying and teaching lagging skills.

SUMMARY OF RESEARCH RESULTS BY SETTING

The CPS approach was developed by staff in the Department of Psychiatry at Massachusetts General Hospital (MGH) in Boston, Massachusetts, and the first book describing the approach was published in 1998.³¹ Since then, clinical staff from MGH have provided training and consultation to hundreds of schools, hospitals, and residential treatment centers. Most frequently, all agency or school staff members receive intensive training in the model, followed by ongoing consultation to a core team that oversees the implementation of CPS within their facilities.

Following is a summary of all known attempts to evaluate the efficacy of the CPS approach. Published articles describing CPS treatment outcome studies were identified through the following methods: (1) computerized searches of electronic databases for articles published between 1998 and 2012 using keywords “collaborative problem solving,” and (2) a manual search of the reference lists of articles obtained through the database searches. After excluding articles that use the term *collaborative problem solving* to describe a process unrelated

to the treatment model under discussion here, a total of nine peer-reviewed articles remained, which discussed six unique empirical studies. A summary of these six studies, including demographics of research participants and major findings, is presented in Table 1.^{32–40} In addition to these six published studies, we include in this article unpublished results from outcomes studies implemented as part of internal quality-improvement efforts at a number of schools and agencies not included in the published studies. Since MGH staff have provided consultation to all of the schools and agencies that have adopted CPS as an organization-wide treatment model, these outcomes have been reported back to MGH staff via personal communication, for the purpose of informing model development. These unpublished outcomes are included here in the interest of informing future evaluation and intervention efforts, and should be interpreted with appropriate caution.

Outpatient Research: Published

The first study of CPS in an outpatient setting was a randomized, controlled trial conducted at Massachusetts General Hospital.^{32,33} In this study, families ($n = 47$) were randomized into two groups, and received individual family treatment either with CPS ($n = 28$) or parent management training (PMT; $n = 19$), a behavioral family therapy model that focuses on modifying parental discipline to help reduce oppositional behavior by teaching and motivating children to be more compliant. All enrolled children had a diagnosis of oppositional defiant disorder and significant mood symptoms; many children also displayed subthreshold features of conduct disorder. In this trial, CPS produced significant improvements in numerous domains of functioning, including improvement in parents’ perceptions of competence and stress (as measured by the Parenting Stress Index) and in parent-child interactions (as measured by the Parent-Child Relationship Inventory), as well as a reduction in oppositional behaviors (as measured by the ODD Rating Scale). Although in many cases, improvements experienced by families receiving CPS were greater than those experienced by families receiving PMT, differences between conditions were not statistically significant, possibly due to the small sample size. There was, however, a statistically significant difference between conditions on the Clinical Global Improvement scale, for which children in the CPS condition were rated by both therapists (measured post-intervention) and parents (measured at follow-up) as improving more than children in the PMT condition. The authors concluded that the CPS model was a worthy alternative to behavioral models such as PMT.^{32,33} Of note, this study remains the only randomized, controlled trial that has been published on CPS to date, though a large-scale replication including 150 families is currently under way. Preliminary data from this replication indicate that, consistent with the original trial, individuals in the CPS group achieved clinically and statistically significant improvements in ODD symptoms, performing better than

Published Outcomes After Adoption of Collaborative Problem Solving Approach							
Publication(s)	Setting	n	Age	Available child characteristics	Design	Training/treatment details	Main findings
Greene et al. (2004) ³² Also discussed in Greene et al. (2003) ³³	Outpatient family therapy	47	4–13	68% male ODD + affective dysregulation (minimum subthreshold MDD or BD)	Experimental (randomized, controlled trial)	Flexible, manualized CPS delivered weekly by 4 CBT therapists for 7–16 weeks Compared to manualized parent management training delivered weekly by 2 behavioral therapists for 10 weeks	Oppositional behavior & parent stress decreased in both conditions Parent-child relationship significantly improved in CPS condition Clinical improvement significantly higher for CPS condition as rated by therapist & parent
Greene et al. (2006) ³⁴ Also discussed in Regan et al. (2006) ³⁵	Inpatient psychiatric	Not reported	3–12	74% male 95% referred for "out-of-control behavior" 80% severe trauma histories Average stay 14 days	Pre/post, between subjects	Milieu staff attended a 3-hour CPS training & received twice-weekly group supervision sessions for 7–12 months	Restraints decreased from 281 events in the 9 months before intervention to 1 event during a 15-month follow-up Short holds decreased from 100+ /month to <10/month Staff/patient injuries decreased from 10.8/month to 3.3/month
Martin et al. (2008) ³⁶ Also discussed in Mohr et al. (2009) ³⁷	Inpatient psychiatric	755	3–15	65% boys with adjustment, anxiety, bipolar, depressive, hyperactivity, psychosis, or other Average stay 29 days	Pre/post, between subjects	All staff attended a 3-hour CPS training & received monthly 90-minute video supervision for the first 6 months, & local weekly supervision for 1.5 years thereafter	Restraints decreased from 263/year to 7/year Seclusions decreased from 432/year to 133/year Durations also decreased significantly
Epstein & Saltzman-Benaiah (2010) ³⁸	Outpatient parent therapy group	19 parents of 12 children	6–12	83% male Tourette's/tic disorder + ODD, but not CD All had comorbid ADHD	Pre/post, within subjects	Parents attended 8 weekly 2-hour CPS sessions, including didactic presentations, homework, & role play; booster session conducted at 2-month follow-up	High treatment fidelity, attendance, retention, homework completion, & satisfaction in group attendees Disruptive behaviors decreased significantly but generally stayed in clinically significant range ODD diagnostic scores improved by mothers' report Mothers' parenting stress decreased
Schaubman et al. (2011) ³⁹	Alternative day school	16	Grades 7–8	Children in need of alternative day school Other demographics not reported	Pre/post, within subjects Quasi-experimental comparison	Eight teachers attended 12 hours of CPS training & received weekly 75-minute consultations for 8 weeks; also received individual support & coaching as needed	Teacher stress decreased significantly in multiple stress domains; effects stronger for teachers with highest fidelity Discipline referrals decreased significantly; effect generalized to the whole school (n = 100), not just the target children

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Table 1 Continued							
Publication(s)	Setting	n	Age	Available child characteristics	Design	Training/treatment details	Main findings
Johnson et al. (2012) ⁴⁰	Outpatient family therapy	17	6–13	71% male ODD + ADHD, but not PDD	Pre/post within subjects	Families received 6–10 weeks of CPS based on need; poor responders (n = 8) were offered ADHD medication after outpatient intervention was completed (prior to 6-month follow-up)	ADHD and ODD symptoms decreased significantly from baseline to post-treatment 53% of children were rated by their pediatricians as “much” or “very much” improved post-treatment At 6-month follow-up, 81% of participants were rated by pediatricians as “much” or “very much” improved

ADHD, attention-deficit/hyperactivity disorder; BD, bipolar disorder; CBT, cognitive-behavioral therapy; CD, conduct disorder; CPS, collaborative problem solving; MDD, major depressive disorder; ODD, oppositional defiant disorder; PDD, pervasive developmental disorder.

wait-list controls and as well as the standard behavioral parent-training model.⁴¹

In the second examination of outpatient CPS, a pilot study explored the effectiveness of CPS in a group setting in Toronto, Ontario.³⁸ Parents of 12 children with comorbid ODD and Tourette’s syndrome participated in an eight-week group intervention that included instruction on the CPS model, discussion, troubleshooting, and practice that included group exercises and role-play. Parents completed assessment measures at enrollment, pre-intervention, post-intervention, and two-month follow-up. Consistent with the results of the randomized, controlled trial described above, children in families treated with CPS exhibited a reduction in oppositional behavior (as measured by the Eyberg Child Behavior Inventory and ODD Rating Scale), and mothers (but not fathers) reported a significant reduction in parenting stress (as measured by the Parenting Stress Index, Short Form). Authors concluded that CPS group therapy with parents was feasible and effective for reducing oppositional behaviors and mothers’ stress.³⁸

Finally, in a recent outpatient study performed in Sweden,⁴⁰ 17 children with comorbid ODD and ADHD received six to ten weeks of outpatient family therapy using CPS. Parents completed symptom checklists (Swanson, Nolan, and Pelham-IV and Conners’s 10-item scale) at baseline, after treatment, and at six-month follow-up. After treatment, parent reports of both ADHD and ODD symptoms had decreased significantly, and 53% of children were rated by their pediatricians (who were not study investigators) as showing “much” or “very much” improvement on the Clinical Global Impression-Improvement scale. Providing ADHD medication to 8 of the 17 children who did not respond as well to the intervention resulted in additional improvement at six-month follow-up, at which time 81% of participants were rated by their pediatricians as showing “much” or “very much” improvement. The authors concluded that CPS was effective for reducing symptoms of ODD and ADHD and that a subgroup of children with comorbid ODD and ADHD may benefit from a combination of CPS and medication.⁴⁰

Summary of Outpatient Research

Research on CPS in outpatient settings suggests that CPS is effective for reducing oppositional behaviors, symptoms of ADHD, and parenting stress, and for improving parent-child relationships. In addition, it appears that this model can be used successfully both with individual families and in group settings, with the latter often being considered a cost-effective option. The randomized, controlled trial conducted by Greene and colleagues³² suggested that CPS is at least as effective as a standard behavioral parent-training model. Additional well-powered, experimental studies are recommended in order to increase confidence in the effectiveness of CPS with different outpatient populations and as compared to other treatment models. Additionally, future studies should explore variables (such as demographic

factors and diagnoses) that differentially predict response to CPS versus standard behavioral treatments.

Inpatient Research: Published

The CPS model has been successfully implemented in a number of child and adolescent inpatient units across North America. To date, only two of these units have published research findings documenting CPS outcomes. The first of these was conducted at the Child Assessment Unit (CAU), a 13-bed, locked psychiatric inpatient unit at Cambridge Hospital in Cambridge, Massachusetts.^{34,35} Thirty-four staff members were trained in CPS and attended supervision sessions twice a week for one year. At that time, 95% of children admitted to the CAU exhibited severe oppositional and unmanageable behavior, and approximately 80% had significant trauma histories. The unit admitted children between the ages of 3 and 14, and the average length of stay on the unit was 14 days. Prior to the implementation of CPS, the CAU experienced a rate of mechanical restraints and locked-door seclusions twice the state average, and had higher-than-average rates of staff and patient injuries. Following CPS implementation, restraints decreased from 281 episodes documented in the nine months prior to training to only 1 episode in the 15 months post-training. Physical holds lasting under five minutes decreased from over 100 per month to less than 10 per month. Finally, staff and patient injuries decreased from an average of 10.8 per month to 3.3 per month.^{34,35}

In the second published example of CPS implementation on an inpatient unit, data were collected for all children admitted to a 15-bed psychiatric inpatient unit at Yale–New Haven Children’s Hospital during the five years before, and 1.5 years after, implementing CPS implementation.^{14,36} All unit staff were trained on the CPS model, and CPS was implemented over a period of six months, during which staff attended supervision twice weekly for 90 minutes. During the study period, 755 children were hospitalized, accounting for 998 total admissions, and the average length of stay was 29 days. During the 1.5 years after CPS implementation, there was a 97% reduction in restraints, from an average of 263 to 7 per year, and a 69% reduction in seclusions, from 432 to 133 per year.^{14,36}

Inpatient Research: Unpublished

Although published research in inpatient settings is limited to the two studies mentioned above, outcome data have also been reported via personal communication by two other agencies that have implemented the model on their inpatient units. The Ohio Hospital for Psychiatry documented a 95% reduction in the use of restraints and was seclusion free for one year following the implementation of CPS. Staff turnover on the unit also decreased to under 3% during the period after CPS implementation. Additionally, Emanuel Hospital in Portland, Oregon, implemented CPS in a 17-bed psychiatric unit admitting patients aged 9 to

18 years, with an average length of stay of seven days. After CPS implementation, there was a 78% reduction in the use of restraints and a 42% reduction in seclusions. Moreover, these results were sustained despite steady documented increases in hospital unit census and patient acuity.

Summary of Inpatient Research

Taken together, these published and unpublished findings create a body of evidence suggesting that CPS may be effective in reducing the use of restrictive interventions such as physical and mechanical restraints, as well as locked-door seclusions, in inpatient settings. In light of the current national initiative to move away from such restrictive interventions,²³ CPS may provide an alternative to conventional behavioral methods such as point and level systems that have traditionally been used in inpatient units.

A significant weakness of these studies is the lack of comparison groups that would allow us to assess whether changes are independent of other factors, including cohort effects or other noncomprehensive changes in hospital procedures. Although reductions in the use of restraints and seclusions ranged from 42% to the complete elimination of these interventions, well-powered studies with randomized or matched controls will be critical. Also recommended are studies that examine variables more proximal to the treatment that may drive the reductions in restrictive interventions. For instance, future research should measure variables that will allow for analyses of whether observed decreases in restrictive interventions are driven by decreases in patient’s externalizing behaviors, improvement in the adults’ ability to manage externalizing behaviors once they begin, adults’ increased tolerance due to better understanding of children’s skill deficits, or other factors.

Residential Research: Unpublished

The CPS model has been adopted by multiple child and adolescent residential treatment programs across North America; however, to date, no evaluations of outcomes in these agencies have been published. Nevertheless, some broad observations can be made from unpublished research reports. First, consistent with research from inpatient facilities working under the CPS model, two residential programs have reported significant decreases in restraints and seclusions after implementation of CPS on residential units. The first is a 12-bed residential program in Nova Scotia serving children under the age of 13 who are referred for externalizing behaviors, with an average length of stay of six months. This program reports that six months after CPS was adopted on the unit, the number of seclusions decreased by 69%, and after 40 months, by 78%. The second is an agency called Kairos (formerly Southern Oregon Adolescent Study and Treatment Center), which includes multiple residential and day treatment programs for youth in Oregon. After implementing CPS agency-wide, the total number of emergency support interventions (including

restraints, seclusion, and hospital transports) in Kairos residential facilities decreased nearly 80%, from 1326 events in 2008 to 275 events in 2011.

In addition to measuring agency-level data such as restraints and seclusions, one new, nine-bed residential facility in London, Ontario, conducted a comprehensive study in which they measured change over time in individual-level variables such as social skills, community participation, and academic performance in 49 boys placed in residential care under the CPS model. Boys in this program were between the ages of 9 and 13, and the average stay was 90 days. Results indicated that boys made significant improvements from pre-admission to discharge, exhibiting significant reduction of outbursts/meltdowns (as measured by the Conners Global Index), improved social skills (as reported by parents on the Social Skills Rating Scale, Conners' Parent Rating Scales, and the Social subscale of the Child and Adolescent Functional Assessment Scale), and increased community participation (as measured by the Community subscale of the Child and Adolescent Functional Assessment Scale). Six months post-discharge, outbursts and physical aggression were reduced even more, suggesting that boys may have learned effective frustration-tolerance skills that they retained upon leaving the facility. Additionally, parents' reports of boys' internalizing symptoms (as measured by Internalizing subscale of the Brief Child and Family Phone Interview) improved significantly from pre-admission to post-discharge. These results are the first to demonstrate improvements in child functioning at the individual level, beyond reductions in oppositional behavior, suggesting proximal variables that should be explored in future research as mediators of the relationship between CPS intervention and reduction of restrictive interventions. Additionally, these results suggest that CPS treatment may be associated with reduced internalizing and also externalizing symptoms, providing direction for future research. A more detailed account of this comprehensive project in London, Ontario, can be found in a formal report presented to the Center of Excellence in Children's Mental Health at the Children's Hospital of Eastern Ontario.⁴²

Summary of Residential Research

Though unpublished, these findings suggest that, as in inpatient facilities, using CPS in residential treatment programs may be associated with a reduction in restrictive interventions such as physical restraints and seclusion. One study also found that in addition to being associated with a reduction in externalizing symptoms, CPS may be associated with improved social skills and community engagement and with reductions in internalizing symptoms. In the absence of a comparison group, however, we are unable to attribute these changes specifically to the CPS model; changes in these individual variables may be due to nonspecific treatment effects related to residential treatment or regression toward the mean. As in other settings, research with

randomized or matched comparison groups is recommended for the residential treatment setting. Based on these preliminary associations, it is recommended that within the context of future experimental or quasi-experimental studies, improvements in social skills, community engagement, and internalizing symptoms should be explored as possible mechanisms for the reduction in externalizing behaviors that may be documented after CPS treatment.

Juvenile Justice Research: Unpublished

CPS is currently being implemented in a number of juvenile justice settings across North America. At present, no known published studies are available on outcomes of CPS in these settings, but there is one unpublished report of findings from an internal quality-improvement project at the Mountain View Youth Development Center, a high-custody unit in Maine. Staff at the center received an initial training in CPS and weekly supervision in the approach. After implementation of CPS, the rates of assault and the use of force decreased by more than 50%, and time spent in seclusion decreased by 89%. Additionally, the one-year recidivism rate prior to the introduction of CPS was 60% (as measured in 2003), which fell to 15% after CPS was introduced in 2008. Finally, the agency reported that considerably fewer staff compensation claims arose due to injury after the adoption of CPS.

Summary of Juvenile Justice Research

While research in juvenile justice settings has been minimal, this initial report of positive outcomes is promising. Behavior management in detention centers has historically relied on the use of reward and punishment systems, but new research suggests that these approaches may increase aggressive response, thereby creating exactly the situations that they are meant to discourage.¹⁸ Although the preliminary research findings presented here suggest that CPS may provide a nonpunitive alternative, comparison groups will be critical for future evaluation of CPS efficacy in juvenile justice settings. In the absence of a systematic comparison, it is not currently possible to estimate the degree to which CPS alone has been responsible for the gains reported here. In addition, it will be especially important to measure skill development over time in this population, as it could be hypothesized that decreased recidivism rates like those reported in Maine could result from the development of skills taught as part of CPS, such as frustration tolerance, empathic listening, and expression of one's own perspective in noncombative ways. In sum, this area is worthy of further research attention.

School Research: Published

The CPS model has been adopted schoolwide in a number of special and general education settings. The single published account assessed the associations between a CPS intervention, on the one hand, and discipline referrals and teacher stress, on the other. Based on research suggesting

that student misbehavior is a prominent source of teacher stress,^{6–8} Schaubman and colleagues³⁹ conducted a pilot study in an alternative school in Colorado to see whether training teachers in CPS could help to reduce stress related to especially challenging seventh- and eighth-grade students. Eight teachers were trained in the CPS approach for a total of 12 hours over two days, and received 75-minute weekly consultations for eight weeks. Each teacher focused on implementing CPS with two challenging students and completed measures at baseline and post-intervention that assessed stress specifically related to each of those target students using the Index of Teaching Stress. Results indicated that teacher stress decreased significantly pre- to post-CPS implementation, and that this effect was strongest for teachers who were rated by supervisors as highly competent in the CPS approach. Furthermore, analysis of discipline referral data also indicated a significant reduction in the number of discipline referrals for the 16 target students, as well as for students who were not specifically targeted for intervention (presumed by the article's authors to be due to spillover, since these eight teachers taught all of the students in the school). The authors asserted that the reduction in teachers' stress may have resulted from increased perceptions of control related to the shift from a reactive to proactive approach of managing misbehavior.³⁹

School Research: Unpublished

A number of promising findings from school-based implementations of CPS have remained unpublished. Such evaluations of outcomes, initiated for the purpose of quality improvement, typically focus on the consequences of students' oppositional behaviors, such as restraints, seclusions, suspensions, and office referrals, rather than on the behaviors themselves. In particular, four schools have provided unpublished data exhibiting significant decreases in such disciplinary outcomes. First, a regional school program for elementary students with emotional disorders in Maryland reported a decrease in restraints from 25 to 1 per month, and a decrease in minutes spent in time out from 6223 to 789 per month, after adopting CPS. Second, in the first year after staff received CPS training, Astor Day Treatment Center in New York City reported 64% fewer physical holds, 27% fewer visits to the crisis room, 91% fewer in-school suspensions/alternative placements, 27% fewer staff injuries, and 47% fewer child injuries. Third, the Bend-La Pine School district in Oregon implemented CPS in their community-based educational programs for middle and high school students with emotional and behavioral disorders. Prior to CPS implementation, this program recorded a rate equivalent to 60 physical restraints and 160 involuntary seclusions per year, but after schoolwide CPS implementation, the school recorded only 10 restraints and seclusions for the entire year. Continuation of the CPS program in these Oregon schools has resulted in a virtual

elimination of these disciplinary practices between 2009 and 2012. Fourth, at the Pioneer Special Schools, a program implemented in the Portland, Oregon, public school systems for students displaying oppositional behaviors in kindergarten through sixth grade, the minutes spent in out-of-class coaching decreased by 60%, the minutes spent in supervised isolation by 70%, and the minutes spent in a deescalation room by 55% following the adoption of CPS.

Though most school programs have focused on measuring reductions in disciplinary outcomes, a few schools have also measured and reported increases in positive factors observed after the schoolwide adoption of CPS. First, in an alternative school in New York serving 44 students from kindergarten to fifth grade with severe behavior or academic challenges, the number of suspensions per year dropped dramatically (from 200 pre-intervention to 1 post-intervention) after CPS was introduced, and administrators also observed a 48% increase in school attendance and 250% increase in family participation. Similarly, a program implemented in Colorado across six alternative schools reported that after CPS was implemented, 62% of teachers reported a decrease in their perceived stress in the classroom, 67% reported improved confidence in their general ability to work with students, and 86% reported an improved relationship with students (all measured by the Index of Teacher Stress). In this school, student self-report measures completed before and after the introduction of CPS indicated improved social skills, self-control, and executive functions, and decreased hyperactive/inattentive symptoms (as measured by the Social Skills Improvement System and Behavior Rating Inventory of Executive Functioning).

Summary of School Research

Similar to what we have seen in many of the other clinical settings using CPS, much of the research on CPS in schools remains unpublished, limiting conclusions that can be reliably drawn. Findings from published research and unpublished reports indicate that the implementation of CPS in educational settings has been consistently associated with significant reductions in disciplinary outcomes such as restraints, seclusion, suspensions, and alternative placements. Teachers trained in CPS have reported reductions in student-related stress as well as improved confidence and relationships with students, and the initial evidence suggests that CPS may be positively associated with peripheral variables such as student attendance and family participation. Preliminary results also suggest that treatment with CPS may be associated with improved social skills and executive functioning; future research needs to explore whether improvements in these skills drive decreases in restrictive disciplinary practices such as suspensions, restraints, and seclusions. Rigorous and controlled research will be necessary in order to validate these preliminary, but promising, findings.

GENERAL SUMMARY

In sum, using CPS to manage children's externalizing behaviors in outpatient, inpatient, residential, juvenile justice, and school settings has been associated with positive outcomes in a number of research studies. Across these settings, positive outcomes after the introduction of CPS included reductions in observed oppositional and defiant behaviors, as well as in related disciplinary and restrictive interventions such as restraints and seclusion. Secondary benefits of the model have included reduction in adult stress, improvements in adult-child relationships, and decreased staff and patient injuries.

A moderate degree of published research across settings documents the primary benefits noted above. For instance, significant reductions in oppositional behaviors have been documented in outpatient settings,^{32,38,40} and decreases in disciplinary action have been documented in both inpatient^{34,36} and school settings.³⁹ Published research has also documented a number of secondary benefits. For instance, improvement in adult stress and adult-child interactions have been documented in outpatient^{32,38} and school settings,³⁹ and reductions in staff and patient injuries were documented in inpatient settings.³⁴

Data from a number of unpublished quality-improvement projects further support these published results. For example, reductions in restraint and seclusion have been reported in inpatient, residential, juvenile justice, and school settings. A residential program reported reductions in primary externalizing behaviors such as aggressive outbursts. A juvenile justice program documented decreased staff injuries, and an inpatient program reported decreased staff turnover, an indicator of caregiver stress. Furthermore, a number of unpublished outcome studies extend what we have learned from published studies. For example, after adopting CPS, a residential program reported improvements in social skills and community participation, and a school reported improvements in attendance and family participation. These intriguing findings provide direction for future work.

Despite the many apparent strengths of CPS, this research summary also reveals weaknesses in the current body of research that will need to be addressed in order to increase confidence in, and understanding of, the CPS approach. Most notably, only one published randomized, controlled trial has compared CPS to another treatment model, and the sample size in that study was small.³² Though a large-scale replication of this work is in progress, remaining published research has followed pre/post designs, which are able to detect change over time but do not allow us to completely rule out cohort effects, maturation effects, or other characteristics of the setting that would have contributed to change in the absence of CPS. The magnitude of the reported effects (for example, when restraints decrease by 97% and no other systematic changes are noted)³⁶ suggest that changes were at least in part due to the CPS intervention, but additional well-controlled studies are warranted to rule out confounding variables.

FUTURE DIRECTIONS

As mentioned previously, well-controlled studies comparing CPS to other standard treatments or to wait-list-control groups will be critical in order to separate the effects of CPS from other environmental effects and from the nonspecific effects that come from receiving well-administered treatment under any model. Since randomization in inpatient, residential, and school settings can be especially difficult, quasi-experimental designs may be necessary. In addition, since comparisons between multiple evidence-based treatment models sometimes result in equal primary benefits,⁴³ investigators should measure the many important domains that should be considered in defining treatment effectiveness—such as feasibility, patient satisfaction, or cost of implementation—that could differentiate CPS from other promising treatment approaches.⁴⁴

Another area worthy of research attention is in identifying the mechanism(s) behind CPS outcomes—that is, variables that mediate the relationship between the CPS intervention and any positive effects that may be observed. To date, we have a number of hypothesized mechanisms, none of which has received adequate study. Reductions in disciplinary action such as suspensions, restraints, and seclusions are presumed to be a direct result of decreased oppositional behaviors. It is also possible, however, that adult caretakers and staff trained in CPS are less likely to respond with restrictive interventions in response to challenging behavior once they begin to view such behavior as a product of lagging skills as opposed to purposeful defiance. Similarly, reductions in oppositional behavior are presumed to be a direct result of improvements in the skills targeted by CPS: cognitive flexibility, emotion regulation, executive functions, language processing, and social skills. But it is also possible that children who receive treatment under the CPS model simply feel more understood and are therefore more motivated to behave well for newly empathic adults. Only one study has taken the approach of measuring variables that might be considered mediators (including social skills and executive functions);⁴² however, this research group did not test these mediation models (e.g., whether patients whose social skills were most improved also exhibited the largest reductions in aggressive outbursts). More nuanced research in which we measure and analyze not just outcomes, but also possible mediating variables, will promote a better understanding of *how* CPS works.

The third area recommended for future study is the identification of particular strengths and limitations of the CPS intervention. Future investigations might explore whether particular demographic or family characteristics such as age, diagnosis, socioeconomic status, cultural background, or parenting style can be used to predict the success of CPS in reducing challenging behavior. Future investigations might also follow the lead of Stewart and colleagues⁴² in exploring the effect of CPS on internalizing symptoms and not just on externalizing symptoms. Studies might ask whether the CPS

model works better in teaching some skills (e.g., executive functions) more than others (e.g., emotion regulation). They might also evaluate whether CPS reduces caregiver stress in inpatient and residential units in addition to the stress reductions reported for parents and teachers. Finally, future research should explore longitudinal trajectories of children treated under the CPS model and also the minimum dose necessary for long-term benefits. With results from these investigations, CPS interventions can be modified to better target treatment to children who will benefit the most, and to provide appropriate levels of treatment to sustain long-term symptom reduction.

CONCLUSION

One commonly held belief is that challenging children often choose not to comply with adult expectations, because they have learned that disruptive behavior results in personal gains, such as getting one's way, receiving attention, or avoiding work. The CPS model, in contrast, conceptualizes childhood externalizing behaviors as the product of lagging cognitive skills in the broad domains of problem solving, flexibility, and frustration tolerance. Consistent with the philosophy that "children do well if they can," adults trained in CPS identify a child's cognitive-skills deficits and then assist the child to build these skills through a process of collaboratively solving problems to find solutions that are mutually satisfactory.

Published and unpublished research provides suggestive evidence that the use of CPS with challenging children may result in decreased oppositional behavior and caregiver stress, reductions in the use of restraints, seclusions, and school suspensions, and improvements in individual skills, including social and executive functioning. Over the last decade, the CPS approach has been increasingly implemented in outpatient, inpatient, residential, juvenile justice, and school settings across North America. In order for this growth to continue, investigators will need to build upon prior research findings through ascertainment of larger samples and through the use of experimental and quasi-experimental designs. It will also be necessary to evaluate mechanisms of change under the CPS model as well as the particular strengths and weaknesses of the approach. Through systematic evaluation of the CPS model, research can inform continued model development and targeted dissemination of CPS in the pursuit of reduced rates of childhood externalizing disorders—an outcome that promises great benefits for children, caregivers, and society at large.

Declaration of interest: Drs. Ablon, Epstein, and Pollastri are employed by the Department of Psychiatry at Massachusetts General Hospital, where they practice and consult on the Collaborative Problem Solving approach.

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