# Parent-Child Interaction Therapy: An Examination of Cost-Effectiveness

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Abstract

An empirically supported treatment for children with disruptive behavior disorders, Parent-Child Interaction Therapy (PCIT), has received increased interest from policymakers and mental health administrators regarding its cost-effectiveness (i.e., ratio of treatment costs to behavior gains). This paper examines the projected costs and treatment outcomes associated with implementing and completing PCIT and demonstrates favorable cost-effectiveness ratios. For example, start up costs of PCIT, including equipment and training, were estimated at approximately $14,000 and the average cost of providing PCIT from intake to termination was estimated at approximately $1,000 per client. Benefits include clinically significant improvements on multiple measures of disruptive behavior and strong maintenance data, suggesting the PCIT is an effective and financially viable form of treatment for child disruptive behavior disorders.

Keywords: Parent-Child Interaction Therapy (PCIT), cost-effectiveness, disruptive behavior disorders

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In regard to mental health impairment, disruptive behavior has been found to be the most frequent cause of child outpatient or inpatient referral (Wells & Forehand, 1985) and is estimated to affect up to 23% of young children (O'Brien, 1996). In addition to an especially poor prognosis, the societal cost of children with disruptive behavior disorders (DBD) is great. Estimates indicate that a child with severe behavioral problems is about ten times more expensive than a child without such problems (Scott, Knapp, Henderson, & Maughan, 2001). Given the potential monetary benefits of early intervention among this population, as well as the intangible gains associated with improved behavior and a safer community, it is advantageous to explore DBD treatments that are efficacious and financially prudent. The current paper sets out to evaluate the cost-effectiveness of Parent-Child Interaction Therapy (PCIT; Eyberg, Boggs, & Algina, 1995; Hembree-Kigin & McNeil, 1995), an empirically supported treatment for child DBD, and in doing so, assess the anticipated financial costs and behavior improvements associated with its implementation and practice. First, we will review the extant literature and examine the implications, financial and otherwise, of untreated DBD. Next, we introduce PCIT and demonstrate the empirical support for the use of PCIT for children with DBD. Following such an introduction, we commence with an analysis of the costs and anticipated behavior changes associated with the use of PCIT on a per-child basis. Additionally, we discuss the startup costs necessary for implementing PCIT. Lastly, we conclude with a discussion of the implications of the results and suggest future directions for research in this area. We hope that this paper will encourage the use of PCIT in new settings, including both community and university clinics. Particularly when considering the exuberant costs of DBD, PCIT may be an attractive option to clinicians and policymakers if it is demonstrated to be a cost-effective treatment.

The class of externalizing behaviors referred to as DBD is generally typified by aggressive, defiant, and impulsive behaviors which are commonly diagnosed as either Conduct Disorder (CD) or Oppositional Defiant Disorder (ODD). CD is characterized by aggression, theft, destruction of property, and defiance of societal norms. ODD is defined as a persistent pattern of behavior which includes arguing, disobedience of adult requests, and anger. All, by definition, lead to clinically significant impairment in the academic, interpersonal, and/or occupational domains (American Psychiatric Association, 2000). Additionally, these disorders are typically present early in life and can be recognized in children as young as two years of age (Muntz, Hutchings, Edwards, Hounsome, & O'Cèlleachair, 2004). Among the numerous biological and situational correlates for the development of DBD, some of

the strongest data indicate that family factors greatly contribute to child behavior. Indeed, among others, parental depression (Querido, Eyberg, & Boggs, 2001), reports of parental stress (Eyberg, Boggs, & Rodriguez, 1992), and parent-child interactions (Olson, Bates, & Bayles, 1990) have all been demonstrated to be associated with the display of child disruptive behavior. Indeed, research on this population indicates that parent-child interactions are one of the strongest determinants of the development of childhood behavior problems (Campbell, 1997; Patterson, 1982).

Given the severity of these behaviors, there is a strong need for effective and early interventions. McNeil, Capage, Bahl, and Blanc (1999) reported that "young children with severe behavior problems do not immediately 'outgrow' their disruptive behaviors without intervention" (p. 451). Such a statement is not hyperbole as early-onset disruptive behavior is indicative of an especially poor prognosis (McMahon & Wells, 1998). In the absence of effective treatment, childhood disruptive behavior is likely to persist into adolescence and adulthood (Lahey et al., 1995). Disruptive behavior in early childhood is likely to manifest itself in adulthood through psychological impairment, criminality, or incarceration (Farrington, 1995). Studies have demonstrated that nearly 40% of children diagnosed with CD are convicted of crimes later in life, most frequently for CD-related offenses such as property destruction or assault (Farrington, 1995).

Given the numerous documented negative repercussions of child DBD, it is critical to examine empirically-supported treatments in regards to their effectiveness and feasibility to implement (e.g., financial cost of treatment). Two common methods for fiscally evaluating treatments are cost-benefit and cost-effectiveness analyses. While there has been much confusion in differentiating between the two, the primary distinction is based upon the outcome variables (Yates, 1999; Yates & Taub, 2003). Both cost-benefit and cost-effectiveness analyses measure the financial implications of a particular treatment modality. However, a cost-benefit analysis restricts its comparison to the monetary input and output. That is, the cost of a treatment is compared to the financial gains it produces. A cost-effectiveness analysis, on the other hand, measures the outcome of an intervention in terms of treatment effects or behavior change. The cost of a treatment is juxtaposed to the non-monetary improvements one makes as a result (e.g., improvements in a child's maladaptive behavior). While the effects of DBD extend into both the financial and behavioral domains, we believe that a cost-effectiveness analysis may be of more interest to treatment providers and clinicians familiar with this population. As is such, we will now discuss the implications of child DBD. We do briefly discuss the financial benefits of successful treatment as well as the cost of untreated child disruptive behavior. Although technically superfluous in a cost-effectiveness analysis, we believe that such figures may best outline the urgency of early intervention and put into perspective the impact of this population on the general public.

## Implications of Disruptive Behavior Disorders

All of the following figures are presented in United States dollars with English Pound figures adjusted using the Federal Reserve Board's (2007) exchange rate of £1 = $1.84. Fiscally speaking, the cost of untreated DBD and its multiple negative outcomes to society is vast. Considering that the data confirm that treatment earlier in life is more effective than later treatment, there is an urgent need from a financial and a behavior standpoint for early and immediate intervention (Gallagher, 2003). Cohen (1998) estimates that effective treatment among a high-risk population, such as children with DBD, may save approximately $2 million over the course of each child's lifetime in averted costs associated with school dropout, future criminality, and substance abuse. Additionally, Knapp, Scott, and Davies (1999) found that the cost of a young child with CD between 4 and 10-years-old were averaged at over $28,000 annually, with a majority financed through taxpayer funds (e.g., school system, health care).

Paramount to the study of the cost of child DBD is longitudinal data collected over the course of one's lifetime. Foster, Jones, and the Conduct Problems Prevention Research Group (2005) identified children in kindergarten as being at a high risk for persevering behavior problems. The results

demonstrate that youths not receiving treatment were by far the most costly through adolescence in regards to their medical care, mental health treatment, juvenile justice, and school costs. Additionally, while the annual costs of the respective services remained fairly stable over time for the unimpaired comparison group, adolescents with CD generally increased their cost to society throughout their high school years. Over the final four years of high school, the results suggested that an adolescent with CD may cost an additional $11,700 annually compared to an unimpaired child (Foster et al., 2005). There was a similar discrepancy when comparing adolescents with ODD, although the annual cost was less than children with conduct problems (Foster et al., 2005). Particularly when considering the relatively high prevalence rates of CD (6%) and ODD (8%) among the study's sample, such a cost adds a heavy financial burden for taxpayers. Other longitudinal studies (e.g., Scott et al., 2001) reiterate that children with DBD cost significantly more than children without such impairment, as educational services, truancy, unemployment benefits, medical and mental health care, and legal/incarceration costs are far greater for this population. Disruptive children, in the absence of treatment, are at risk of becoming disorderly adults with more severe problems. In the long run, the general public pays the price.

The cost of DBD has been demonstrated to be exorbitant from a financial standpoint. Yet the scope of DBD reaches beyond the fiscal consequences. As Cohen (1998) noted, there are many hidden expenses associated with disruptive behavior which are difficult or impossible to measure. There is the direct cost, such as the amount paid in social services or incarceration, and what he terms the indirect or "social cost" (p. 6). This refers to, for instance, the price of a community feeling less safe as a result of crime or how hospitals are less productive due to caring for an assault victim. While social costs may be difficult to measure, the intangible benefits of a safer community in the absence of child and adult disruptive behavior cannot be discounted. School classmates, for instance, bear the negative effects of disruptive behavior in the classroom. Martini-Scully, Bray, and Kehle (2000) reported that in a classroom with a disruptive child, teachers spend less time on general student education and more time controlling the disturbances of the difficult child. Although it is difficult to quantify such an effect, it is clear that by usurping teacher attention, disruptive children reduce the quality of academic instruction for the other students without behavior problems. Thus, in addition to the direct costs of treating this population, the social and intangible costs of DBD continue to negatively affect the unimpaired members of society.

Given the established expenses that occur directly and indirectly as a result of DBD, the next logical step is to examine the available treatment options and to determine their costs and effectiveness. Of the treatments most likely to be effective, there is often the common link of early intervention, as disruptive behaviors worsen with age, which impair scholastic, social, and self-help skills over time (Hembree-Kigin & McNeil, 1995). In large scale cost-benefit studies of child treatment, early intervention programs, particularly among families of low socioeconomic status have demonstrated some of the most favorable outcomes (Aos, Lieb, Mayfield, Miller, & Pennucci). Indeed, there are several benefits of early intervention—a shorter learning history, fewer extraneous influences, and increased efficacy of behavioral contingencies (Hembree-Kigin & McNeil, 1995). In addition to early intervention, there is evidence that treatments which instruct parents on how to appropriately manage and improve their child's behavior are more efficacious than those chiefly offering tips or advice (Muntz et al., 2004). In other words, in vivo practice, where immediate feedback can be supplied regarding actual parent-child interactions, is likely a critical element for the retention of useful skills and knowledge of behavioral management (Muntz et al., 2004). Consequently, there appears to be three elements of effective and cost-efficient interventions: provided early in the child's life (e.g., under 7 years of age), focused on practice of parenting skills, and supported by empirical evidence.

A behavioral treatment which meets these criteria is PCIT. While a more in-depth description of the procedures, costs, and outcomes will follow, PCIT was independently evaluated by Aos and colleagues (2004) and found to be a cost-beneficial child welfare/home visitation program. For each child, the cost of a complete PCIT treatment program was found to be $1,296. The monetary benefits of PCIT,

within the seven areas of crime, substance abuse, educational outcomes, teen pregnancy, teenage suicide attempts, child abuse/neglect, and domestic violence, were measured at $4,724 per child—a gain of nearly $3,500. Considering that the costs outweighed the benefits in five of the seven other interventions programs classified as similar treatments, evidence indicates that further study of the costs and outcomes produced by PCIT is warranted as it is likely to be a cost-effective treatment for childhood disruptive behavior.

In addition to the cost-effectiveness evaluation conducted by Aos and colleagues (2004), the PCIT literature includes a Krivelyova, Sukumar, Stephens, and Freeman (2007) study which examined the costs of PCIT compared to that of treatment as usual in a system of care program. The authors assessed costs through a review of service utilization and billing records. Results demonstrated that although PCIT was initially more expensive, after 18 months, the average cost of treating a child with PCIT was almost $600 less than standard treatment. While the two respective studies demonstrate the financial benefits of PCIT, there remain a number of critical differences which distinguish between the current study and those conducted by Aos et al. (2004) and Krivelyova et al. (2007). Firstly, while Aos and colleagues (2004) evaluated the financial costs and gains of PCIT and 60 other community-based treatments, PCIT was not its focus and the authors only broadly presented a relatively small amount of findings pertaining to its treatment initiation. A limitation of the Krivelyova et al. (2007) study was its retrospective design and measurement of costs by examining billing records. Therefore, the costs of initiating and conducting PCIT were not directly examined. In contrast, our current study evaluates cost-effectiveness and is more specifically geared towards an in-depth analysis of the costs of PCIT as well as the behavior improvements observed as a result. This paper focuses solely on the financial costs and resulting behavior improvement of PCIT through an itemization of the startup and per-child treatment costs as well as the anticipated behavior change to be observed. However, before elaborating on the cost-effectiveness of PCIT, it is important to examine more detailed information on the: behavior management procedures involved, specific components of treatment, evidence supporting its use, and preliminary cost estimates of PCIT.

## Parent-Child Interaction Therapy

### *Overview*

Developed by Sheila Eyberg, currently at the University of Florida, PCIT has been demonstrated to be an empirically-supported treatment for young children with disruptive behavior problems (Brinkmeyer & Eyberg, 2003). Treatment is typically conducted in weekly one-hour sessions where both the parents and child are present. The format of treatment sessions is both didactic and experiential. Specifically, the therapist first teaches specific skills to parents and then coaches the parents as they practice these skills while interacting and playing with their child. This unique coaching component of treatment enables the therapist to observe the parent-child interactions and provide parents with immediate feedback on their use of specific skills. This format is consistent during the two phases of treatment: Child-Directed Interaction (CDI) and Parent-Directed Interaction (PDI).

CDI, the first phase of PCIT, focuses on strengthening or enhancing the parent-child relationship and increasing desirable child behaviors (e.g., prosocial behavior). These goals are accomplished through the use of CDI, or, as parents often refer to it, "special play time," where the child, rather than the parents, leads a five-minute play session. During this time, parents are instructed to behave in accordance with the *PRIDE* skills: praising appropriate behavior, reflecting the child's speech, imitating the child's play, describing the child's behavior, and the use of enthusiasm. In particular, parents learn to use labeled praise by telling their child exactly what he or she is doing correctly. While parents are taught the *PRIDE* skills throughout CDI, they also learn to avoid asking questions, giving commands, or criticizing the child. A vital aspect of PCIT is the use of selective attention where the parents are taught to ignore mildly inappropriate behaviors during CDI and attend to more desirable behaviors through the use of the *PRIDE*

skills. The progress of treatment is dependent on the development of the parents' skills. In order to advance to the second phase of treatment, parents must meet mastery criteria where, during a five-minute CDI session, they demonstrate all of the necessary *PRIDE* skills in the absence of therapist coaching. The criteria is quite stringent; ten labeled praises, descriptions, and reflections must be recorded along with the use of less than three total questions, commands, and criticisms.

PDI, the second phase of PCIT, emphasizes consistent and structured discipline techniques. After instruction on the use of clear and direct commands, parents practice the utilization of consistent, specific, and immediate consequences to reinforce child compliance and punish defiance. For instance, if the child obeys a command, parents learn to immediately provide a labeled praise. If the child does not obey, parents issue a single warning followed by a three minute time-out. Following the time-out, the child is presented with the choice of complying with the original command or serving another three-minute time-out. Additional strategies are presented for managing the child's behavior if he or she does not stay in the timeout chair or refuses to comply. In order to complete treatment, parents are again observed without the therapist coaching during a five-minute play session. To successfully meet mastery criteria, parents must provide at least 4 commands, 75% of which are appropriately issued and followed with the correct consequences.

One of the integral and unique components of PCIT is live, in-vivo coaching. Typically, this coaching occurs with the therapist located behind a one-way mirror coaching the parent through a wireless earphone, commonly referred to as a "bug-in-the ear." Although PCIT has been modified in community settings without this equipment by employing in-room coaching, this modification is not ideal and does not fully preserve the key features of PCIT. Specifically, in-room coaching may result in heightened reactivity in both the child's and the parent's behavior. Furthermore, nearly all of the PCIT efficacy research has been conducted with therapist coaching behind a one-way mirror. Currently, there is no available research directly comparing the efficacy of coaching in-room to behind a one-way mirror.

The number of treatment sessions required to complete PCIT varies as progression through the program is data-driven and is dependent on parents mastering the necessary skills taught in CDI and PDI. Often treatment can be completed in 10 to 16 sessions for the majority of families (Herschell, Calzada, Eyberg, & McNeil, 2002). In PCIT outcome studies, researchers either use the mastery-based criteria to determine treatment length or set a specific number of sessions that all families receive. Gallagher (2003) reviewed the outcome studies that utilized the mastery-based approach and found that on average, families required 12.6 sessions to complete PCIT. In addition to these standard sessions, booster sessions can be included on an as-needed basis.

*Evidence*

PCIT has a large evidence-base for treating young children with disruptive behavior problems. Researchers have found reductions in child disruptive behavior following PCIT when compared to waitlist and classroom control children (e.g., McNeil et al., 1999; McNeil, Eyberg, Eisenstadt, Newcomb, & Funderburk, 1991; Schuhmann, Foote, Eyberg, Boggs, & Algina, 1998). Research also demonstrates that parents are satisfied with the treatment structure and content and report more confidence in their ability to manage their child's behavior following treatment (Schuhmann et al., 1998). Additionally, there is evidence that the gains obtained in PCIT generalize to the school setting (McNeil et al., 1991) and to untreated siblings (Brestan, Eyberg, Boggs, & Algina, 1998).

The overwhelming majority of PCIT efficacy studies have examined the treatment in its entirety (e.g., CDI and PDI). To date, only one study has compared the different treatment components of PCIT. Eisenstadt, Eyberg, McNeil, Newcomb, and Funderburk (1993) randomly assigned families to PCIT where each received CDI and PDI, although in different sequence, in order to evaluate the behavior

changes occurring as a result of each of the components. After seven weeks of treatment, results suggested that families receiving PDI underwent greater improvements in both observed and maternal reports of child behavior than families receiving CDI. Yet, all participants in the study eventually received the entire PCIT protocol, so it is unclear as to whether treatment gains would persist or if any long-term detriments would appear if families received CDI or PDI in isolation. While more research is to be conducted on the effectiveness of each of the separate components of PCIT, these preliminary findings are intriguing in that some positive effects—perhaps not as much as seen following a full protocol—may arise from only certain elements of PCIT. Given that a treatment consisting of only child- or parent-directed interactions would be substantially shorter and less costly (as it takes up less therapist and client time) than a full PCIT battery, this is a ripe area for future efficacy and cost research. With additional study of the effectiveness of the components of PCIT, a wider range of options would be available to determine the best course of treatment given one's financial constraints and desired behavior improvement.

In addition to considering the efficacy of the entire PCIT protocol or its individual components, it is necessary to examine the long-term maintenance of treatment gains when examining cost-effectiveness. Several PCIT studies have examined the long-term effects of PCIT and have demonstrated the persistence of treatment gains (e.g., Eyberg et al., 2001; Funderburk et al., 1998; Nixon, 2001; Nixon, Sweeney, Erickson, & Touyz, 2003; Schuhmann et al., 1998). Boggs and colleagues (2004) found that clinically significant gains in child behavior were maintained 1 to 3 years following PCIT for families who successfully completed PCIT. Moreover, Hood and Eyberg (2003) examined families 3 to 6 years following treatment and also found long-term gains in the frequency of child disruptive behavior as well as maternal confidence in controlling child behavior. Based on these studies, it is likely that treatment gains of reduction of child behavior continue years following treatment for most families who successfully complete treatment.

Although research on the long-term effects suggests that the treatment gains from successful completion of PCIT persist over time, these positive changes are not maintained in families who drop out during the course of treatment. For instance, Boggs and colleagues (2004) examined families that dropped out of treatment and revealed no differences when comparing child behavior and parent stress at pretreatment and 1-3 years following treatment. Therefore, an examination of the attrition rate is important when considering the efficacy and long-term maintenance of a particular treatment.

Dropout from general psychotherapy averages 46.86% over the course of treatment (Wierzbicki & Pekarik, 1993). When specifically examining attrition rates in parent training, 28-50% of families prematurely terminate treatment (Forehand, Middlebrook, Rogers, & Steffe, 1983; Kazdin, Mazurick, & Siegel, 1994; Prinz & Miller, 1994). In a review of PCIT treatment outcome literature, Gallagher (2003) found that attrition rates for families receiving PCIT averaged 12.33% with a range of 0-53%. Werba, Eyberg, Boggs, and Algina (2006) found that 33% of families receiving PCIT dropped out of treatment prior to successful completion. Therefore, the research on PCIT suggests that the treatment is efficacious, has long-term effects, and has an attrition rate comparable to other empirically-supported treatments. Given the body of literature on the positive effects on PCIT, the next step is to evaluate the costs associated with conducting treatment.

*Costs*

Costs of implementing PCIT consist of both start-up and ongoing expenses. Initial expenditures for PCIT include purchases of equipment and therapist training while maintenance expenses include therapist salaries and treatment assessment measures. Thus, in conducting a cost-effectiveness analysis, it is crucial to consider the necessity of these expenses and the overall cost of implementation on the efficacy of treatment. Equipment will likely consist of much of the initial costs when first implementing PCIT. Both audio and video equipment are required in PCIT to enable coaching behind a two-way mirror.

Estimates for the equipment vary; however, Chaffin and Funderburk (2005) give a low-end estimate of $5,000 to furnish and equip a room with necessary PCIT equipment. The University of California, Davis (UC Davis) Children's Hospital: PCIT Training Center (2007a) estimates that equipment for one PCIT room costs $5,963, plus additional labor and infrastructure charges. Therefore, the authors recommend budgeting $10,000 for equipment and infrastructure expenses to implement a PCIT treatment program. Labor costs vary depending on the company and on the physical characteristics of the room. Additionally, changes may need to occur within the therapy rooms. Specifically, rooms may need to be remodeled to include features such as a one-way mirror and a timeout room.

Another initial fee required for implementing PCIT in community agencies and other settings is the training of PCIT clinicians. Intensive training is necessary to become a competent and skilled PCIT therapist and research demonstrates that merely reading a treatment manual is helpful but not sufficient in becoming a competent PCIT therapist (Herschell et al., 2007). Additionally, even attending a two-day didactic or experiential workshop is effective but does not consistently result in mastery of PCIT skills, which is necessary in order for therapists to successfully coach parents (Herschell et al., 2007).

Based on this research and the need to preserve the integral features of PCIT, the PCIT Advisory Board has been working on setting guidelines outlining the minimum requirements for training PCIT therapists (Herschell & McNeil, in press). Although no such guidelines currently exist, the PCIT Advisory Board agrees that the process needs to involve at least 40 hours of initial training in addition to advanced training and/or supervision (Herschell & McNeil, in press). Individual PCIT trainers have developed their own training requirements, many of which share common features. For instance, the UC Davis Children's Hospital: PCIT Training Program (2007b) consists of 40 hours of training in fundamental, relationship enhancement, and PDI skills. Similarly, the University of Oklahoma Health Sciences Center (2002) also requires a 40 hour workshop plus additional requirements of two days of advanced training and weekly phone consultations for six months.

The initial cost of training required to preserve the integrity of PCIT adds to the start-up cost of implementation. These costs vary depending on the training site. For instance, the University of Oklahoma Health Sciences Center (2002) charges $4,000 per individual for a five day PCIT workshop, two days of advanced training, and six subsequent months of phone consultation. Sheila M. Eyberg at the University of Florida (Eyberg, 2006) and Cheryl B. McNeil at West Virginia University charge $3,000 per clinician for a five day workshop, although these costs do not encompass advanced training requirements or ongoing supervision. Additionally, agencies implementing PCIT typically require between four and eight therapists trained in PCIT to develop a self-sustaining program. These therapists may be able to continue their training and become qualified to train others in PCIT within the agency. However, in order to instruct others in PCIT, additional training is necessary and various training cites typically have requirements to become a PCIT instructor capable of independently training others (UC Davis Children's Hospital: PCIT Training Center, 2007b).

After completing therapist training and the purchase of necessary equipment, certain PCIT maintenance fees remain. However, these fees are not above and beyond costs associated with other treatments. The cost of psychometric assessments and therapist salaries are common expenses for any form of treatment. Therapist salaries often vary depending on geographic location and education of the therapist (masters- or doctoral-level clinician). In addition to the therapist costs, assessment measures are necessary to monitor progress as PCIT is a data-driven treatment. Minimally, therapists should be coding parent-child interactions as well as administering certain psychometric assessments at relevant times during treatment.

The goal of this paper is to integrate the relevant literature in order to perform a cost-effectiveness analysis of PCIT to determine if the behavioral gains are worth the financial cost of treatment. In our

review of the literature, it is clear that disruptive behavior in children is both prevalent and costly and PCIT is an efficacious treatment for this population. However, despite abundant evidence supporting its use, there have been limited evaluations of its financial costs as it relates to treatment benefits. Given the push for the application of cost-benefit analysis research within the domain of clinical treatment (e.g., Yates, 1994), the purpose of the current paper is to help to inform practitioners and consumers on the costs and treatment benefits of PCIT. Furthermore, if PCIT is indeed demonstrated to be cost-effective in addition to its abundant empirical support, policymakers may be better able to weigh the pros and cons of utilizing PCIT as a primary treatment of child disruptive behavior. Through a cost-effectiveness analysis, clinicians and health-care providers can assess the short- and long-term expenses and investment returns in order to determine if PCIT is a fiscally-wise treatment option.

## Measurement of Costs and Treatment Outcomes

There are numerous ways to conduct a cost-effectiveness study. However for most of the general population, and likely those reading this article, the main point of interest is if early intervention with PCIT will, in the long run, pay off. That is, are the costs involved with PCIT worth the behavior improvements observed as a result? However, such a decision is often complex as there is no clear standard as to an acceptable ratio between upfront costs and behavior gains. There are short- and long-term expenditures and potential improvements in tangible (e.g., less aggressive acts) and intangible (e.g., less parental stress) aspects of behavior. Additionally, most practitioners and policymakers have varying criteria of the worth of behavior change. While our exploration and disclosure of relevant cost-effective information allows one to independently judge the cost-effective merit of PCIT, we believe that once the various costs and treatment outcome linked to treating this population are established, cost-effective recommendations on the use of PCIT will be clear and supported through the collected data.

Given that numerous studies have examined the effectiveness of PCIT, yet few have examined the monetary implications of executing such a unique treatment, the focus of the current study will be to examine the relation of PCIT costs to treatment outcome. That is, we will estimate the startup, treatment, and maintenance costs of PCIT as well as the anticipated net behavioral change and improvement as a result of treatment in order to determine if the use of PCIT is of value from a long-term financial standpoint. Thus, a cost-effectiveness analysis, as defined above, is more appropriate considering the paper's goals.

Financial figures and other data relating to PCIT were collected from published journal manuscripts and other relevant sources. Although handbooks outlining the implementation of cost-effectiveness analyses suggest independently collecting the financial data of an intervention (e.g., Yates, 1999), given the breadth of the PCIT literature, particularly in evaluating its treatment outcome, we determined that all relevant data on treatment effectiveness could be accurately compiled from previously completed studies. Cost data relevant to PCIT (e.g., training, equipment, child toys) can also be collected from the respective retailers vending the items. Additionally, this method of determining costs may be similar to those used by a clinician first implementing PCIT. With an integration of multiple treatment outcome estimates, collected from varying samples and study designs, the conclusions may even be more generalizable to multiple settings. In order to clearly outline the measured variables in our cost-effectiveness analyses, we have operationally defined and measured each of the components as follows.

### *Costs*

In accordance with standard guides on conducting a cost-effectiveness study, direct costs consist of the "time, transportation, space, materials, equipment, and overhead" (Fals-Stewart, Yates, & Klostermann, 2005, p. 30) required to successfully assess and treat a client. In other words, it refers to the aspects of treatment which can be directly measured. Utilizing methods advocated by Yates (1994, 1999),

we undergo four steps in comprehensively measuring the per-child cost of a particular intervention. First, we calculate the quantity of resources utilized. This includes length of treatment, transportation costs, office space, PCIT equipment, training, and child toys. Next, we calculate the per-unit cost for each resource, such that the cost of the particular service or item is distributed across the number of clients treated as a result. For instance, the cost of therapist time is specific to one client whereas the PCIT audio/visual equipment is employed by all of the clients treated with the equipment. Third, we multiply the quantity of services by the per-unit cost. For instance, 10 hourly sessions of PCIT would be multiplied by the cost of the therapist's time or the cost of child toys is divided by the number of clients using them. In order to calculate a per-child cost on shared expenses, such as space, equipment, and training, we assume a therapist caseload of 25 clients per week and, collected from a treatment outcome review study (Gallagher, 2003), an average treatment length of 13 sessions for each client. While the costs incurred for each client will vary based upon one's caseload, we decided that weekly treating 25 clients was a fair estimation and used such a figure in our calculations.

In order to provide a more comprehensive assessment of the costs of PCIT, we include a separate table itemizing initial PCIT startup costs (see Table 1). These initial investments are the upfront expenses that are likely required prior to a clinician's use of PCIT. While upfront costs are spread across each client treated and can be minimal on a per-child basis, it is a sizable investment nevertheless. From these calculations, we yield a total cost of the initial investment likely required to implement PCIT as well as the cost of treating one child with PCIT. Along with the treatment outcome data we determine the cost needed to produce a particular behavior change or effect size. Our estimation of initial start-up costs included all one-time costs associated with the implementation of PCIT. These costs include audio/visual equipment, labor, child toys, and therapist training costs. Audio/visual equipment was estimated utilizing the UC Davis Children's Hospital: PCIT Training Center's (2007a) itemized list of PCIT equipment and included various earpieces, radio transmitters, and batteries required for appropriate PCIT coaching. Labor costs were derived from the estimations of SSL Industries, Inc. (2007).

*Treatment Outcome*

In his manual on conducting a cost-effectiveness analysis, albeit within the domain of substance abuse treatment, Yates (1999) outlines that the benefits of a particular treatment are measured in terms of treatment outcome. In the case of PCIT, improvements, as measured by parental reports of child behavior and parental stress, are all categorized under the umbrella of treatment outcome. That is, the bulk of the benefits of PCIT are derived from reducing the frequency of maladaptive or disruptive child behavior and increasing the occurrence of more desired behavior. In regards to measuring these variables, data were collected from all PCIT outcome studies examining mean differences in pre and post-treatment measures on the respective Eyberg Child Behavior Inventory (ECBI; Eyberg & Pincus, 1999), Child Behavior Checklist (CBCL; Achenbach, 1991), and Parenting Stress Index (PSI; Abidin, 1990) scores, excluding studies only reporting follow-up data or with a sample size of five or less. Data are derived from short- and long-term follow-up studies examining the functioning of children following PCIT treatment. All relevant studies examining outcome statistics of families completing a full PCIT treatment battery were utilized. Average changes in the ECBI intensity and problem score, CBCL externalizing score, and PSI total score were included as assessments of treatment outcome. As these reports are the most frequent indicator of treatment outcome in PCIT research, thus providing a more powerful base for conclusions (e.g., Thomas & Zimmer-Gembeck, 2007), we believe it to be an accurate and established assessment of behavior change. Additionally, there are certain constructs (e.g., parental stress) which cannot be accurately and reliably measured through behavior observations, further supporting our decision to utilize parent report. It is important to note, however, that cost-effectiveness ratios are likely to vary based upon the measure of behavior change. For instance, another popular assessment used in PCIT treatment outcome studies is parent-child behavioral observations (e.g., Dyadic Parent-Child Interaction Coding System; Robinson & Eyberg, 1981). While observations of child behavior has also demonstrated

statistically significant child behavior improvement, effect sizes, or magnitudes of change (Yates, 1999), are less drastic, with figures indicating a -.54 drop in negative child behaviors and .94 increase in positive behaviors, compared to a decrease of -1.31 when examining parental report (for a meta-analytic review of PCIT treatment outcome, see Thomas & Zimmer-Gembeck, 2007). We openly acknowledge that some treatment providers may consider behavior observations to be a more relevant appraisal of the effectiveness of PCIT. As is such, we urge future researchers to evaluate the cost of PCIT within the context of observed behavior change; such figures may provide further evidence for the treatment's cost-effectiveness.

Secondly, as each family will respond to PCIT in an ideographic manner, better understanding broad treatment effectiveness is an important supplementary measure of treatment outcome. Effect sizes provide a more detailed explanation of the degree to which a child's behavior is likely to change. Naturally, larger improvements are more valuable than smaller ones. Collected from Thomas and Zimmer-Gembeck's (2007) meta-analysis of PCIT, the effect size reported when calculating improvement in children from pre- to post-treatment was used as an additional measure of overall treatment outcome. Within the study, the effect size of parent-reported child improvement was determined from eight studies utilizing data collected from a variety of measures, most frequently the ECBI and PSI.

*Calculating Cost-Effectiveness*

There is an array of techniques for conducting a cost-effectiveness analysis. Broadly speaking, the formula for calculating a treatment's cost-effectiveness is to compare the overall costs of implementation to the behavioral changes and improvements observed as a result. Naturally, the more the behavioral gains outweigh the fiscal costs, the more desirable the intervention, at least from a monetary perspective. In accordance with Yates' (1999) NIH manual on conducting cost-effectiveness analyses, we computed our statistics to report the relation of the costs of PCIT to its behavioral gains while incorporating treatment effectiveness data. Most frequently, this is summarized through a cost-effectiveness ratio (Phillips & Thompson, 2001), where the costs are divided by the treatment outcome $\left(\frac{Costs}{Outcome}\right)$. Using such a formula, we evaluate the anticipated cost incurred on a per-child basis required in order to reduce one's ECBI, CBCL, and PSI score by one point. Similarly, using the effect size data specified, we can specify how much cost is required to observe a -.01 effect size in reducing negative behaviors.

## Results

*Costs*

*Initial costs*. Standard PCIT audio/visual and other therapy equipment is listed along with initial and advanced PCIT training in Table 1. Audio/visual equipment consisted of all recommended materials needed to conduct out-of-room coaching (UC Davis Children's Hospital: PCIT Training Center, 2007a) and estimated installation labor costs (SSL Industries Inc., 2007), totaling $7,913. Other startup costs unique to PCIT include child-friendly toys which can be utilized in CDI or PDI interactions. The cost of toys was estimated from four items commonly used during PCIT: a coloring book and markers, Play Doh, Mr. Potato Head, and Legos. The cost for these items when purchased from a popular retailer totaled $50.79 (Toys 'R Us: Geoffrey Inc, 2007). Therapist training costs included five days of initial training, two days of subsequent advanced training ten weeks later, and six months of phone consultation for one PCIT therapist—all incorporated in the University of Oklahoma Health Sciences Center (2007) PCIT training module costing $4,000. Such a program was chosen over other equally qualified training sites (e.g., Eyberg at the University of Florida, McNeil at West Virginia University) given its inclusion of advanced training and consultation services in its total cost. In addition to training costs, agencies

initiating a PCIT program must factor in the cost of lost therapist billable hours during training. Based on the estimation that a therapist treats 25 clients a week at a rate of $60 per hour of treatment, the cost of lost billable hours for the seven days of PCIT training (five days of initial and two days of advanced instruction) was estimated at $2,100 per clinician. Summing these initial PCIT costs, we estimate that the preliminary investment needed to successfully practice PCIT to be nearly $14,000 for a single therapist. Naturally, costs will be greater to train an agency staff of 4 to 6 therapists, ranging from approximately $56,000 to $84,000.

Table 1: *Itemization of initial PCIT costs*

| Expense | Resource | Cost |
|---|---|---|
| **Audio/Video Equipment** | | |
| | High resolution digital color camera | $552.00 |
| | Camera power supply | $15.00 |
| | High resolution color monitor with audio | $400.00 |
| | T3514 Vari-focal glass lens with manual iris | $99.00 |
| | ½ Inch VHS VCR | $270.00 |
| | TOA mixer amplifier | $379.00 |
| | 2 TOA microphone phantom inputs | $130.00 |
| | TOA balanced line driver | $70.00 |
| | 2 Crown high quality PZM microphones | $180.00 |
| | Ctime date generator with backup battery | $475.00 |
| | Pelco heavy duty pan / tilt system | $593.00 |
| | Mounting system | $60.00 |
| | Pelco control system | $270.00 |
| | 2 High frequency BTE receiver system | $1,320.00 |
| | High frequency FM transmitter | $630.00 |
| | Two-channel headphone amplifier system | $158.00 |
| | Single or dual muff headset and muting system | $192.00 |
| | Set of miscellaneous wires, connectors and antennas | $170.00 |
| | Labor costs | $1,950.00 |
| **Other Equipment** | | |
| | Toys | $50.79 |
| **Therapist Training** | | |
| | Initial/advanced training and phone consultation for one therapist | $4,000.00 |
| | Lost billable hours during training for one therapist | $2,100.00 |
| **Total Initial PCIT Costs** | | **$14,063.79** |

*Note*. Video and Audio Equipment Estimates based on figures from the UC Davis Children's Hospital: PCIT Training Center (2007a).

*PCIT per-child costs.* Ongoing PCIT costs, as presented in Table 2, were determined in addition to start-up costs. These costs were determined for an individual client and thus common expenses, such as PCIT equipment and training, are distributed over the number of clients receiving its services. Included were specific costs associated with treating a client including therapist time, client transportation, therapy room, and office space.

Given our assumptions of a weekly PCIT caseload of 25 clients and an average treatment length of 13 sessions (Gallagher, 2003), we hypothesize that a full-time PCIT therapist can treat approximately 100 families each year. The cost of audio/visual equipment per client was based on the assumption that the equipment would last 5 years. Therefore, with the assumption that 500 clients could be treated during that time, the total cost of equipment was calculated as $15.83 for each child. We conservatively estimated that a PCIT clinician would add to or replace the child toys used in treatment every 13 weeks and after completing treatment for 25 clients. Dividing the total cost of toys ($50.79) by 25 clients brings about a per-child cost of $2.03 for toys. While there are no guidelines as to an expiration of one's PCIT training, we presume that a therapist's training will be sufficient for at least 10 years. Thus, about 1,000 clients could be treated over the course of the 10 years, suggesting that the initial training cost of $4,000 for each therapist amounted to $4.00 per client. Using similar assumptions of caseloads and utility of one's PCIT training (1,000 clients over 10 years), it was determined that the $2,100 worth of lost therapist billable hours during the seven total days of training amounted to $2.10 per client for one therapist.

Table 2: *PCIT per-child costs*

| **Expense** | **Resource** | **Cost** |
|---|---|---|
| **Time** | | |
| | Master's Level Clinician | $440.46 |
| **Transportation (.40/mile)** | | |
| | Clients | $78.00 |
| **Space** | | |
| | Therapy Room | $456.00 |
| **Materials** | | |
| | ECBI at13 sessions | $17.68 |
| | CBCL at Pre and Post-Treatment | $4.00 |
| | PSI at Pre and Post-Treatment | $5.02 |
| **Equipment** | | |
| | Audio/Visual Package, including labor | $15.83 |
| | Chairs | $0.44 |
| | Table | $0.15 |
| **Therapist Training** | | |
| | Initial and Advanced Training per Therapist | $4.00 |
| | Lost Billable hours per Therapist | $2.10 |
| **Other Costs** | | |
| | Child Toys | $2.03 |
| **Total Per-Child Cost of PCIT** | | **$1,025.71** |

Therapist time was calculated based on the national median salary for a master's level clinician in 2001 of $46,000 (American Psychological Association, 2003). An average hourly rate of $24.47 was determined for the PCIT therapist's time based on instructions by Yates (1999). Note that this is the monetary amount allotted to the therapist time, not the cost of an hour of treatment. The cost of therapist

time was chosen over the cost of a billable hour as it is a likely estimation of the net pay required for a therapist over the course of treatment. The cost of a billable hour, for instance, may include allocations for expenses such as office space or therapy materials, which we have included in our cost analysis, and may not include additional time required of the therapist outside of treatment, such as writing intake and termination reports. This figure was then multiplied by 18 to account for the average number of required PCIT sessions (13; Gallagher, 2003) to complete the treatment set in addition to an estimated 5 hours for administrative work, which includes the writing of reports and progress notes. Therefore, during the course of PCIT, the cost of a masters-level clinician's time was estimated at $440.46 for each child treated.

While greatly varying depending on the density of the general population and the quantity of clinicians within a community, we assume a 15 mile round trip at $.40/mile for a total of $78 over the course of treatment. Although also likely to be modified based upon one's community, the cost of renting office space was estimated using the national average of $190 a month per square foot (Sadovi, 2006). Therefore, a twenty square foot office would cost approximately $3,800 a month and $45,600 a year. Dividing that figure by an annual caseload of 100 clients provides the per-child expense of $456 over the course of treatment.

Costs of assessment measures for one client were determined by assuming the administration of the CBCL and PSI during pre- and post-treatment and the ECBI for each treatment sessions as advocated by Eyberg and Members of the Child Study Laboratory (1999). Then, costs were determined by consulting Psychological Assessment Resources (PAR) Inc. (2007) for the current cost of the ECBI, CBCL, and PSI. A packet of 25 ECBI forms (no separate scoring forms are needed) were priced at $34 or $17.68 for the 13 forms necessary for each client over average length of treatment (Gallagher, 2003). A packet of 30 CBCL forms and 30 CBCL scoring forms were priced at $30 each, for a total of $4 for each client. Thirdly, the scoring forms of the PSI were priced at $62 for a packet of 25. In addition, a packet of reusable manuals were priced at $55. Assuming that the reusable manuals will be functional for 10 years (and costing $.06 as a result), the per-child cost of the PSI totals $5.02.

Lastly, while not a unique cost of PCIT, the purchase and subsequent use of furniture was also factored into the cost of PCIT for one child. Obtained a from popular office furniture retailer, the cost of a table ($74.99) and four chairs ($219.96) totaled $294.95 (Office Depot, 2007). Assuming usability for at least 5 years and 500 clients, furniture costs were fairly negligible for both the table ($.15) and chairs ($.44) for each individual client. Summing together all of the stated costs, a final cost of $1,025.71 was estimated to be required in order for one therapist to successfully complete a full treatment battery for one child using PCIT.

*Treatment Outcome*

Table 3 provides a summary of the studies utilized to calculate the projected treatment outcome following PCIT completion. Our analysis indicated that, across studies, a child will decrease his or her ECBI intensity and problem score by 46.47 and 11.77 points, respectively, CBCL externalizing score by 10.20 points, and PSI total score by 38.75 points. Using average percent decrease as a measure of change indicated score decreases of 29% on the ECBI Intensity Scale, 61% on the ECBI Problem Scale, 17% on the CBCL Externalizing Scale, and 15% on the PSI. Additionally, derived from Thomas and Zimmer-Gembeck's (2007) meta-analysis of PCIT, the effect size when comparing the pre and post-treatment assessments of clients completing a PCIT treatment battery was measured as an improvement of -1.31, demonstrating a large effect of PCIT in reducing problem behaviors.

Table 3
*Summary of PCIT treatment outcome studies*

| Study | Age | Sample Size | Observed Improvement |
|---|---|---|---|
| Bagner & Eyberg (2003) | 3-6 years | *N* = 55 (Involved Fathers)<br>*N* = 36 (Absent Fathers)<br>*N* = 16 (Uninvolved Fathers) | ECBI (I) = 47.72, PSI = 31.57<br>ECBI (I) = 64.44, PSI = 27.00<br>ECBI (I) = 69.86, PSI = 47.72 |
| Brestan, et al. (1997) | 3-6 years | *N* = 30 | ECBI (I) = 36, ECBI (P) =10 |
| Eisenstadt et al. (1993) | 2-7 years | *N* = 24 | ECBI (I) = 71.2 , ECBI (P) = 17, CBCL = 12.2 , PSI = 55.6 |
| Eyberg, Boggs, & Algina (1995) | 3-6 years | *N* = 6 | ECBI (I) = 55, ECBI (P) = 15 |
| Eyberg & Robinson (1982) | | *N* = 7 | ECBI (I) = 52.7, ECBI (P) = 10.7 |
| Funderburk et al. (1998) | 2-7 years | *N* = 12 | ECBI (I) = 68, ECBI (P) = 16.3 |
| Matos, Torres, Santiago, Jurado, & Rodriguez (2006) | *M* = 4 years, 9 months | *N* = 9 | CBCL = 11.11 |
| McNeil et al. (1999) | 2-8 years | *N* = 18 | ECBI (I) = 58.69, ECBI (P) = 14.37, CBCL = 8.32, PSI = 55.04 |
| McNeil et al. (1991) | 2-7 years | *N* = 10 | ECBI (I) = 74.8, ECBI (P) = 17.2 |
| McNeil, Herschell, & Gurwitch (2005) | 2-8 years | *N* = 27 | ECBI (I) = 28.63, ECBI (P) = 5.78 |
| Nixon (2001) | 3-5 years | *N* = 17 | ECBI (I) = 41.34 |
| Nixon et al. (2003) | 3-5 years | *N* = 17 (Mother)<br>*N* = 17 (Father) | ECBI (I) = 41.35, CBCL = 8.23 , PSI = 20.71<br>ECBI (I) = 24.33 |
| Schuhmann et al. (1998) | 3-6 years | *N* = 19 | ECBI (I) = 41.3, ECBI (P) = 9.5, PSI = 33.6 |
| Timmer, Urquiza, & Zebell (2005) | 2-8 years | *N* = 70 (Biological Parents)<br>*N* = 54 (Foster Parents) | ECBI (I) = 37.2, ECBI (P) = 9.3 , CBCL = 10.9<br>ECBI (I) = 31.8, ECBI (P) = 7.2 , CBCL = 6.1 |
| Timmer, Urquiza, Zebell, & McGrath (2005) | 2-8 years | *N* = 67 (Children maltreated)<br>*N* = 28 (Children not maltreated) | ECBI (I) = 30.8, ECBI (P) = 10.7, CBCL = 8.2<br>ECBI (I) = 45.7, ECBI (P) = 9.9, CBCL = 16.6 |

*Note*. ECBI (I) = Eyberg Child Behavior Inventory intensity score; ECBI (P) = Eyberg Child Behavior Inventory problem score; CBCL = Child Behavior Checklist externalizing score; PSI = Parenting Stress Index total score.

*Cost-Effectiveness Ratios*

Through dividing the total PCIT per-child cost of $1,025.71 by the mean decrease observed in the respective psychometric assessments, we quantified the cost of reducing one's maladaptive behavior by one point on each scale. Following treatment in PCIT, in order to incur a one point decrease in the ECBI intensity and problem score from pre- to post-treatment, the cost incurred was $22.07 and $87.15, respectively. Similarly, a one point decrease in a child's CBCL externalizing score was estimated to cost $100.56. Lastly, $26.47 was required in order to decrease one's total PSI score by one point through the use of PCIT. A different outcome measure, effect size, provided the means to measure the magnitude of behavior change. Given the total per-child costs of PCIT and Thomas and Zimmer-Gembeck's (2007)

meta-analytic findings, in order to sustain an effect size decrease in problem behaviors of -.01, a cost of $7.83 was incurred.

## Discussion

As part of our cost-effective analysis, we calculated the anticipated cost of treating a child with a DBD using PCIT to and compared it to the expected behavior changes to be incurred as a result. Results indicated an average cost of $1,025.71 to treat one child with PCIT. Such a figure is especially reasonable when considering the treatment outcome of children receiving PCIT exceeds many similar forms of DBD treatment at a comparable cost (Aos et al., 2004; Krivelyova et al., 2007). Observed mean improvements included 46.47 and 11.77 points as measured by the ECBI intensity and problem score, respectively, 10.20 points on the CBCL externalizing score, and 38.75 on the PSI total score. Additionally, prior studies have indicated an average effect size decrease in problem behaviors of -1.31 for families completing a PCIT treatment battery (Thomas & Zimmer-Gembeck, 2007). Given such figures, we calculated the following cost-effectiveness ratios. In order to achieve the smallest measurable change in behavior as measured by a one point decrease on the ECBI, CBCL, and PSI, costs ranged from $22.07-$100.56, depending on the assessment. Using effect size as the metric of change, $7.83 was required to reduce problem behaviors by -.01. While such figures, derived from the average number of PCIT sessions and anticipated costs, will likely vary depending on the presenting symptoms specific to the family receiving treatment, we believe that the estimations are as accurate as possible given the current state of the PCIT literature. In contrast to a cost-benefit analysis, where only financial figures are compared, there are no established standards for determining the acceptability of a particular cost-effectiveness ratio. As such, policymakers are frequently put in the position to determine at what point an empirically supported treatment is beneficial from a monetary standpoint. In order to examine its utility, we present two primary arguments supporting that PCIT is a cost-effective form of treatment for child disruptive behavior.

First, the cost of PCIT is quite modest compared to estimated costs this population incurs without treatment, particularly when considering the anticipated behavior gains. Cohen (1998) estimated that up to $2 million is saved per child through effective treatment which prevents high-risk children, such as those with DBD, from becoming career criminals as they mature. Other calculations (Foster et al., 2005; Muntz et al., 2004) indicate similarly high costs associated with this population, as children with disruptive behaviors are more likely to drop out of school, abuse drugs and alcohol (Cohen, 1998), experience mental health impairment, and be imprisoned (Farrington, 1995) than unimpaired children. With average decreases in problem behaviors ranging from 17-61%, the short-term PCIT treatment outcome is promising; however, there are no available longitudinal data tracking children completing a full PCIT treatment battery into adulthood. As there is no empirical confirmation that children receiving PCIT maintain their behavior gains into adulthood, we are limited in our conclusions regarding the long-term treatment effects of PCIT.

Secondly, we reason that the benefits of PCIT go beyond the financial domain and outweigh its relatively low cost. As indicated by measured decreases in the EBCI, CBCL, and PSI scores, PCIT leads to decreases in undesirable behaviors and increases in desirable behaviors. From a financial standpoint, such improvements may be indicative of lower societal costs required to manage a child's behavior, but the repercussions of advantageous child behavior may also denote improved school behavior, social relations, and parent-child interactions. As discussed in our review of the literature, these social or intangible benefits can be difficult to accurately quantify, but are vital in order to understand the positive effects of a treatment. It has been documented that PCIT leads to reduced parental stress. Such a change can lead to improved mental and physical health for the respective parent as well as general overall well-being for the child's entire family. Added benefits following completion of PCIT include more parental confidence in managing disruptive behavior (Schuhmann et al., 1998) and less frequent or problematic disruptive behavior from untreated siblings than reported by a waitlist control group (Brestan et al., 1998).

Following PCIT, the benefits of improved child behavior have been shown to generalize into the school environment (McNeil et al., 1991), demonstrating an improved learning environment for the child, teacher, and other students. Additionally, a reduction in child disruptive behavior, regardless of the treatment modality, is expected to improve the work productivity and efficiency of the parents involved. Forgatch and DeGarmo (in press) found that mothers receiving an early intervention treatment program improved their financial status and were more likely to overcome poverty compared to mothers not in treatment. Despite the absence of a standard criterion for cost-effectiveness ratios, the numerous positive effects of PCIT and general improvement in child behavior appear to outweigh the approximate $1,000 required in order to treat a child, thus supporting the cost-effectiveness of PCIT.

*Limitations and Future Directions*

Potentially the most glaring limitation is the collection of data from available sources such as previously completed studies. In other words, we did not collect original cost or treatment outcome data. Behavior improvement data were collected from prior studies and equipment and training costs estimated from relevant PCIT guides or retailers. Although we argue that such a methodology may make the results more generalizable as multiple study designs, child presenting symptoms, and therapists were used, it also compelled us to make numerous estimations on certain costs. Expenses associated with therapist caseload, office space, furniture, and transportation were based upon national averages and reasonable assumptions. Some may argue that the lack of original data may weaken our treatment cost estimates. Similarly, in an effort to attain conclusions that would apply to a majority of clinicians, we may have overlooked or misjudged specific costs which are not universal to all treatment providers. For instance, for a faculty member operating in a university setting, there may be less cost associated with obtaining office equipment but more costs associated with the time of research assistants and graduate students. Thus, the cost data is a rough approximation and may not apply to each and every practitioner.

Another limitation is the general absence of long-term data tracking children receiving PCIT. While we can conclude from prior studies that the behavior of children will likely improve directly following treatment and much of the gains remain up to 30 months later, no studies have been conducted which examine children receiving PCIT into adolescence and adulthood. While we assume that the rates of substance abuse, school dropout, mental health impairment, and delinquency are reduced somewhat, there is no available data to support this premise. Thus, we are unable to determine if children with DBD who receive PCIT do indeed cost less than untreated children. As it is not an aspect of a cost-effectiveness analysis, we did not attempt to determine the financial benefits of PCIT, but we concur that such data would be a beneficial addition to our conclusions. Another limitation of this evaluation is the absence of standard criterion for judging if a treatment is beneficial from a cost-effectiveness standpoint. While we analyzed the cost of treating a child with PCIT relative to the expected treatment outcome, we can only reason if such a ratio is acceptable to a mental health practitioner or policymaker.

A further limitation of this study deals with the matter of client dropout. Our cost-effectiveness analysis was designed to assess the costs and treatment outcome of fully implementing and completing a PCIT treatment program. As with any form of intervention, dropout is expected; some cases will have a small exposure to PCIT—potentially one or two sessions—and then prematurely end treatment. While prior studies have indicated that the dropout rates of families receiving PCIT, which are estimated to be between 12-33% (Gallagher, 2003; Werba et al., 2006), are favorable to other forms of psychotherapy (47%; Wierzbicki & Pekarik, 1993), it will nevertheless add to the overall total cost of treatment. As families who drop out of treatment do not demonstrate marked improvement in child disruptive behavior (Boggs et al., 2004), resources and time spent on these clients do not appear to contribute to any behavior gains. To add to our previous recommendation of collecting original data, we encourage future researchers to consider client dropout and its effect on the overall cost of treatment.

The current cost-effectiveness analysis also did not take in to account the rate of therapist turnover. Particularly within an agency setting, it may be common to spend large sums of money training clinicians in a particular treatment only to have some therapists leave the agency shortly thereafter. Considering the initial cost of over $6,000 incurred from training and the respective lost billable hours, high therapist turnover can easily lead to a misappropriated investment. Additionally, with higher agency overhead and the agency's subsequent need to train new therapists, a higher per-child cost may be sustained. In order to reduce the risk of training therapists who will soon leave the agency, we recommend that mental health agencies interested in PCIT train their most stable staff members. Additionally, contractually obligating therapists who receive training to remain at the respective agency for a specified period of time may also help ensure that the cost of PCIT training is well spent.

In order to better assess the cost-effectiveness ratio of PCIT, we suggest that future studies in this domain compare the cost-effectiveness results of other DBD treatments to PCIT. Results could be more comprehensive and directly compare PCIT to alternative forms of empirically supported treatments. In such a case, the cost to produce the same change, as measured by psychometric assessments or behavior observations, can be examined. Although cost-effectiveness analyses have been conducted on other similar early intervention programs (e.g., Olchowski, Foster, and Webster-Stratton, 2007), differences in methodology make a direct comparison between these treatments difficult. However, it is important to note that both PCIT and the Incredible Years Program were found to be cost-effective. In regards to a comparison of magnitude of behavior improvement, there is only one available study (Thomas & Zimmer-Gembeck, 2007) which directly compares PCIT to another similar parenting intervention, Triple P-Positive Parenting Program (Sanders, Markie-Dadds, & Turner, 2003). PCIT was evaluated quite favorably, with the authors reporting that "[s]tandard PCIT tended to have larger effects than Triple P" (Thomas & Zimmer-Gembeck, 2007, p. 491) in certain measurements of improvement (e.g., treatment vs. waitlist) while the two did not statistically differ when using other metrics of change (e.g., child behavior observations). While we are careful not to assert that one treatment is necessarily superior to another, Thomas and Zimmer-Gembeck's (2007) findings are promising in demonstrating the effectiveness of PCIT compared to other similar treatment programs. We encourage future research to explore additional treatment comparisons, especially studies involving efficacy and cost data.

Future studies could also add to the literature by performing a cost-benefit analysis and illustrating the benefits of a treatment exclusively in monetary terms. Although Aos and colleagues (2004) do compare the financial costs and the return on investment of PCIT, studies could further elaborate on this relation. In order to do so, long-term data tracking children receiving PCIT into adolescence and adulthood is likely required. With the use of standardized measurements and a comparison to other forms of DBD treatment, policymakers and clinicians can determine which treatment leads to behavior changes at the smallest cost.

Our final recommendation for future studies is an improved analysis of the relation of PCIT costs to particular monetary gains. As policymakers are typically seeking ways to maximize results while minimizing the cost of treatment, a better understanding of what specific aspects of PCIT lead to financial gains would aid in their decisions. We chose to include all recommended PCIT expenses necessary to complete a full treatment battery in our cost-analysis. Given the large cost of initiating PCIT—about $14,000 per therapist or $84,000 for an agency staff of 6 therapists—some mental health administrators may be lax to make such a hefty investment. Compiling a "bare bones" list of expenses which are mandatory, as opposed to those which are helpful but not absolutely needed, would likely be helpful to those looking to cut costs. Similarly, further examining what characteristics of CDI and PDI are most effective in producing financial or behavioral gains may also produce a more efficient (although different) treatment battery that may be attractive from a large scale perspective. While the current study is a preliminary step in evaluating the costs and benefits of PCIT, there are many more studies which must occur in order to significantly advance the literature.

*General Conclusions*

The current study evaluated the costs of treating a child with PCIT in comparison to the expected treatment outcome. Results indicated that PCIT is a fairly inexpensive form of child DBD treatment and leads to considerable improvements in child behavior. Additionally, considering the numerous ramifications of such treatment gains, such as lower parental stress and better behavior in school, PCIT appears to be a cost-effective treatment that is worth its initial investment. However, it is important to note that despite our emphasis on finances, the overall worth of a treatment stretches beyond such implications. There are many other aspects of a treatment to consider, those which transcend cost or treatment outcome data, which add value to a treatment. In other words, a cost-effectiveness analysis examines only one segment of a treatment; psychotherapy is far too complex for a single calculation to evaluate its worth.

As the literature has reached a point where the efficacy of many forms of treatment has been established, discussions of practicality has become equally as valuable. Particularly from a policymaking perspective, the financial feasibility of a treatment may be most relevant to its widespread application. However, the implications of the current study likely lie in its comparison to similar forms of empirically supported treatment. While we can recommend PCIT as a strong value considering its ratio of costs to treatment outcome, we cannot yet determine if it will necessarily lead to a better return on investment than other forms of treatments. Despite such a limitation, PCIT may still be an attractive option to mental health practitioners. As future researchers in this area further evaluate the cost-effectiveness of other treatments and compare their value to PCIT, a clearer picture will develop. In such a case, policymakers, clinicians, and the general public can better evaluate the ratio of costs to child behavior change and have the information available to optimally treat children with DBD.

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