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Family-Centered Positive Behavior Support on Children with ADHD: A Literature Review

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Abstract

Family-centered positive behavior support (FCPBS) has drawn widespread research interest in the field of children with developmental disabilities; most research has used positive behavior support (PBS) to reduce problem behaviors in children with autism or other more severe developmental disabilities, but few of them focus on the effects of FCPBS on children with ADHD. This paper presents a comprehensive introduction to attention deficit/hyperactivity disorder (ADHD) and family-centered positive behavior support. We then focus on existing research on FCPBS and related references in children with developmental disabilities to explore future directions and conclude this paper.

Keywords

Family-Centered, Positive Behavior Support, Problem Behavior, Attention Deficit/Hyperactivity Disorder (ADHD)

1. Introduction

Attention-Deficit/Hyperactivity Disorder (ADHD) is one of the most common neurodevelopmental disorders and affects a large number of children worldwide (Barkley, 1997a). According to the systematic reviews and meta-analyzes published by Polanczyk et al. (2007) and (2014), the global prevalence of ADHD in school-aged children has increased from 5.29% to 7.2%. According to the different clinical expression, three sub-types are distinguished: Predominantly inattentive type (ADHD-PI), predominantly hyperactive-impulsive type (ADHD-PH), and combined type (ADHD-C), the main symptoms of the disorder include inattention, restlessness, impulsivity and/or hyperactivity (APA, 2013). ADHD leads children to be unable to filter irrelevant information, unable to focus on them-

selves and weak delayed reward skills, even though children with ADHD know what they should do, they still cannot control their behavior, these symptoms are associated with the impairment of the executive function of the brain and can lead to various neuron-cognitive disorders, as well as a decline in academic and social function in the long term (Barkley, 2013; Barkley, 1997b; Counts et al., 2005).

According to previous researches identified, ADHD is a chronic long-term diseases and would not disappear completely with children grew up (Van & Leslie, 2008; Bernfort et al., 2008; Conrad & Potter, 2000). Faraone and Biederman (2016) report that about one-third of children with ADHD would persist into adulthood. In addition, the impairments in academic, social and family functioning will persist into adulthood, ADHD presents in various ways during different phases of growth and development (Murphy & Barkley, 1996; Michielsen et al., 2018). As children with ADHD grow into adulthood, their purposeless restlessness may migrate to purposeful restlessness, as well as the symptoms will naturally evolve as the individual matures and develops more severe comorbid disorders such as depression, anxiety, bipolar disorder and substance abuse (Schatz & Rostain, 2006).

There is growing evidence that children with ADHD would be so prone to failure in life that the negative sequelae of the problem behavior not only cause physical harm to themselves and others, but also lead to marginalization in life, such as educational segregation, limited employment opportunities, rejection by members of the community, separation from home and family (Carr et al., 1999, Pelham et al., 2016; Wåhlstedt et al., 2008; Counts et al., 2005; Lebowitz, 2016). Therefore, it is very important to implement effective interventions that can greatly enable population with ADHD to maintain a well function at each stage.

Stimulant medication, particularly methylphenidate hydrochloride (MPH), is the most commonly used medication in pharmacotherapy for the treatment of ADHD, and despite a lack of efficacy data, the number of preschool-aged children taking medication has increased dramatically (Daughton & Kratochvil, 2009; Rappley, 2006; Kern et al., 2007). Stimulants could increase children's attention, decrease impulsiveness and prove adjustment but not compliance with parental requests, and some related evidences showed that stimulant medications have not been shown to solve the problem of ADHD-related dysfunction (McGoey et al., 2002; Mulqueen, Bartley, & Bloch, 2015). More specifically, medications cannot resolve the core symptoms of ADHD (e.g., oppositional/aggressive behavior, social skills, academic performance). However, due to the side effects of MPH might be more intense and differ among young children, and not all ADHD children respond to stimulant medications, parents generally do not accept medication treatment as the first-line treatment for their children and tend to take family remedies when children begin to show some symptoms of ADHD (Hoza et al., 2008).

Empirical researches have identified that the development of ADHD symptoms might be amplified or diminished by environmental factors at school and at home (Tarver et al., 2014; Ficks & Waldman, 2009; Rutter et al., 2006; Childs et al., 2016). Therefore, the fixed routines and specific guidance with concise requirements contained in highly structured environments are conducive for ADHD children to exhibit their optimal functioning. A meta-analysis by DuPaul et al. (2012) including 60 studies from 1996-2010, found that school-based interventions for children with ADHD have moderate to large effects on ADHD children's behavior and academic performance. In addition, research by Pelham et al. (1998) found that behavioral parent training and classroom behavioral interventions were considered the most beneficial non-pharmacological treatments. However, most parents of children with ADHD do not know exactly what type of coping interventions to implement (Podolski & Nigg, 2001).

When ADHD children exhibit some challenging behavior problems such as restlessness, impulsivity, and poor academic performance, these are invariably blamed to lack of effort and disobedience, aim to let children more "obedient and easier to control," many parents might use inappropriate parenting methods such as physical punishment, threats, or verbal reprimands (Modesto-Lowe et al., 2008). However, the effects of oppressive parenting are minimal and may even be counterproductive. These types of harmful disciplinary methods would further impair the development of comorbidities in children with ADHD. Numerous studies have shown that parenting style is an important factor affecting the ADHD child, as are the parent-child relationship and the quality of the family environment. These factors are positively correlated with the development of ADHD symptoms, and numerous studies have found that parenting a child with ADHD usually have to spend a lot of energy and time interacting with people (such as teachers, peers and neighbors) who has influenced by problematic behavior of their child and the families of children with ADHD are more conflicted and contradictory than family of children without ADHD (Theule et al., 2013; Hutchison et al., 2016). High levels of stress and tension in raising ADHD children have also been reported by parents (Podolski & Nigg, 2001; Harrison & Sofronoff, 2002; Graziano et al., 2011; Baker & McCal, 1995; Pelham & Lang, 1999; McGoey et al., 2005).

Mounting researches have evidenced the efficiency and importance of family-based interventions in reducing ADHD symptoms in children, as well as large numbers of empirical evidence supporting the competence of using positive behavioral supports with children with developmental disabilities who have special needs (Hoza, Kaiser, & Hurt, 2008; Gerdes et al., 2012; Davis et al., 2012; Lo et al., 2020; Braswell & Bloomquist, 1991; Loh, 2020; Sonuga-Barke et al., 2006). However, few researchers combine a family-centered intervention with positive behavior support as an early intervention for children with ADHD. Early intervention has positive outcomes for children with ADHD, particularly intervention based on parent education (PE) and intervention designed for family setting

not only reduce problem behavior immediately, but also reduce the negative sequelae of ADHD-related problems (Kern et al., 2007; McGoey, et al., 2002). Mcgoey et al. (2002) mentioned compared with parent training or child behavioral, systematic intervention method might more useful to children with ADHD, in past 2 decades, family-centered positive behavior support (FCPBS) as a systematic intervention method has been identified its effectiveness on problem behavior of different sever developmental disabilities, however only few researchers implement FCPBS for children with ADHD (Ruef et al., 1999; Carr et al., 2002).

Thus, for find a more comprehensive, useful, and no side-effect intervention method for children with ADHD, this study examines the existing researches about family-centered positive behavior support, focusing specifically on its impact on ADHD children's problem behaviors. In the following sections, we introduce the definition and characteristics of PBS and the family-centered PBS intervention approach, explain the intervention program of family-centered PBS, review the empirical evidence to supporting its effectiveness, outline implications for practice, and future directions. By examining research in this area, we hope to enhance our understanding of the benefits and potential of family-centered positive behavior support on problem behavior and family life quality, and contribute to ongoing efforts to optimize interventions for this population.

2. The Definition of Positive Behavior Support

What exactly is PBS? Before Dunlap and his team revised the definition of PBS, there were a large number of different explanations. According to the latest update by Kincaid et al. (2016):

> "positive behavior support is an approach to behavior that includes an ongoing process of research-based assessment, intervention, and data-based decision-making focused on building social and other functional competencies, creating supportive context and preventing the occurrence of problem behaviors. PBS relies on strategies that respectful of a person's dignity and overall well-being and that are drawn primarily from behavioral, educational, and social sciences, although other evidence-based procedures may be incorporated. PBS may be applied within a multi-tiered framework at the level of the individual and the level of the individual and the level of larger systems (e.g., families, classrooms, schools, social service programs, and facilities) (p. 71)."

Positive behavior support is not a new theory, which is a systematic approach to intervening with individual behavior that has emerged from three major sources: applied behavior analysis (ABA), the normalization/inclusion movement, and person-centered values (Johnston et al., 2006; Dunlap et al., 2014). As an alternative to aversive interventions for individuals with significant disabili-

ties, the original intent of PBS original was to improve the quality of life for vulnerable populations (Singer & Wang, 2009; Morris & Horner, 2016). The primary principle of PBS is to provide positive and non-aversive approaches, regardless of individual level or at the system level (Kincaid et al., 2016). And the final goal of PBS is not only to reduce problematic behaviors, but also to build appropriate behaviors that result in durable change and a rich lifestyle (Morris & Horner, 2016).

Applied behavior analysis (ABA) is an effective, analytical approach validated by scientific, emphasizes positive intervention to improve the behavior of concern, apply effective strategies to cope problem behaviors, and promote good behaviors, ABA emphasizes the analysis of behavioral functionality and the underlying functions and purposes of behavior (Johnston et al., 2006; Horner et al., 1990; Carr et al., 2002). PBS was founded in ABA, which provides a conceptual schema and assessment intervention strategies for PBS, based on ABA, PBS has evolved in assessment intervention strategies (Morris & Horner, 2016). ABA has made two major contributions to PBS: 1) providing an element of conceptual framework relevant to behavior change, 2) providing a set of assessment and intervention strategies (Meyer & Evans,1989; Dunlap & Carr, 2007; Carr et al., 2002) Both PBS and ABA believe that human behavior can be changed and that behavior is defined and understood in context, and conceptualize the environment as an independent variable and people's behavior as a dependent variable (Carr & Sidener, 2002; Johnston et al., 2006).

PBS believes that antecedent events or variables and reinforcing consequences are the reason for recurrent behavior (Carr et al., 2002; Horner et al., 1990; Dunlap et al., 2009). Thus, PBS assumes that behavior can be influenced and changed by a structured environment, according to setting events, established operations, positive and negative reinforcements (Horner et al., 1990; Shriver et al., 2001). Therefore, through functional behavior assessment (FBA) relative antecedents and consequences of problem behaviors can be identified, according this, problem behaviors could be predicted and controlled in a structured environment.

FBA originates from ABA, which is an experimental method for researchers to determine 1) classes of problem behavior, 2) antecedents that occasion and do not occasion problem behavior, and 3) variables responsible for the main problem behavior, the variables refer to the function/purpose/goal/motivation/intention of the problem behavior (Carr, 1999). Shriver et al. (2001) defined FBA is "an umbrella term for various methods used to identify environmental variables that evoke and maintain problem behavior." FBA believes every behavior serves a purpose. By understanding the relationship among purpose, motivation, intent with problem behavior, thus, can help make problem behavior understandable and controllable by 1) altering the environment before problem behavior occurs and 2) teaching appropriate behaviors as an effective strategy for reducing unwanted behaviors (Singer & Wang, 2009; Carr et al., 2002). There are four com-

monly motivation categories: 1) to get attention and comfort from others, 2) to help individual to escape or avoid task or situation do not want to face, 3) to help individual to get the substance item or 4) to generate sensory reinforcement in the form of visual, auditory, tactile, and even gustatory stimulation (Carr & McDowell, 1980).

In summary, FAB as the central among the practice used in PBS which mains to identified the extent of the problem behavior and understand the conditions under which the problem behavior occurs in order to modify and rearrange the environment to reduce the recurrence of the problem behavior and promote replacement behavior (Fettig & Barton, 2014; Shriver, Anderson, & Proctor, 2001). Through FBA, a more appropriate intervention strategy can be developed for different individuals who exhibit different problem behaviors (Carr et al., 2002).

Elaboration of Characteristics of PBS

PBS is a construction of a comprehensive set of procedures, as Kincaid et al. (2016) emphasized, PBS is not limited to one type of assessment, intervention, or interpretive process. PBS involves a continuation of assessment, intervention, and decision-making processes that can be dissimilar depended on the goal of works (e.g. system, organization, educational institution, family, and individual).Although some features of PBS share similarities with other intervention approaches, the uniqueness of PBS is its integration of core features into a cohesive whole:

1) Emphasis on comprehensive lifestyle change and quality of life enhancement: PBS emphasizes rearranging the environment to change lifestyle and quality of life de-emphasizes the focus on problem behaviors. As mentioned earlier, the final goal of PBS is not only to reduce the occurrence of problem behaviors, but more importantly to lead to a more meaningful and stable lifestyle. Comprehensive lifestyle change includes several dimensions such as social relationships, personal satisfaction, employment, self-determination, recreation and leisure, community adjustment, and community integration (Horner et al., 1990; Horner, 2000; Ruef et al., 1999; Carr et al., 2002; Gao, 2020).

2) lifespan perspective: this perspective views PBS as a never-ending systemic process, as Carr, Levin, et al. (1999) concluded "maintenance refer[s] to periods measured in decades as the individual progresses from childhood through adolescence and adulthood. This...will require research into methods for identifying and achieving meaningful change over protracted periods of time" (p. 23). Comprehensive lifestyle changes are not an established event that occurs within a compressed time frame, a qualitative change often takes several years, the problem of deficient environment adaptive skills would be emerged with the change of environment in different phases in life, hence, PBS intervention strategies need to be modified consciously, add new strategies and delete old ones (Kincaid et al., 2002; Carr et al., 2002; Lucyshyn et al., 2007).

3) ecological validity: PBS is not a laboratory-based intervention approach based on laboratory, PBS emphasizes a natural, real-world environment, PBS emphasizes changing the environment rather than the individual's behavior, the focus of the intervention must be on changing the environment, these concepts align with the perspective of ecological theory, the ecological systems theory emphasizes the interaction between individuals and physical and social environments, therefore, PBS sees the intervention process as a collaboration of researchers, practitioners, and stakeholders, and more towards intervention agents are parents, teachers, job coaches to support individuals in typical relevant settings such as home, school, and workplace for extended period (Bronfenbrenner, 1994; Morris & Horner, 2016; Carr and Sidener 2002).

4) Stakeholder participation: different with traditional intervention approach, PBS emphasizes participants are the collaborators with professions in the intervention process, all relevant stakeholders (parents, teachers, siblings, neighbors, friends) are partners to developing and defining the vision, methods, and standard of success related to the quality of life (Carr & Sidener 2002; Carr & Horner 2007).

5) Social validity: except objective measures, the perspective of relevant others (parents, teachers, siblings, friends, and job coaches) on the effectiveness of the intervention are equally important; therefore, social validity has also been used as an assessment factor for intervention outcomes (Morris & Horner, 2016; Carr & Sidenerl, 2002; Sugai & Simonsen, 2012).

6) Multicomponent behavior support plans: comprehensive interventions can help increase positive behavior while decreasing problem behaviors, through FBA, combining multiple procedures to cope with the different problem behaviors, different motivations, different antecedents, and different setting events (Horner & Carr, 1997; Morris & Horner, 2016; Carr, 1999; Carr & Sidenerl, 2002);

7) Emphasis on preventive and teaching: the best timing to intervene problem behavior is when the behavior is not occurring, different with traditional intervention approaches, as a proactive prevention approach PBS focus on skills building (communication and self-management) and design environment to prevent the recurrence of problem behavior. PBS intervention strategy is not designed for the moment that problem behavior is occurring, which aims to minimize the likelihood of problem behavior in the future (Carr & Durand, 1985; Carr & Sidenerl, 2002; Kincaid et al., 2002).

8) Flexibility concerning scientific practices: PBS is a science that research in complex community settings, thus, the research methodology of PBS is not limited in FBA, which is flexible in correlation analyses, naturalistic observation, and case studies, the source of data collection can from qualitative measures, ratings, interviews, questionnaires, logs, and self-report (Carr & Sidenerl, 2002; Kincaid et al., 2002).

9) Multiple theoretical perspectives: in past decades year development, PBS

combine other theoretical perspectives (systematic analysis, ecological psychology, environment psychology), especially ecological system theory, both PBS and ecological paradigm think the focus of intervention is changing the environment rather than problem behavior (Carr & Sidenerl, 2002).

3. Family-Centered Positive Behavior Support

For individuals with developmental disabilities, the family is the most reliable source of support (Kim & Morningstar, 2005; Allen & Petr, 1996). family-centered intervention strategy is to organize assistance collaboratively and per individual family's wishes, strengths, and needs. According to Dunst (2002), the term "family-centered" refers to a specific set of beliefs, principles, values, and practices to support and strengthen the family's capacity to enhance and promote child development and learning. Thus, the strengths of family-centered can be defined as acknowledging, incorporating, soever assessment, goal setting, and intervention matched to the needs of individual families (Dunlap et al., 2008; Gore et al., 2013; Smith-Bird & Turnbull, 2005).

In the late 1990s, researchers combined the family-centered approach with PBS for families of children with developmental disabilities (Lucyshyn, Albin, & Nixon, 1997; Gao, 2020). family-centered positive behavior support (FBPBS) 1) views the family as a unit; 2) recognizes and builds on family strengths; 3) develops authentic partnerships between family and professionals; 4) ensures family choice and participation in decision making; 5) mobilizes informal and formal supports and resources; and 6) actively involves the family in the intervention by employing competency enhancing and empowering practices (Dunst, 1997). Within the PBS framework, the concept of family support aims to involve and empower families by building on family strengths, acquiring and developing new skills needed to support child development, and improving family unity and quality of life (Lucyshyn et al., 2002; Mahoney & Wheeden, 1997).

According to (Lucyshyn et al., 2015; Lucyshyn, Miller, Cheremshynski, Lohrmann, & Zumbo, 2018; Duda et al., 2008; Gao, 2020), FCPBS features are: 1) the conduct of a functional assessment (FA); 2) the design of a multi-component behavior support plan that emphasized preventive, teaching and reinforcement strategies; 3) the family activity setting (routine) as a unit of analysis and intervention; 4) consideration of contextual fit in plan design; 5) the development of a collaborative partnership with family members; 6) implementation support that included in vivo coaching; 7) measurement of social validity as well as problem behavior and adaptive behavior; and 8) focus on improving child behaviour and child and family quality of life.

Family-Centered PBS Intervention Mode Programme

Marshall and Mirenda (2002) mentioned, collaborative behavior support planning requires professional and family members to participate together in five successive phases:

1) Building relationships between the family and professional, family-centered positive behavior support needs collaboration between the consultant and family members to work together and establish trust, openness, and reciprocity. This process can lead to more relevant questions, acceptable and feasible interventions, and meaningful outcomes in relevant contexts.

2) Conducting a functional assessment of behaviors of concern, there are four steps need to do a) consultant needs to identify the behaviors of concern, b) conduct a functional assessment, c) collaborate to develop hypotheses, d) identify family routines as contexts for intervention.

3) Collaborating to develop a behavior support plan with the family based on the observation and consultant data.

4) Implementing the support plan in valued but problematic target routines in family and community and empowering family-members to solve problem behaviors in non-trained family settings.

5) Monitor and evaluate the implementation process, and make adjustments and reversions on ongoing data to improve the effectiveness, acceptability, and sustainability of the FCPBS plan.

4. Empirical Evidences of Positive Outcomes of FCPBS

Previous studies have evidenced the effectiveness, acceptability, and durability of FCPBS for children with challenging behavior in their daily routines as an intervention approach implemented by parents for children with challenging behavior has demonstrated encouraging outcomes, through engaging, parents help their child generalize acquired abilities to surrounding settings (e.g. Lucyshyn et al., 1997; Carr et al., 1999; Clarke, Dunlap, & Vaughn, 1999; Dunlap & Carr, 2007, Lucyshyn et al., 2007; Doubet & Ostrosky, 2015; Binnendyk & Lucyshyn, 2009; Lucyshyn et al., 2015; Lucyshyn et al., 2018).

FCPBS is embodied in reducing problem behavior to a low frequency and improving the life quality of children and their families (Fettig et al., 2015; Lucyshyn et al., 2015; Cheremshynski, Lucyshyn, & Olson, 2013; Binnendyk & Lucyshyn, 2009). For example, Fettig et al. (2015) reported that after implementing the FCPBS intervention, the percentage of an interval between the occurrence of challenging behaviors in the three participants continued to decrease. Lucyshyn et al. (2015) examined the effect of FCPBS on children 3 - 8 years old with differing developmental disabilities, the results indicated an overall 89.5% reduction in problem behavior of 10 children with developmental disabilities after implementing FCPBS intervention. Positive outcomes also showed in families of diverse linguistic and cultural backgrounds. Research by Cheremshynski, Lucyshyn, and Olson (2013) used both qualitative and quantitative methods to understand the diverse culture, avoiding stereotypical views of family culture and designing more suitable support plans; intervention led to the problem behavior of children engaged in low to near zero levels. In research about children with food refusal, intervention outcomes of FCPBS showed acceptance level of 5 tar-

get foods improved from 0% to 100%, and the problems of aggression and self-injured also decreased (Binnendyk & Lucyshyn, 2009; LaVigna & Willis, 2012).

Lots of research reported improvements maintained at weeks and months, even years post-intervention (Cheremshynski et al., 2013; Binnendyk & Lucyshyn, 2009; Lucyshyn et al., 1997; Duda et al., 2008). Due to reduction of problematic behavior, life quality of both child and family improved while parenting stress decreased (Binnendyk & Lucyshyn, 2009; Lucyshyn, Albin, & Nixon, 1997; Duda, Clarke, Fox, & Dunlap, 2008; Lucyshyn et al., 2018).

5. Limitation

Unfortunately, there is very little FCPBS research related to the problem behavior of children with ADHD, and references consulted in this literature review focused on FCPBS plans designed for children with autism and other severe developmental disorders. That is because there is little research about family-centered PBS for children with ADHD, thus not enough empirical evidence on the nature and effectiveness of FCPBS for children with ADHD and those at risk of developing the disorder.

However, according to the research of Erhardt and Baker (1990), intervention based on family is effective for reducing problem behaviors and improving the parent-child interactions of two preschool-age boys with ADHD. Besides, a systematic review of early intervention for preschool-aged children with ADHD by McGoey, Eckert, and Dupaul (2002); Pelham and Waschbusch (1999) mentioned that both child-management training and parent training are the intervention programs more often used for children with ADHD through educational overviews of child behavior problems, instruction and training in behavior management principles, development of individualized interventions, completion of homework assignments, and individual consultation, the outcomes of child-management training show positive influences on reducing problematical behavior and parenting stress, and parent-training interventions also have significantly affect on challenging behavior of ADHD children by having the lessons to assist parents(educational reviews, skill-oriented training of behavior-management principles, individual training, and guidelines for managing future behavior problems). As McGoey, Eckert, and Dupaul (2002) mentioned, children with ADHD should be treated with a combination of interventions in a long-term way (Ma, Lai, & Xia, 2018).

FCPBS, as a multiple-component intervention, is more comprehensive and potentially successful. Parents, family members, and peers all are stakeholders. Involving people surrounding children with ADHD in the intervention program would help them get more comprehensive help. Extrapolating family-centered PBS interventions from the literature aimed at behavior problems of children with autism and other severe developmental disorders might help to address the problem behavior of children with ADHD.

6. Conclusion and Research Directions

To date, family-centered positive behavior support (FCPBS) is widely used in the field of developmental disabilities, and this paper presents a comprehensive explanation of FCPBS. Empirical evidence consistently demonstrated the effectiveness of FCPBS in improving various outcomes related to problem behavior management of children with developmental disabilities. The results of research in the field of FCPBS highlight the reduction of problematical behavior and enhancement in life quality. Moreover, FCPBS also positively impacts social functioning and has long-last implications for children and their families' well-being and quality of life. Thus, we proposed that FCPBS is deemed effective in providing adequate support for children with ADHD and their families, problem behavior and complex need of children with ADHD can be addressed in the framework by FCPBS. Through leveraging the strengths and features of family-centered intervention and the PBS approach, FCPBS has the potential to make a meaningful difference in the lives of children with ADHD and their families.

As one of the common neurological disorders, ADHD usually shows obvious features in preschool age, therefore, we need to pay attention to early family intervention for children with attention deficit disorder, thus, future research should pay more focus on the impact of FCPBS on the problem behavior of children with ADHD, and examining the effectiveness of the long-term intervention, evaluating the optimal dosage and duration of interventions, and exploring the scalability of FCPBS in real-world settings would contribute to a more comprehensive understanding of its impact on children with ADHD.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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