**Analyzing the Utility of Dyadic Parent-Child Interaction Coding System (DPICS) Warm-Up Segments**

by

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Abstract

Analogue behavioral observations are an important component of multimodal, multi-informant assessments. One observation system developed specifically for use with Parent-Child Interaction Therapy (PCIT), an empirically-supported treatment for families of children with conduct problems, is the Dyadic Parent-Child Interaction Coding System, now in its third edition (DPICS-III). Although the DPICS has undergone several revisions and is backed by a substantial knowledge base, more research is needed to bolster its utility. One topic in need of empirical investigation relates to the usefulness of the warm-up (WU) segments integrated throughout the structured DPICS observation. Although these segments were initially introduced to improve the representativeness of observational data collected in subsequent segments, this purported benefit has not been empirically investigated. This study analyzed the contribution of including WU segments in DPICS observations by comparing mean parent and child behavioral composites of frequency counts obtained from pre- and post-treatment DPICS WU and typically-coded (TC) segments. No significant differences were found between WU and TC segments at pre- or post-treatment observations. The implications of these findings are discussed. This study is limited by its use of a small, archival sample and low base rates for certain child behaviors. Future studies should focus on establishing test-retest reliability of the DPICS and developing training aids to facilitate the dissemination of the DPICS and PCIT into community settings.

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# Introduction

The field of child clinical psychology currently faces the need to develop evidence-based assessment (EBA) practices in order to accompany the recent push for evidence-based treatments (EBTs; Mash & Hunsley, 2005). This need was raised by Mash and Hunsley (2005), who argued that many assessments for children and families lacked adequate empirical support; still, due to "a steadfast belief in the intrinsic worth" (p. 363) of these assessments, many measures are still utilized despite their lack of empirical grounding. Mash and Hunsley highlight the irony of the discrepant attention given to EBTs and not EBAs given that EBTs, by definition, require solid assessment practices (p. 363). These authors propose that developed EBAs should have the traditionally-emphasized promise of adequate reliability and validity as well as strong evidence of clinical utility. Furthermore, given the unique influences of family, peers, and developmental changes on children, Mash and Hunsley argue that it is essential that comprehensive assessments of children include a larger number of assessments as well as a multimodal approach, which may incorporate behavioral observations in multiple contexts and input from multiple informants (e.g., parents, teachers, peers) (p. 364). Mash and Hunsley also emphasize the need for EBAs to be explicit about their intended purposes and populations of interest. One specific field that requires further development of EBAs is the assessment of families and children with conduct problems.

## Assessment of Conduct Problems in Children

Much research has focused on the assessment and treatment of childhood conduct problems (CPs); this focus is likely due to the disruptive nature of the disorder, the chronicity and long-term costs associated with CPs, and the fact that CPs are some of the most common referral problems for children (McMahon & Frick, 2007; McMahon, Wells, & Kotler, 2006). Indeed, prevalence rates for Conduct Disorder and Oppositional Defiant Disorder range from less than 1% to 10% and 2 to 16%, respectively (APA, 2000). Despite this empirical focus, more work is needed to improve the effective assessment of children referred for CPs (McMahon & Frick, 2005, 2007). McMahon and Frick (2005) provide suggestions for important considerations clinicians should be aware of when conducting a comprehensive assessment of children with CP. Citing the variety of CP presentations, high comorbidity, risk factors, and various developmental pathways of CP, these authors endorse an EBA of CP that utilizes a multistage approach with multiple measures conducted with multiple informants to collect data relevant to multiple contexts. Furthermore, McMahon and Frick (2005) advocate for the use of multiple assessment methods when conducting a comprehensive evaluation of CP. Following an initial assessment stage that incorporates broad screening to identify CP and comorbid concerns, these authors suggest using more-intensive assessment methods, including analogue behavioral observations, to collect detailed information about a child's CP behavior.

## Analogue Behavioral Observation

The analogue behavioral observation is an often-used assessment method for the collection of objective clinical data and the building of empirical support for various psychotherapeutic interventions. Mori and Armendariz (2001) define analogue assessment as

> an observational measure of the… behavior(s) of interest elicited through the use of simulated conditions that take place in a laboratory or clinic… with the naturalistic setting in mind, such that the behaviors of interest occur under circumstances that are in some way reminiscent of home, community, or school conditions (p. 36).

According to Haynes (2001), the goal of analogue behavioral observation is to "derive valid and cost-effective estimates of a client's behavior, thoughts and cognitive processes, emotions, and physiological functioning, and of interactions between the client and others" (p. 73). Haynes adds that it is believed that analogue behavioral observations can have clinical utility not only through their cost-effectiveness, but also through their incremental utility (adding to the validity of clinical judgments beyond that provided by other measures), treatment utility (identifying functional relationships that maintain behavior problems, which can then become targets for treatment), and their sensitivity to change (providing feedback of treatment effects).

However, analogue behavioral observations have yet to gain widespread prominence as a preferred assessment tool in clinical practice (Mash & Foster, 2001). Mash and Foster (2001) offer several potential reasons that analogue behavioral observations have not been widely used in clinical settings. Among these reasons, researchers argue that cost barriers and accessibility concerns hinder the dissemination of analogue behavioral assessments into clinical settings (Brestan-Knight & Salamone, in press; Mash & Foster, 2001); thus, these assessments "must prove their worth, efficiency, and cost-effectiveness in the practice setting" if they are to gain popularity in clinical settings (Mash & Foster, 2001, p. 87). Furthermore, several authors have argued that analogue behavioral measures are lacking in reliability and validity data (Haynes, 2001; Mash & Foster, 2001; Mori & Armendariz, 2001; Roberts, 2001). Although this method of assessment has been used for over four decades, many analogue measures lack evidence of

standardization, incremental utility, reliability via temporal stability, and ecological and construct validity (Mori & Armendariz, 2001). Furthermore, Haynes (2001) argues that numerous analogue measures were developed "with insufficient attention to their psychometric properties and with insufficient adherence to well-established principles of assessment instrument development" (p. 74). Thus, more research is needed to bolster the reliability and validity of many analogue behavioral observations in order to justify their use in the evaluation and treatment of child psychopathology.

Analogue Behavioral Assessment of Parent-Child Interactions

Analogue behavioral assessment has often been used to collect behavioral data regarding the functioning of the parent-child relationship and commonly-used parenting practices (e.g., Brestan-Knight & Salamone, in press; Haynes, 2001; Mash & Foster, 2001; Roberts, 2001), now known to be critical factors in the development of CP (McMahon & Frick, 2005). Regarding the status of the literature base supporting analogue behavioral assessments of parent-child interactions, much more research is needed (Brestan-Knight & Salamone, in press; Roberts, 2001). Roberts' (2001) review of analogue behavioral observations concluded that analogues of free play, parent-directed play, and parent-directed chores are all psychometrically underdeveloped and require more development in the domains of test-retest reliability, clinical utility, and normative data. Also, Roberts contends that the procedures for many analogue behavioral observation approaches are arbitrarily determined and lack empirical support (e.g., the optimal durations of these observations; McMahon & Frick, 2005). Along with these psychometric concerns, researchers acknowledge a lack of data regarding the optimal number and duration of observations needed and the added expense associated with using these observations (Brestan-Knight & Salamone, in press; Mash & Foster, 2001; McMahon & Frick,

2005). Thus, it appears that more reliability and validity evidence, as well as evidence of clinical utility, is needed to justify the use of free-play and parent-directed play analogues in clinical research and practice. Regardless of this conveyed need for further justification of analogue behavior observations, many clinicians and researchers utilize these observations (Mash & Foster, 2001; McMahon & Frick, 2005). McMahon and Frick (2005) report that one of the unique strengths of analogue behavioral observations that adds to their appeal is their ability to measure ongoing treatment progress during parent training interventions (p.497), an often-used method of intervention for children with CP.

Parent Training as a Treatment for Children with Conduct Problems

Specific to child conduct problems (CPs), several empirically-supported treatments exist. The reader is directed to Eyberg, Nelson, and Boggs (2008) for a review of evidence-based psychosocial treatments for child and adolescent disruptive behavior. Utilizing the task force criteria for well-established and probably efficacious treatments (see Chambless et al., 1998; Chambless et al., 1996), Eyberg, Nelson, and Boggs identified 1 well-established treatment (Parent Management Training Oregon Model – PMTO) and 15 probably-efficacious treatments for child and adolescent disruptive behavior. Further, they recommended that, especially for younger children with CPs, clinicians should consider parent training as a "first line approach" (p. 233) to treatment. This recommendation is supported by the fact that the only current, well-established treatment identified by Eyberg, Nelson, and Boggs utilized parent training.

Parent-Child Interaction Therapy

One empirically-supported treatment for children with disruptive behavior problems is Parent-Child Interaction Therapy (PCIT; Hembree-Kigin, & McNeil, 1995). PCIT is a parent training program based on Hanf's (1969) two-stage model for parent training that seeks to

improve the parent-child relationship and correct maladaptive parent and child behavioral patterns. Unlike other parent training programs, these objectives are accomplished through direct, in vivo instruction via a bug-in-ear device, by which the therapist coaches the parent to use positive parenting skills in real-time while providing immediate feedback regarding the parent's performance.

PCIT consists of two phases of treatment. The first is the Child-Directed Interaction (CDI) phase. During this phase, parents are taught the PRIDE skills, an acronym for the skills of Praise, Reflection, Imitation, Description, and Enthusiasm; these skills are intended to improve the parent-child relationship by encouraging positive parental attention and selective ignoring of minor misbehaviors. Once parents reach behavioral criteria for using the PRIDE skills, therapy transitions to the second phase of treatment, known as the Parent-Directed Interaction (PDI) phase. This phase of treatment focuses on teaching the parent effective discipline techniques for correcting a child's disruptive or defiant behavior.

PCIT has been found to be effective in treating families of children with disruptive behavioral disorders (Nixon, Sweeney, Erickson, & Touyz, 2003; Schuhmann, Foote, Eyberg, Boggs, & Algina, 1998) as well as numerous other childhood psychological problems, including children with abuse histories (Chaffin et al., 2004; Ware, Fortson, & McNeil, 2003), separation anxiety disorder (Choate, Pincus, Eyberg, & Barlow, 2005), and mental retardation (Bagner & Eyberg, 2007). PCIT has also been shown to improve disruptive behaviors in children with comorbid medical problems such as diabetes (Miller & Eyberg, 1991) and cancer (Bagner, Fernandez, & Eyberg, 2004). Furthermore, the treatment effects of PCIT have been shown to generalize beyond the home to improve children's behavior in the school (Funderburk, Eyberg, Newcomb, McNeil, Hembree-Kigin, & Capage, 1998; McNeil, Eyberg, Eisenstadt, Newcomb, &

Funderburk, 1991) and hospital (Bagner, Fernandez, & Eyberg, 2004) contexts and to untreated siblings (Brestan, Eyberg, Boggs, & Algina, 1997).

The Dyadic Parent-Child Interaction Coding System (DPICS)

An integral assessment used to measure treatment progress during PCIT is an analogue behavioral observation system developed specifically for use with PCIT in research and clinical settings: the Dyadic Parent-Child Interaction Coding System III (DPICS-III; Eyberg, Nelson, Duke, & Boggs, 2005). Clinicians can use the DPICS to code parent and child behaviors observed during a standardized, 25-minute play situation which is divided into three major segments: a Child-Led Play (CLP) segment, Parent- Led Play (PLP) segment, and a Clean-Up (CU) segment. During the first 10 minutes of observation, parents are instructed to allow the child to lead the play. The first 5 minutes of this segment is designated a "warm-up" (WU) segment that is intended to allow the dyad to acclimate to the play situation; the WU segment is not coded, however, the latter 5 minutes of the CLP segment are coded. The CLP segment is followed by a 10-minute PLP segment, during which the parent is instructed to lead the play. Again, the first 5 minutes of this segment is designated a WU segment and is not coded while the latter 5 minutes of PLP are coded. The final 5 minutes of observation consists of the CU segment, where parents are instructed to direct the children to clean up the toys by themselves. There is no WU segment for CU as it is rare that the child takes the full 10-minute period to successfully clean up the toys. From a separate observation room, the therapist delivers instructions to parents via a bug-in-ear device so as to limit the obtrusiveness of the therapist during the parent-child interaction. PCIT, coupled with the DPICS, provides parents with quantitative feedback related to specific behaviors and broader behavioral patterns and interactions observed between the parent and child that may contribute to the development and

maintenance of child behavioral problems; along with these data, the DPICS also provides a means to measure treatment progress and outcome (Brestan-Knight & Salamone, in press; McMahon & Frick, 2005).

There are several studies supporting the psychometric qualities of the DPICS, including standardization data, adequate inter-observer agreement, test-retest reliability, discriminative validity, convergent validity, and treatment sensitivity (see Eyberg et al., 2005 for a review; Bessmer, 1998; Bessmer & Eyberg, 1993; Chaffin et al., 2004; Coursen, 2009; Deskins, 2005; Foote, 2000; McMahon & Frick, 2005; Robinson & Eyberg, 1981; Schuhmann et al., 1998; Webster-Stratton, 1985). However, more studies are needed to bolster support for the updated coding system. For example, reliability data for the DPICS-III are derived from standardization studies conducted on the DPICS-II; also, needed test-retest reliability has not yet been documented for the DPICS (Brestan-Knight & Salamone, in press). Furthermore, normative data are only available for children ages 3 through 6. Although normative data for children ages 7 through 12 were collected for comparison children (Coursen, 2009) and for physically abused children (Deskins, 2005), more data are needed to extend the clinical utility of the DPICS-III to older populations (Eyberg et al., 2005). Improving the clinical utility of the DPICS in terms of dissemination and accessibility has been accomplished, in part, by the refinement of behavioral codes in later editions of the coding system and through the development of an abridged manual (Chase & Eyberg, 2006); however, the clinical utility of the DPICS may be further improved by examining the observation duration. Thus, although the DPICS addresses many of the psychometric concerns associated with many analogue behavior observations of families (e.g., Roberts, 2001), more work is needed to extend the clinical utility of the DPICS.

One area of the DPICS-III in need of empirical investigation relates to the WU segments that precede CLP and PLP coding segments. Since the first edition of the DPICS (Robinson & Eyberg, 1981), it has been an assertion of many researchers that these WU segments help to ensure that the following CLP and PLP coding segments obtain representative samples of parent-child interactions. This assertion has no direct empirical support and has been the subject of several preliminary investigations (e.g., Dolbear et al., 2006; Zaremba, Carson, Salamone, & Knight, 2007). Given McMahon and Frick's (2005) criticism of these arbitrarily-determined observation durations and the recent push in the field to optimize treatment effectiveness and clinical utility, the question of the supposed necessity of DPICS WU segments has added relevance and important implications for the dissemination and implementation of PCIT in practice settings.

Analyzing DPICS Warm-Up Segments

Dolbear et al. (2006), using DPICS-II observations obtained during an evaluation of Ridgeway's (2007) group PCIT protocol, compared post-treatment WU segments with CLP and PLP segments to determine if parent skill level varied from WU segments to their "typically-coded" (TC) counterparts (i.e., WU CLP versus TC CLP and WU PLP versus TC PLP). Dolbear et al. found that parents displayed significantly higher levels of prosocial behavior during the WU CLP segment than the TC CLP, WU PLP, and TC PLP segments, which were not significantly different from each other. Furthermore, a nonsignificant trend was observed which showed that both WU segments (WU CLP and WU PLP) tended to have more prosocial behavior than the TC segments. Also, they found a nonsignificant trend in which fewer inappropriate parenting behaviors occurred during the WU segments than did during the TC segments. Child inappropriate behaviors were found to increase in frequency over time across

segments regardless of the DPICS segment, although this trend was not significant. Overall, these data suggest that parents might have become more fatigued throughout the DPICS-II observation, resulting in their engaging in fewer prosocial behaviors during the TC segments than in the WU segments that preceded them. Furthermore, children may become more fatigued throughout the assessment, leading to irritability, which may lead to more inappropriate behaviors from them as the DPICS observation continues. Dolbear et al. conclude by suggesting that the WU segments, although intended to improve the validity of the CLP and PLP segments of the DPICS observation, may actually be the more-valid segments in that fatigue does not alter parent and child behaviors. Dolbear et al. suggest that DPICS warm-up segments be altered or deleted when using DPICS to analyze group PCIT participants' behaviors in order to improve the accuracy and validity of observations.

In 2007, Zaremba et al. (2007) replicated Dolbear et al.'s (2006) study using the abridged version of the revised DPICS III (Chase & Eyberg, 2006), to compare post-treatment WU and TC segments. Zaremba et al.'s results were similar to Dolbear et al.'s (2006) findings in that, although not significant, there was a trend for parents to use more prosocial behaviors during WU segments than in the TC segments that followed. Specifically, Zaremba et al. found that parents used significantly more labeled praises during the WU CLP segment than in the TC CLP segment; they also found a nonsignificant trend for parents to use more unlabeled praises during the WU CLP segment than in the TC CLP segment. Also, similar to Dolbear et al., Zaremba et al. found a nonsignificant trend for parents to display more inappropriate behaviors during TC segments than in WU segments. Interestingly, Zaremba et al. found that child compliance was higher during the TC PLP segment than in the WU PLP segment, a finding that may suggest the WU PLP segment is needed in order to obtain accurate measures of parent discipline skills

during the TC PLP segment of the DPICS observation. Thus, it is possible that WU segments may be effective when coding PLP segments but not CLP segments. Given the discrepant findings between Dolbear et al. (2006) and Zaremba et al. (2007), more research is needed to determine the utility of DPICS WU segments.

Both Dolbear et al. (2006) and Zaremba et al. (2007) suggest that fatigue may have contributed to the varying frequencies of parent and child behavior. However, both studies only analyzed post-treatment DPICS observations and, therefore, have no pre-treatment comparison for analyzing differences between WU and TC segments at pre- and post-treatment. Furthermore, both studies reported non-significant trends; further studies utilizing more-powerful statistics may therefore disclose significant differences between WU and TC segments.

Goals of Study

The study seeks, in general, to add empirical support to the analogue behavior assessment literature as well as the parent training literature by comparing data collected at various times during an analogue behavior observation to determine what, if any, additional data are gathered during an as yet unsupported, arbitrarily determined time segment. Specifically, this study is the first of its kind to empirically investigate the benefits of the abridged DPICS-III WU segments at pre- and post-treatment for a community sample of parent-child dyads participating in a group parent-training intervention by directly comparing parent and child behaviors from pre- to post-treatment and from WU to TC DPICS segments. The results of this study will either provide much needed empirical support for current procedures, or question their utility and provide direct implications for improving the efficiency of the abridged DPICS-III assessment procedure in a community setting.

Hypotheses

1. It is hypothesized that parent and child behavior, as measured by DPICS-III composites, will not differ between pre-treatment WU and TC segments.
2. It is hypothesized that parent and child behavior, as measured by DPICS-III composites, will differ significantly between post-treatment WU and TC segments.
    a. Parent Prosocial Behavior will decrease from WU to TC segments.
    b. Parent Inapporpriate Behavior will increase from WU to TC segments.
    c. Child Prosocial Behavior will decrease from WU to TC segments.
    d. Child Inappropriate Behavior will increase from WU to TC segments.
    e. Child Compliance will decrease from WU to TC segments.
    f. Child Noncompliance will increase from WU to TC segments.

# Method

## Participants

This study utilized archival pre- and post-treatment assessment data collected from 27 pairs of parent-child dyads who participated in Ridgeway's (2007) group PCIT intervention. For more-detailed information about these participants, see Ridgeway (2007). Of the 27 dyads who began the group PCIT treatment, 16 completed the entire 12-week-long intervention. Of these, data were included from 13 dyads as a videotape for 1 dyad's pre-treatment assessment was corrupted and could not be coded and observations for 2 dyads were unusable.

## Measures

### *Dyadic Parent-Child Interaction Coding System (DPICS-III)*

The abridged version of the DPICS-III (Chase & Eyberg, 2006) was used to code WU and TC CLP, WU and TC PLP, and CU segments of videotaped DPICS behavioral observations taken at both pre- and post-treatment. The abridged DPICS-III collects frequency counts of various child and parent behaviors (e.g., Prosocial Talk (PRO), Command (CM), Labeled Praise (LP), Unlabeled Praise (UP), Neutral Talk (TA)). These categories of behaviors can then be combined using formulae set forth by Eyberg et al. (2005) to create composite categories. For this study, the composite categories for child behavior included Compliance, Noncompliance, and Inappropriate Behavior while the composite categories for parent behavior included Inappropriate Behavior and Prosocial Behavior. Due to the lack of a composite category for child prosocial behavior, this study also examined child Prosocial Talk (PRO). For a list of child and

parent behavior codes, see Table 1. For a list of child and parent composite categories and their formulae, see Table 2.

*Training of Coders*

Undergraduate research assistants underwent a rigorous training process that included the completion of the DPICS-III workbook (see Eyberg, Nelson, Duke, & Boggs, 2005), weekly practice meetings led by a faculty supervisor, and the reliable coding of a criterion videotape. Training occurred over a period of approximately 4 months. Weekly practice meetings consisted of checking coders' progress with the workbook, answering questions related to coding, and coding practice tapes under the supervision of the faculty supervisor. Upon completion of the workbook, coders were required to code a criterion tape with a reliability of at least 90% agreement.

Procedure

For more information related to the group PCIT intervention procedures, see Ridgeway (2007). Before treatment, dyads completed a pre-treatment DPICS observation. This pre-treatment assessment was videotaped to be coded at a later date. Participating dyads who completed the 12-week program again completed a videotaped DPICS observation. For this study, these pre- and post-treatment videotaped observations were randomly assigned to be coded by a team of 4 DPICS-III trained coders who were blind to the source of the videotapes, to this study's hypotheses, and to the classification of videotapes as being pre- or post-treatment.

*Coding Procedures*

Only coders who successfully completed the training procedures listed above were permitted to code tapes for this study. Pairs of coders were randomly assigned to code videotapes, with one coder randomly designated the "primary coder" and the other designated

the “reliability coder.” As each videotaped segment played, coders made tally marks of each occurrence of specific parent and child behaviors, as defined by the abridged version of the DPICS-III manual (Chase & Eyberg, 2006), on one of two coding sheets (see Figure 1 and Figure 2) in order to obtain frequency counts of these behaviors for each observation segment. All 130 videotaped segments were watched twice by coders, once to observe the child’s behaviors and once to observe the parent’s behaviors. Frequency count totals were then entered into a computer database and compiled into the various composite categories for statistical analyses.

Analyses

Inter-coder reliability was calculated for each coded segment using Percent Agreement, which is calculated by dividing the sum of agreements for a given segment by the sum of agreements and disagreements for that segment. Intraclass correlations were also calculated for each behavior code by compiling frequency counts across all coded segments for a given family and comparing these total counts between primary and reliability counts. Descriptive statistics were also collected for each behavior code by segment. Behavior composite scores were calculated using the appropriate formula (see Eyberg, Nelson, Duke, & Boggs, 2005 or Table 2 for composite formulae). To determine if child and parent behavior changed significantly from WU to TC segments or from pre- to post-treatment, DPICS composite score means were entered into repeated measures pairwise orthogonal planned comparisons.

# Results

## Preliminary Analyses

### *Intraclass Correlations and Percent Agreement Reliability Analyses*

All observation segments were coded by trained primary and reliability coders using the abridged DPICS-III. For each coded behavior, primary and reliability totals were pooled across all coding segments for each family. Thus, 2 totals of target behaviors observed throughout pre- and post-treatment observations for each family were calculated: a primary total and a reliability total. These totals were then compared using Intraclass Correlations (ICCs) with one-way random effects models and single measurement reliability. Shrout and Fleiss (1979) suggest that the acceptable ICC have a reliability coefficient greater than 0.75. If the reliability coefficient for any given behavior code fell below this cutoff, the database was examined to determine if any one family's codes were responsible for the insufficient reliability. This occurred for the Child Noncomply and Child No Opportunity to Comply codes for 1 family; this family was observed to have considerably more codes in these categories during pre-treatment than any other family involved in this study, and considerable disagreement between primary and reliability coders for this family was observed at pre-treatment. Upon re-coding of this family's pre-treatment observation, ICC reliability coefficient values for these behavioral codes exceeded the cutoff of 0.75. ICC values ranged from 0.83 to 0.99 for child codes and from 0.79 to 0.98 for parent codes.

Percent Agreement was calculated for each observation segment by dividing the sum of agreements between primary and reliability coders for each behavior code by the sum of agreements and disagreements. All coded segments exceeded the 80% agreement criterion.

*Composite Calculation*

Composite categories were calculated using formulae adapted from Eyberg et al. (2005). These formulae are listed in Table 2.

Pairwise Planned Contrasts

For both hypotheses, pairwise planned comparisons were conducted between group means for each calculated composite. Two types of comparisons were conducted: comparisons between WU and TC segments of CLP and PLP (e.g., WU CLP versus TC CLP at pre-treatment, WU CLP versus TC CLP at post-treatment); and comparisons between pre- and post-treatment segments (e.g., WU CLP at pre-treatment versus WU CLP at post-treatment). Results from these contrasts are summarized in Tables 3 through 6.

Discussion of Hypotheses

*Hypothesis 1*

It was hypothesized that parent and child behavior, as measured by the DPICS-III composites, would not differ between pre-treatment WU and TC segments. This hypothesis was fully supported in that there were no significant differences between WU and TC segments at pre-treatment for any of the composite means (see Table 3).

*Hypothesis 2*

It was hypothesized that parent and child behavior, as measured by the DPICS-III composites, would differ significantly between post-treatment WU and TC segments. Specifically, it was believed that, due to participant fatigue, parent Prosocial Behavior would

decrease (i.e., this composite would decrease significantly from WU CLP to TC CLP and from WU PLP to TC PLP); parent Inappropriate Behavior would increase; child prosocial behavior would decrease; child Inappropriate Behavior would increase; child Compliance would decrease; and child Noncompliance would increase. Contrary to our predictions, none of these hypotheses were supported in that there were no significant changes in any composite category means from WU to TC segments during post-treatment observations. In other words, behavior composite means were constant for parents and children at post-treatment from WU to TC segments (see Table 4).

## Discussion

The purpose of this study was to empirically investigate the utility of WU segments in abridged DPICS-III coded behavioral observations of families seeking treatment for child CPs in a community setting; this was accomplished by comparing composite scores of parent and child behaviors collected during WU and TC segments of CLP and PLP situations at pre- and post-treatment. In this analysis, no significant differences emerged between parent or child composite scores from pre- and post-treatment observations. Thus, it appears that the data collected during WU segments is statistically and functionally equivalent to that collected during the TC segments during both CLP and PLP observation situations.

These results contradict the findings of two previous studies that found parent and child behavior tends to worsen throughout observations coded with the research version of the DPICS-II and the abridged version of the DPICS-III (Dolbear et al., 2006; Zaremba et al., 2007). These authors suggested that parent and child fatigue influenced the dyad's behavior during latter segments of the observations. Suggesting that fatigue may result in the collection of unrepresentative data, the opposite outcome of the original intent of WU segments, Dolbear and colleagues (2006) and Zaremba and colleagues (2007) recommended that DPICS WU segments be removed in order to protect the validity of the gathered data. Although this study failed to replicate these previous findings and does not question the validity of DPICS data, it does not reject the recommendations made by these authors. Even though it is possible that fatigue is still impacting parent and child behavior, it may be that PCIT trains a skill set such that parent

acquisition and utilization of these skills is unaffected by fatigue. Thus, the effects of fatigue may not impact the dyad's performance during DPICS observations nor the validity of data gathered. Still, the equality of WU and TC data observed in this study provides support for previous authors' (Dolbear et al., 2006; Zaremba et al., 2007) recommendations to shorten or eliminate WU segments from DPICS observations as a means of increasing the efficiency, cost-effectiveness, and clinical utility of this particular analogue behavioral observation.

Although the psychometric properties of the DPICS, unlike many analogue behavioral observations (Haynes, 2001; Mash & Foster, 2001; Mori & Armendariz, 2001; Roberts, 2001), are supported by numerous studies, the assumed usefulness of arbitrarily determined WU segments remains an unsupported and possibly unnecessary practice that adds to the cost of using this observation system; by doing so, the continued use of WU segments may discourage the utilization of the DPICS in clinical and community settings (Mash & Foster, 2001), which may, in turn, discourage the dissemination of PCIT in community settings. This is concerning given that, in order to expand the EBT movement, more studies need to be conducted in community settings with new populations (Eyberg, Nelson, & Boggs, 2008).

In order to anticipate the possible argument that treatment dosage was insufficient to elicit behavior change and, thus, the effects of fatigue may not be apparent and not produce differences between WU and TC segments, pairwise planned comparisons between pre- and post-treatment composite scores were conducted for WU and TC segments. The results of these analyses are shown in Table 5 and Table 6. These comparisons reveal significant changes in parent and child behavior from pre- to post-treatment in both WU and TC segments. Both sets of comparisons reveal significant increases in Parent Prosocial behavior and decreases in Parent Inappropriate behavior in CLP, PLP, and CU observation situations. Thus, Ridgeway's (2007)

group protocol appears to have produced significant behavior change in parents. Interestingly, the effect sizes of these positive changes decreased for Parent Prosocial from WU to TC segments and from CLP to PLP segments. However, the effect sizes of the decrease in Parent Inappropriate behavior increased from WU to TC segments during CLP but decreased from WU to TC during PLP. It is possible that these fluctuations in effect sizes may provide indirect evidence supporting Dolbear et al.'s (2006) and Zaremba et al.'s (2007) fatigue hypothesis; however, even if these changes in effect sizes are due to fatigue, the effects of fatigue were not powerful enough to negate all changes in parent behavior. In other words, although the skills used by parents decreased in frequency during the observation, they still used these skills more than at pre-treatment. Furthermore, the beneficial effects of therapy on parent behavior are revealed during WU segments, although the magnitude of change may be inflated given that the effects of fatigue are arguably not included. However, the question of whether the effects of fatigue should be considered when assessing behavior change in parents and children using the DPICS is best answered by the assessment developer. Several authors argue that EBAs, in general, and analogue behavioral observations, in particular, should be explicit about their intended purpose (e.g., Haynes, 2001; Mash & Hunsley, 2005). Applying this recommendation to the DPICS, the DPICS manual should specify whether the purpose of the assessment is to monitor behavior change in parents and children independent of or in addition to the effects of fatigue. If the effects of fatigue are not considered relevant when using the DPICS to assess parent behavioral change, then eliminating WU segments seems indicated. Conversely, if clinicians deem it important to document parent behavioral change in spite of fatigue effects (perhaps to maximize assessment external validity or treatment generalizability), then using WU segments may help fulfill this goal.

Regarding child behavior change, it is noteworthy that Child Prosocial behavior decreased significantly from pre- to post-treatment during CLP and PLP situations according to pairwise comparisons of WU segments; however, this decrease disappears when analyzing pre- and post-treatment TC CLP and TC PLP segments; this is most likely due to a higher frequency of child prosocial behavior during post-treatment TC segments as compared to post-treatment WU segments. There are several possible explanations for this change. It is possible that children were nervous about treatment, and this nervousness was manifested through increased prosocial talk during the pre-treatment observation; by the end of treatment, this nervous chatter had decreased, causing a significant decrease in prosocial talk. The decrease in child prosocial behavior may also be accounted for by higher frequencies of parent verbal behavior at post-treatment (e.g., more Labeled Praise, Behavior Descriptions, and Reflections), which would give children fewer opportunities to speak. It is also possible that children require a WU period in order to become engaged in the play and participate verbally at post-treatment. In sum, it is possible that WU segments have differential utility depending on the focus of treatment; if treatment focuses on improving parenting skills, then WU segments are unnecessary as the effects of treatment are immediately noticeable during the DPICS observation; however, if the focus of treatment is on child behavior change, such as prosocial verbal behavior in children with autism (Brooks, Wilsie, Thornberry, Jr., Lambha, & Brestan-Knight, 2009), then WU segments may be required in order to allow the child time to acclimate to the play situation.

Overall, this study suggests that direct comparison of WU and TC DPICS segments yields no statistical difference in information gathered regarding parent and child behavior. Given the cost and utility concerns of behavioral observations mentioned by many authors (e.g., Brestan-Knight & Salamone, in press; Mash & Foster, 2001; McMahon & Frick, 2005), these

findings call into question the usefulness of DPICS WU segments; however, if one considers the varying effect sizes captured by these different comparisons (e.g., higher effects on parenting skills during WU segments), or the multiple purposes of DPICS assessments (e.g., parent versus child behavior change), it is possible to justify the continued use of WU segments. Still, given that the duration of DPICS observations has no impact on the progression or outcome of treatment (i.e., PCIT progress depends on in-session assessment rather than the 25-minute pre- and post-treatment DPICS observations), the possibility that including non-coded WU segments may cause the DPICS instructions to confuse front-line clinicians, and the added time and cost of including WU segments, it appears that clinicians only stand to gain from eliminating WU segments, especially given the recent push for dissemination in community settings (e.g., Eyberg, Nelson, & Boggs, 2008).

Limitations and Future Directions in Research

These data were obtained from archival videotapes of pre- and post-treatment DPICS observations. Due to corruption of data, several observations were unusable. This deletion of data also further limited this study's sample size, which may limit statistical power.

Another limitation of this study is the low base rate of child misbehavior observed in this primarily child maltreatment sample. This fact is likely due to the nature of the sample obtained in this study, which consisted of families recruited through a local Child Advocacy Center rather than families presenting at a university-based clinic with disruptive behavior disorders. Comparing the Child Inappropriate mean frequencies from pre-treatment CLP, PLP, and CU segments from this study with those pre-treatment frequencies collected from families with children diagnosed with Oppositional Defiant Disorder (ODD; see Eyberg, Nelson, Duke, & Boggs, 2005, p.239-241), it appears that children from this study exhibited lower frequencies of

Child Inappropriate behavior than children with ODD. Perhaps a similar analysis of child behavior composites for TC and WU DPICS observations collected from a clinic-referred sample of children with ODD and ADHD will shed more light on whether WU segments are needed to collect representative child behavioral data.

This study used data from families undergoing group PCIT rather than typical, individualized PCIT. The typical PCIT protocol is designed to progress throughout treatment based on the individual family's performance rather than a set number of sessions. For example, the progression from CDI to PDI is contingent upon the parent's use of 10 Labeled Praises, 10 Behavior Descriptions, and 10 Reflections and the avoidance of 3 Commands, Questions, and Criticisms during a brief, 5 min in-session CLP DPICS observation. However, the group protocol used by Ridgeway (2007) accelerated families through treatment based on a set number of sessions rather than performance criteria. This protocol might have resulted in a lower "dosage" of coaching than the typical PCIT protocol for some of the families. Thus, it is possible that there was not a high enough treatment dosage to produce behavior change in children; this and the low base rate of child misbehavior limit the amount of variance captured in this study and may attenuate any effects fatigue may have on their behavior. Future studies in a community setting using the typical PCIT protocol may reveal more about child fatigue and the differential utility of WU segments in group and individual PCIT.

To ensure the successful dissemination and implementation of the DPICS in community settings, future studies should focus on developing a standardized, efficient training tool, such as a DPICS training video. Such a training tool may facilitate clinician understanding of the DPICS protocol, attaining coding reliability, and maintaining implementation and coding fidelity (e.g., using the standardized instructions, decision rules, and priority order correctly). Test-retest

reliability should also be demonstrated with the DPICS in future studies so as to optimize the traditional psychometric qualities emphasized by various authors (Haynes, 2001; Mash & Foster, 2001; Mori & Armendariz, 2001; Roberts, 2001).

The continued refinement of analogue behavioral observations such as the DPICS is vital in the push for EBA of children and families (Haynes, 2001; Mash & Foster, 2001; Mash & Hunsley, 2005), particularly in assessing parent-child interactions of families with children exhibiting CPs (McMahon & Frick, 2005; Mori & Armendariz, 2001; Roberts, 2001). Along with improving traditional psychometric qualities such as reliability and validity (Haynes, 2001; Mash & Foster, 2001; Mori & Armendariz, 2001; Roberts, 2001), analogue behavioral observations can benefit from improving clinical utility by increasing accessibility and eliminating cost barriers (Brestan-Knight & Salamone, in press; Mash & Foster, 2001). This study suggests that the clinical utility of the DPICS may be further improved if WU segments are eliminated from the coding system when assessing child maltreatment samples. Such a change may increase the appeal of the DPICS to clinicians in community settings who cannot afford to implement such an observation as it is currently used. This added clinical utility may subsequently facilitate the dissemination of EBTs such as PCIT into community settings as well as facilitate research studies in community settings, a necessary goal in the development of well-established EBTs (Eyberg, Nelson, & Boggs, 2008).

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Appendix

Table 1

*Parent and Child Behaviors and Respective DPICS-III Codes*

| Parent Behavior (Code) | Child Behavior (Code) |
|---|---|
| Negative Talk (NTA) | Negative Talk (NTA) |
| Direct Command (DC) | Command (CM) |
| Indirect Command (IC) | Question (QU) |
| Labeled Praise (LP) | Prosocial Talk (PRO) |
| Unlabeled Praise (UP) | Yell (YE) |
| Information Question (IQ) | Whine (WH) |
| Descriptive/Reflective Question (DQ) | Answer (AN) |
| Reflective Statement (RF) | No Answer (NA) |
| Behavioral Description (BD) | No Opportunity for Answer (NOA) |
| Neutral Talk (TA) | Comply (CO) |
| Negative Touch (NTO) | Noncomply (NC) |
| Positive Touch (PTO) | No Opportunity for Compliance (NOC) |
| | Negative Touch (NTO) |
| | Positive Touch (PTO) |

Table 2

*DPICS-III Parent and Child Composite Categories and Respective Formulae*

| Composite Category | Formula |
|---|---|
| Parent Inappropriate Behavior | $_{p}IQ + {}_{p}DQ + {}_{p}NTA$ |
| Parent Prosocial Behavior | $_{p}BD + {}_{p}RF + {}_{p}UP + {}_{p}LP$ |
| Child Compliance | $_{c}CO \div [({}_{p}DC + {}_{p}IC) - {}_{c}NOC]$ |
| Child Noncompliance | $_{c}NC \div [({}_{p}DC + {}_{p}IC) - {}_{c}NOC]$ |
| Child Inappropriate Behavior | $_{c}NTA + {}_{c}YE + {}_{c}WH$ |

Note: The subscripts $_{c}$ and $_{p}$ denote child and parent categories, respectively. Adapted from Eyberg et al. (2005).

Table 3

*Pre-treatment DPICS-III Composite Comparisons between WU and TC Segments*

| DPICS-III Composite | M (*SD*) | | *F* |
|---|---|---|---|
| | WU | TC | |
| CLP | | | |
| Parent Prosocial | 3.50 (*3.15*) | 3.69 (*4.01*) | 0.06 |
| Parent Inappropriate | 16.5 (*9.44*) | 16.85 (*8.77*) | 0.09 |
| Child Prosocial | 24.25 (*10.72*) | 24.38 (*10.40*) | 0.00 |
| Child Inappropriate | 0.17 (*0.39*) | 0.62 (*1.12*) | 2.51 |
| Child Compliance | 0.74 (*0.37*) | 0.76 (*0.34*) | 0.02 |
| Child Noncompliance | 0.32 (*0.44*) | 0.27 (*0.34*) | 0.08 |
| PLP | | | |
| Parent Prosocial | 4.58 (*4.10*) | 5.25 (*4.25*) | 0.56 |
| Parent Inappropriate | 14.25 (*6.68*) | 17.08 (*8.62*) | 2.55 |
| Child Prosocial | 23.25 (*10.81*) | 23.00 (*11.43*) | 0.01 |
| Child Inappropriate | 1.08 (*1.93*) | 1.18 (*2.14*) | 0.02 |
| Child Compliance | 0.73 (*0.22*) | 0.64 (*0.33*) | 2.01 |
| Child Noncompliance | 0.25 (*0.19*) | 0.32 (*0.31*) | 1.45 |

Note: *F* = *F ratio* statistic. All values $p > .05$

Table 4

*Post-treatment DPICS-III Composite Comparisons between WU and TC Segments*

| DPICS-III Composite | M (*SD*) | | *F* |
|---|---|---|---|
| | WU | TC | |
| CLP | | | |
| Parent Prosocial | 13.92 (*8.32*) | 10.00 (*6.73*) | 3.20 |
| Parent Inappropriate | 3.85 (*5.16*) | 4.08 (*5.95*) | 0.15 |
| Child Prosocial | 17.69 (*10.69*) | 20.46 (*10.25*) | 1.59 |
| Child Inappropriate | 0.69 (*1.70*) | 0.54 (*1.05*) | 0.17 |
| Child Compliance | 0.81 (*0.38*) | 0.83 (*0.41*) | 0.01 |
| Child Noncompliance | 0.19 (*0.38*) | 0.17 (*0.41*) | 0.01 |
| PLP | | | |
| Parent Prosocial | 8.15 (*6.30*) | 9.69 (*8.59*) | 1.27 |
| Parent Inappropriate | 2.85 (*3.18*) | 3.46 (*5.41*) | 0.43 |
| Child Prosocial | 16.23 (*6.99*) | 17.54 (*9.49*) | 0.50 |
| Child Inappropriate | 1.92 (*3.55*) | 5.77 (*10.28*) | 3.30 |
| Child Compliance | 0.57 (*0.43*) | 0.74 (*0.37*) | 2.79 |
| Child Noncompliance | 0.43 (*0.43*) | 0.26 (*0.37*) | 2.79 |

Note: *F* = *F ratio* statistic. All values $p > .05$

Table 5

*DPICS-III Composite Comparisons between Pre- and Post-treatment WU Segments*

| DPICS-III Composite | M (*SD*) | | *F* | *d* |
|---|---|---|---|---|
| | Pre | Post | | |
| CLP | | | | |
| Parent Prosocial | 3.50 (*3.15*) | 13.92 (*8.32*) | 30.26** | 1.70 |
| Parent Inappropriate | 16.50 (*9.44*) | 3.85 (*5.16*) | 23.87** | -1.75 |
| Child Prosocial | 24.25 (*10.72*) | 17.69 (*10.69*) | 6.03* | -0.64 |
| Child Inappropriate | 0.17 (*0.39*) | 0.69 (*1.03*) | 1.03 | 0.44 |
| Child Compliance | 0.74 (*0.37*) | 0.81 (*0.38*) | 0.09 | 0.23 |
| Child Noncompliance | 0.32 (*0.44*) | 0.19 (*0.38*) | 0.49 | -0.23 |
| PLP | | | | |
| Parent Prosocial | 4.58 (*4.10*) | 8.15 (*6.30*) | 13.37** | 0.69 |
| Parent Inappropriate | 14.25 (*6.68*) | 2.85 (*3.18*) | 58.98** | -2.30 |
| Child Prosocial | 23.25 (*10.81*) | 17.08 (*6.56*) | 6.47* | -0.81 |
| Child Inappropriate | 1.08 (*1.93*) | 1.92 (*3.55*) | 0.62 | 0.30 |
| Child Compliance | 0.73 (*0.22*) | 0.57 (*0.43*) | 2.04 | -0.56 |
| Child Noncompliance | 0.25 (*0.19*) | 0.43 (*0.43*) | 2.52 | 0.56 |

*$p < .05$. **$p < .01$.

Note: *F = F ratio* statistic. *d* = Cohen's *d* effect size.

Table 6

*DPICS-III Composite Comparisons between Pre- and Post-treatment TC Segments*

| DPICS-III Composite | M (*SD*) | | *F* | *d* |
|---|---|---|---|---|
| | Pre | Post | | |
| CLP | | | | |
| Parent Prosocial | 3.69 (*4.01*) | 10.00 (*6.73*) | 12.01** | 1.18 |
| Parent Inappropriate | 16.85 (*8.77*) | 4.08 (*5.95*) | 28.32** | -1.77 |
| Child Prosocial | 24.38 (*10.40*) | 20.46 (*10.25*) | 2.21 | -0.40 |
| Child Inappropriate | 0.62 (*1.12*) | 0.54 (*1.05*) | 0.02 | -0.07 |
| Child Compliance | 0.76 (*0.34*) | 0.83 (*0.41*) | 0.13 | 0.31 |
| Child Noncompliance | 0.27 (*0.34*) | 0.17 (*0.41*) | 0.23 | -0.31 |
| PLP | | | | |
| Parent Prosocial | 5.25 (*4.25*) | 9.69 (*8.59*) | 5.05* | 0.67 |
| Parent Inappropriate | 17.08 (*8.62*) | 3.46 (*5.41*) | 30.30** | -1.99 |
| Child Prosocial | 23.00 (*11.43*) | 17.54 (*9.49*) | 2.37 | -0.55 |
| Child Inappropriate | 1.18 (*2.14*) | 5.77 (*10.28*) | 1.97 | 0.62 |
| Child Compliance | 0.64 (*0.33*) | 0.74 (*0.37*) | 0.61 | 0.30 |
| Child Noncompliance | 0.32 (*0.31*) | 0.26 (*0.37*) | 0.27 | -0.24 |
| CU | | | | |
| Parent Prosocial | 5.08 (*6.91*) | 10.69 (*9.73*) | 8.55* | 0.69 |
| Parent Inappropriate | 8.46 (*5.44*) | 2.46 (*2.96*) | 20.06** | -1.43 |
| Child Prosocial | 12.58 (*5.81*) | 16.38 (*23.42*) | 0.27 | 0.23 |

| | | | | |
|---|---|---|---|---|
| Child Inappropriate | 5.17 (*8.63*) | 4.31 (*8.43*) | 0.07 | -0.11 |
| Child Compliance | 0.81 (*0.32*) | 0.79 (*0.30*) | 0.01 | -0.06 |
| Child Noncompliance | 0.18 (*0.31*) | 0.15 (*0.18*) | 0.20 | -0.21 |

*$p < .05$. **$p < .01$.

Note: *F = F ratio* statistic. *d* = Cohen's *d* effect size.

# TT Thesis Parent Coding Sheet

Tape #: _____ Coder: _____

Circle DPICS Segment: WCLP CLP WPLP PLP CU

Circle One: Primary Reliability Segment Start Time: _____

| Behavior | Count | | | Total |
|---|---|---|---|---|
| **TA** | | | | |
| **BD** | | | | |
| **RF** | | | | |
| **UP** | | | | |
| **LP** | | | | |
| **NTA** | | | | |
| **DQ** | | | | |
| | **AN/CO** | **NA/NC** | **NOA/NOC** | |
| **IQ** | | | | |
| **DC** | | | | |
| **IC** | | | | |
| **PTO** | | | | |
| **NTO** | | | | |

*Figure 1*. DPICS-III coding sheet for observed parent behaviors.

# TT Thesis Child Coding Sheet

Tape #: _____ Coder: _____

Circle DPICS Segment: WCLP CLP WPLP PLP CU

Circle One: Primary Reliability Segment Start Time: _____

| Behavior | Count | Total |
|---|---|---|
| **PRO** | | |
| **QU** | | |
| **CM** | | |
| **NTA** | | |
| **YE** | | |
| **WH** | | |
| **PTO** | | |
| **NTO** | | |

*Figure 2*. DPICS-III coding sheet for observed child behaviors.