Psychometric Properties of the Dyadic Parent-Child Interaction Coding System (DPICS): Investigating Updated Versions across Diagnostic Subgroups

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Abstract

Evidence-based assessment requires the use of diverse methods that incorporate multiple informants and demonstrate adequate psychometrics. The Dyadic Parent-Child Interaction Coding System (DPICS) is an analogue behavioral observation that evaluates parent-child interactions. Although previous editions of the DPICS have been investigated, support for more recent editions is lacking. The current study investigates the psychometric properties of updated DPICS editions. Participants were 122 parent-child dyads who participated in a DPICS observation and completed measures. Children were between ages 2 and 11 and exhibited a range of clinical problems (e.g., conduct issues, anxiety, no clinical problems). The results provided normative information for all DPICS codes across clinical subgroups. Findings also demonstrated associations between child DPICS codes and several variables, including child age, child diagnosis, and parent-reported child functioning. Fewer associations were observed for parent DPICS codes. The study contributes to the clinical utility and contextual use of the DPICS across clinical settings.

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List of Abbreviations

EBPP	Evidence-Based Practice in Psychology
EBT	Evidence-Based Treatments
EBA	Evidence-Based Assessments
ABO	Analogue Behavioral Observation
DPICS	Dyadic Parent-Child Interaction Coding System
PCIT	Parent-Child Interaction Therapy
CLP	Child-Led Play
PLP	Parent-Led Play
CU	Clean Up
WU	Warm Up
DBD	Disruptive Behavior Disorder
ODD	Oppositional Defiant Disorder
ADHD	Attention-Deficit/Hyperactivity Disorder
ASD	Autism Spectrum Disorder
ECBI	Eyberg Child Behavior Inventory
BASC-2	Behavior Assessment System for Children, Second Edition
AUPSC	Auburn University Psychological Services Center
CD	Conduct Disorder
SES	Socioeconomic Status

Psychometric Properties of the Dyadic Parent-Child Interaction Coding System (DPICS): Investigating Updated Versions across Diagnostic Subgroups

In recent years, there has been a call for the increased use of evidence-based practices by clinicians in the field of psychology. This evidence-based practice in psychology (EBPP) has been described as the "integration of the best available research with clinical expertise in the context of patient characteristics, culture, and preferences" (APA Presidential Task Force on Evidence Based Practice, 2006, p. 273). As such, EBPP involves the effective application of several clinical activities, including psychological assessment, case formulation, and treatment planning and implementation (APA Presidential Task Force on Evidence Based Practice, 2006). Although this emphasis on EBPP has resulted in the increased development and dissemination of evidence-based treatments (EBT) in clinical settings, some have argued that clinical assessment methods still remain underdeveloped in terms of psychometric properties, clinical utility, and standardized implementation (Hunsley & Mash, 2010; Mash & Hunsley, 2005).

In clinical psychology, assessment data are particularly important for evaluating clients' functioning, determining treatment progress, and assessing treatment outcome (Hunsley & Mash, 2010). Additionally, given that data supporting EBTs are often obtained using assessment measures, it is important to ensure that these measures have evidence of adequate reliability, validity, clinical utility, and treatment utility to support their continued use (e.g., Hunsley & Mash, 2007; Jensen-Doss, 2011; Mash & Hunsley, 2005). This evidence-based assessment (EBA) requires the integration of research and theory in processes such as determining relevant constructs to measure, selecting appropriate methods and measures for assessment, and using decision-making when necessary in the assessment process (Hunsley & Mash, 2007, 2010). As such, EBA goes beyond just selecting measures with adequate reliability and validity, promoting

the use of assessment measures with multiple informants, objective referents, easily interpretable data, and cost-effective implementation (Hunsley & Mash, 2010).

Behavioral Observation Methods

EBA calls for clinicians to gather and integrate data using different assessment tools that incorporate multiple informants and perspectives (Mash & Hunsley, 2005). Although self-report measures and structured interviews are common assessment methods within clinical settings, the addition of a behavioral observation component may also provide relevant information about client functioning. In particular, behavioral observations offer clinicians valuable data regarding a client's interactions with others (Haynes, 2001). This information can be used to develop hypotheses about factors that affect the client as well as to provide insight regarding potentially effective treatment methods. This assessment method is particularly valuable for clinicians working with children (e.g., Aspland & Gardner, 2003; Heyman & Slep, 2004; Mori & Armendariz, 2001). Specifically, observations of parent-child interactions allow clinicians to understand how both parent and child behaviors may contribute to the child's psychopathology, beyond information provided by self-report or parent-report measures (Gardner, 2000).

The implementation of behavioral observation methods can vary along many factors, including the setting of the observation (home/school vs. clinic/laboratory), the amount of structure in the activity (free play vs. clean up activities), and the instructions given to the participants (open-ended vs. scripted; Hughes & Haynes, 1978). However, as opposed to more naturalistic observation methods, analogue behavioral observations (ABOs) are seen as a more cost-effective and efficient assessment technique (e.g., Haynes, 2001; Heyman & Slep, 2004; Hughes & Haynes, 1978). ABO methods place clients in a contrived situation set in a controlled environment, such as a laboratory or clinic, that is designed to elicit the behaviors of interest

(Mori & Armendariz, 2001). Thus, ABOs are meant to be representative of situations that arise in more naturalistic settings (e.g., interactions that occur in the home or school), which increases the likelihood that relevant behaviors will occur during the observation (Aspland & Gardner, 2003; Haynes, 2001). The measurement of such behaviors or interactions provides inferences regarding how individuals act and function within their daily lives (Haynes, 2001). Thus, ABOs allow clinicians to observe infrequently occurring behaviors, to determine the antecedents or consequences for particular behaviors, and to record the complex and interrelated components of social interactions (Heyman & Slep, 2004).

Advantages and Disadvantages of ABOs

ABO has been shown to have a number of advantages compared to other methods of assessment, particularly when measuring complex social systems like parent-child interactions. First, this technique allows clinicians to operationalize relevant concepts and behaviors, ensuring that they are measured consistently across individuals. By contrast, such definitions may depend on each reporter's individual experience when measured using paper-and-pencil methods (Aspland & Gardner, 2003; Gardner, 2000). Second, compared to self-report or participant-report measures, ABOs are less influenced by response biases and demand characteristics, such as the reporter's mood, expectations for intervention outcomes, or views regarding the child (Gardner, 2000; Heyman & Slep, 2004). Observational systems are also more likely to capture details surrounding an interaction that individuals may be unaware of given the automaticity and speed of such behaviors (Gardner, 2000). For parent-child interactions, ABOs may provide insight into when a child is likely to experience difficulties, how parents react to their child's misbehavior or noncompliance, and how parents behave during positive interactions, which may serve as functional relations for their presenting problem (Haynes, 2001; Heyman & Slep, 2004).

Despite these advantages, there are also limits to the utility of ABO methods. One major barrier for implementing ABO in clinical settings is the amount of time and money needed to learn and implement each system. For example, in order to use most ABOs, clinicians need to have individuals trained to run the observation, the time and space to conduct the assessment, trained coders to evaluate relevant behaviors, and occasional reliability checks to avoid coder drift (Gardner, 2000). Given the limited amount of resources available to clinicians, ABOs may be deemed inefficient compared to cheaper options like self-report measures. Additionally, many researchers have argued that ABO systems lack sufficient evidence of psychometric reliability and validity as well as clinical utility and generalizability (e.g., Gardner, 2000; Haynes, 2001; Heyman & Slep, 2004; Hughes & Haynes, 1978). In particular, for ABO methods, these psychometric factors are likely to be conditional on the properties of the specific system, the individual being observed, the purpose of the observation, and other contextual factors (Haynes, 2001; Heyman & Slep, 2004). As such, it is important for research evaluating ABO systems to address factors such as clinical utility, normative reference data, standardized implementation, validity, and reliability across multiple settings and populations in order to establish their usefulness in a clinical setting (Haynes, 2001; Hughes & Haynes, 1978; Mash & Foster, 2001). One such ABO system that has empirical support for many of these areas is the Dyadic Parent-Child Interaction Coding System (DPICS; Eyberg, Nelson, Duke, & Boggs, 2010), which measures parent and child behaviors during structured play interactions.

Dyadic Parent-Child Interaction Coding System (DPICS)

The DPICS (Eyberg et al., 2010) is a behavioral observation measure used for assessing the quality of parent-child interactions as well as for capturing child prosocial and externalizing behaviors. When using this system, both parent and child verbalizations, vocalizations, and

behaviors are coded by an outside observer during three different structured play situations: Child-Led Play (CLP), Parent-Led Play (PLP), and Clean Up (CU). Of the total 25-minute observation, the first 10 minutes are devoted to CLP, during which parents are directed to let their child choose the play activity and to follow their child's lead. The first five minutes of this segment is considered a "warm up" (WU) in order to allow both the parent and child to adjust to the setting, decreasing reactivity and increasing the representativeness of the coded behaviors (Thornberry, 2013; Thornberry & Brestan-Knight, 2011). Following the WU segment, the interactions between the parent and child are coded continuously for five minutes. Similar to CLP, PLP has a five-minute WU segment followed by five minutes of behavioral coding. However, during this situation, parents are instructed to select the play activity and to direct the child to play by their rules. Finally, the CU segment involves the parent instructing the child to clean up and put away the toys in the room on his/her own. Notably, the CU segment only lasts five minutes during which behaviors are coded, with no initial WU segment. This situational arrangement places increasing demands on the parent to exert control over the child throughout the observation (Eyberg et al., 2010).

The DPICS was originally designed as an assessment tool for a parent-training program, Parent-Child Interaction Therapy (PCIT; Eyberg & Funderburk, 2011), but can also be extended to other clinical settings. For example, the DPICS can be used as one component of a psychological assessment in order to inform diagnosis and treatment decisions about the role of maladaptive interaction styles in child psychopathology. The system can also be used as an assessment tool for other interventions, providing pre-treatment data as well as treatment outcome data (Eyberg et al., 2010). In order to enhance its clinical utility, an abridged version of the DPICS has been released, including only the more relevant parent and child codes for

clinician use (Eyberg, 2010; Eyberg, Chase, Fernandez, & Nelson, 2014). Additionally, the DPICS protocol allows for flexibility in how the observation is conducted, particularly in the absence of technology such as the bug-in-the-ear device or one-way mirror observation facilities (Eyberg et al., 2010). These modifications allow the DPICS to be used even in clinical settings with limited time or financial resources.

Psychometric Properties of the DPICS

Another major advantage of the DPICS is the amount of psychometric evidence for its reliability, validity, and treatment sensitivity (for a review, see Eyberg et al., 2010). Following its development, the DPICS was standardized for use with children between the ages of 3 and 6, including families of children with conduct issues and those without (Robinson & Eyberg, 1981). Additionally, normative data have been collected using the second edition of the DPICS (DPICS-II) for children ages 3 to 6 (Bessmer, 1998), fathers (Foote, 2000), and school-aged children (Deskins, 2005). With regards to reliability, high to adequate inter-observer agreement has been demonstrated for coding of both parent and child behaviors using the original and second edition of the DPICS (e.g., Bessmer, 1998; Deskins, 2005; Foote, 2000; Robinson & Eyberg, 1981).

Similarly, studies have demonstrated adequate discriminant validity, convergent validity, and treatment sensitivity for the DPICS (e.g., Bessmer, 1998; Deskins, 2005; Foote, 2000; Robinson & Eyberg, 1981). Specifically, the DPICS has been shown to discriminate between clinic-referred and non-clinic referred families, with significant differences in the frequency of both child and parent behaviors (e.g., Bessmer, 1998; Bjørseth, McNeil, & Wichstrøm, 2015; Robinson & Eyberg, 1981; Webster-Stratton, 1985). The frequency of several DPICS coding categories has also been shown to be associated with self-report measures of related constructs, including parent-reported child behavior problems and parental stress related to the child

(Bessmer, 1998; Foote, 2000). Finally, the DPICS has been shown to detect changes in the quality of parent-child interactions following completion of interventions, such as PCIT (e.g., Chaffin et al., 2004; Nieter, Thornberry, & Brestan-Knight, 2013; Schuhmann, Foote, Eyberg, Boggs, & Algina, 1998). Despite these supportive findings, the majority of the psychometric evidence for the DPICS has been conducted using older versions and generalized to more recent versions, presenting a problem for clinicians using more recent editions of the DPICS.

Dyadic Parent-Child Interaction Coding System, Third and Fourth Edition (DPICS-III/IV)

Although the developers of the DPICS argue that it is a "single, adaptable system for recording parent and child behavior," there have been several revisions to the manual since its original release (Eyberg et al., 2010, pg. 8). For example, before the release of the third edition of the manual, all codes from the previous editions were evaluated and modified based on their interrater reliability, frequency of occurrence, and other relevant psychometric properties. Thus, compared to the original and second edition of the DPICS, the third edition removed several coding categories that had been shown to occur infrequently (e.g., parent whine, parent yell, parent laugh, and child destructive). Several categories were also moved to a "supplemental" coding designation because of their underdevelopment or irrelevance to the population of interest (e.g., play talk and parent response categories). Finally, some codes were combined in the third edition to create more distinct and relevant categories (for a comparison of the different editions of the DPICS, see Tables 1 and 2; Eyberg et al., 2010). More recently, a fourth edition of the DPICS was released although only minor revisions were made to clarify the coding guidelines for existing categories (Eyberg, Nelson, Ginn, Bhuiyan, & Boggs, 2013). However, the DPICS-IV procedure did remove the PLP warm up segment as it was shown to have no effect on parent and child behavior (Shanley & Niec, 2011; Thornberry & Brestan-Knight, 2011), improving its

clinical utility and making the procedure 20 minutes long (Eyberg et al., 2013). Given these numerous revisions, particularly between the second and third edition of the DPICS, it is important for more recent versions to undergo similar psychometric and clinical evaluation in order to ensure the DPICS has up-to-date empirical support (Brestan-Knight & Salamone, 2011).

Specifically, although standardization data were collected for previous versions of the DPICS (Bessmer, 1998; Foote, 2000; Robinson & Eyberg, 1981), there is a limited amount of normative data available for the third and fourth editions (Eyberg et al., 2013). In fact, these data are not currently published in the abridged versions of the DPICS and are only available for specific populations (e.g., children with ODD/ADHD, Mexican-American dyads) using the DPICS-III (Eyberg et al., 2013; McCabe, Yeh, Lau, Argote, & Liang, 2010). Providing sufficient normative data is a problem that affects many ABOs and is likely to limit the clinical utility of these methods (Roberts, 2001). Normative data allow clinicians to assess whether relevant parent and child behaviors are above clinical limits and provide a criterion through which clinicians can evaluate treatment effectiveness (Foote, 2000; Mash & Hunsley, 2005). Given that the DPICS categories have been shown to distinguish between clinic-referred and non-clinic referred families and are associated with child behavior problems, it is important to determine at what level certain behaviors are clinically relevant (e.g., Bessmer, 1998; Bjørseth, McNeil, & Wichstrøm, 2015; Foote, 2000; Robinson & Eyberg, 1981; Webster-Stratton, 1985).

Additionally, although the DPICS has predominately been used in clinical settings to evaluate children with disruptive behavior disorders (DBDs), its use has expanded in recent years to include the evaluation of children with Autism Spectrum Disorder (ASD), chronic illness, and anxiety disorders (e.g., Bagner, Fernandez, & Eyberg, 2004; Pincus, Cheron, Santucci, & Eyberg, 2006; Solomon, Ono, Timmer, & Goodlin-Jones, 2008; Travis, 2015). Despite the

inclusion of new clinical populations, there is currently little guidance for clinicians using the DPICS regarding what frequency of certain behaviors (e.g., parent inappropriate behaviors, total commands, or child noncompliance) are indicative of clinical problems or how the frequency of these behaviors may differ for children with psychological disorders other than conduct issues. This information is particularly important given that different etiological factors influence the development of child psychopathology. For example, parents of children with DBDs tend to develop coercive interaction patterns, use more inconsistent and harsh discipline, and display less warmth with their children (American Psychiatric Association, 2013; Patterson, 1982; Patterson, Reid, & Dishion, 1992). By contrast, parents of children with anxiety disorders tend to be more intrusive, overprotective, and controlling, allowing their children less autonomy (e.g., McLeod, Wood, & Weisz, 2007; Rapee, 1997). Thus, parent and child behaviors observed during the DPICS for families of children with DBDs may not be the same as those observed for other disorders, requiring greater investigation of the DPICS with different clinical populations.

Another area in which research on the DPICS is lacking is the relationship between observed differences in parent and child behaviors and various demographics characteristics, such as child gender, child age, or family income. EBA research shows that it is important to take such factors into consideration when evaluating the psychometric properties of assessment measures, as reliability and validity are context-sensitive concepts (Mash & Hunsley, 2005). Despite this argument, few studies assessing the DPICS have focused on such relationships, particularly with more updated versions of the DPICS. For example, even though it has been shown that parents' interactions with and parenting of their children can differ based on the child's gender (e.g., Kim, Arnold, Fisher, & Zeljo, 2005; Moon & Hoffman, 2008; Nordahl, Janson, Manger, & Zachrisson, 2014; Parent et al., 2011), only one study has investigated this

relationship using the original version of the DPICS (Robinson & Eyberg, 1981). Additionally, although the effect of SES has been investigated using previous editions of the DPICS, it has not yet been conducted using the abridged version of the DPICS-III or the DPICS-IV, which could provide more clinically useful and updated information (Callahan & Eyberg, 2010). Finally, no study has investigated the relationship between child age and behaviors observed during the DPICS, despite the fact that parents and children are likely to change their behavior depending on the child's developmental level (Shonkoff & Phillips, 2000). This information is important given that the age range for the DPICS has expanded to include school age children for specific populations (Chaffin et al., 2004; Deskin, 2005; McNeil & Hembree-Kigin, 2010). Overall, it remains to be seen whether parents' and children's use of certain behaviors during the DPICS may differ depending on these demographic factors, which could provide a context for clinicians when incorporating and interpreting assessment data.

Goals of the Study

This study aimed to contribute to existing literature about the psychometric properties and clinical utility of more updated versions of the DPICS for families with young children. First, this study provided normative data for different diagnostic subgroups of clinic-referred families as well as families without clinically significant problems. As such, means and standard deviations for relevant parent and child DPICS coding categories were reported across the three play situations (CLP, PLP, CU, and Total). Differences in parent and child codes were also examined based on clinical subgroup. Second, the present study investigated differences in the frequency of certain parent and child behaviors during DPICS observations based on family demographic characteristics, such as child gender, child age, and family income. Third, this study provided evidence of convergent validity for updated parent and child DPICS codes when

compared to parent-report measures of child functioning, including the Eyberg Child Behavior Inventory (ECBI) and the Behavior Assessment System for Children, Second Edition Parent Rating Scale (BASC-2, PRS).

Hypotheses

A major component of this study was descriptive, including the normative data reported for DPICS categories across the three play segments for the non-clinical and clinical subgroups. As a result, we do not have hypotheses for this aspect of the study. However, based on previous research on the DPICS, we expected to find significant differences in the frequency of parent and child codes between the clinical and non-clinical groups (Bessmer, 1998; Foote, 2000; Webster-Stratton, 1985). Specifically, we hypothesized that parents of children diagnosed with DBDs would use more commands, exhibit more inappropriate behavior, and display less prosocial behavior compared to parents with children who had no clinically significant problems. We also expected that children diagnosed with DBDs would be less compliant and would use more negative talk compared to children without clinical diagnoses (Bessmer, 1998; Foote, 2000). Given that no published study has examined differences in the updated DPICS across other clinical subgroups, these analyses are exploratory and have no a priori hypotheses.

For our second goal, we expected that parent and child behaviors would differ during the DPICS observation based on demographic characteristics, including child gender, child age, and annual family income (e.g., Bessmer, 1998; Callahan & Eyberg, 2010; Foote, 2000; Mash & Hunsley, 2005). Although studies have demonstrated inconsistent findings regarding the influence of child gender on parent and child behaviors (Parent et al., 2011), we hypothesized that during the DPICS, parents would exhibit more inappropriate behaviors and fewer prosocial behaviors with boys compared to girls (e.g., Leaper, Anderson, & Sanders, 1998; McKee et al.,

2007; Nixon, 2002). Additionally, girls were expected to demonstrate more compliance and more prosocial behavior than boys during the DPICS (Denham, Renwick, & Holt, 1991; Miner & Clarke-Stewart, 2008; Nixon, 2002; Zakriski, Wright, & Underwood, 2005). Based on previous research on the influence of family income, we hypothesized that parents with higher income would use more prosocial behavior compared to lower income parents during the DPICS (e.g., Bradley, Corwyn, McAdoo, & Coll, 2001; Callahan & Eyberg, 2010; Nievar & Lustar, 2006; Raver, Gershoff, & Aber, 2007). We also expected that children from families with lower income would display more negative talk and less compliance compared to children from families with higher income, based on related findings (Nievar & Luster, 2006; Piotrowska, Stride, Croft, & Rowe, 2015). Although no study has previously investigated differences in the DPICS based on the child's age, we hypothesized that parents would use more total verbalizations, more commands, and more prosocial behavior with younger children than older children, based on related findings (Bradley et al., 2001; Zakriski et al., 2005).

Finally, we expected to replicate previous studies by showing that differences in parent and child behaviors during the DPICS observation are associated with parent-reported child behavior problems. Based on previous literature, we hypothesized that parents who displayed more inappropriate behavior, less prosocial behavior, and more commands would also report higher ECBI Intensity and Problem scores (Bessmer, 1998; Foote, 2000). We also expected that children who used more negative talk and who were less compliant during the DPICS would have higher ECBI Intensity and Problem scores (Bessmer, 1998; Foote, 2000). Although the DPICS has not yet been compared to the BASC-2 PRS, we expected similar patterns of parent and child behaviors during the DPICS for parents who report more externalizing problems. The

investigation of the BASC-2 Internalizing and Adaptive Skills subscales was exploratory given the lack of previous research for this measure and, as a result, had no a priori hypotheses.

Method

Participants

Participants for this study included 122 families with at least one child between the ages of 2 and 11 and his/her primary caregiver. Most of the caregivers who participated were the biological mother of the child (87.7%); however, fathers (8.2%) and other family members (e.g., grandmother, aunt; 3.3%) were also included. One family was missing data for caregiver relation (0.8%). The majority of children were male (60.7%), and the mean age was 6.0 years (*SD*=2.2 years). Two families were missing child gender data (1.6%), and three were missing child age (2.5%). For this study, children were grouped based on their broad diagnostic category, including Disruptive Behavior Disorders (DBD; *N*=34, 27.9%), Anxiety disorders (*N*=19, 15.6%), Autism Spectrum Disorder (ASD; *N*=10, 8.2%), other clinical problems (e.g., parent-child/sibling relationship problem, bereavement, reading disorder, diagnosis deferred; *N*=24, 19.7%), and no clinical diagnosis (*N*=35, 28.7%). Families were predominately Caucasian (84.4%); however, African American (7.4%), Hispanic (1.6%), Asian (0.8%), Multi-racial (2.5%), and Other (1.6%) ethnicities were also represented. Two families were missing data for ethnicity (1.6%). The distribution of family income was as follows: Less than $25,000 (13.9%); $25,000-$49,999 (18.9%); $50,000-$74,999 (16.4%); $75,000-$99,999 (9.0%); more than $100,000 (13.1%). Income data were missing for 35 families (28.7%). Participants were drawn from two samples. Table 5 reports demographic information for the overall sample as well as separately (A and B).

Sample A. Participant data were drawn from 103 clinic-referred families who sought treatment or assessment services at the Auburn University Psychological Services Center

(AUPSC) over the past several years. Specifically, clients between the ages of 2 and 11 who participated in a pre-treatment DPICS observation with their primary caregiver as a part of the usual care at AUPSC were included in the sample. For some families, two parents participated in the DPICS observation (*N*=12, 12.37%). In the current study, the parent with the highest DPICS inter-rater reliability across segments was selected and used in the analyses. Six families were also excluded from the current study due to missing DPICS data.

Sample B. Participant data were drawn from 45 families who were recruited from the community as a part of a larger research study conducted by the Parent-Child Lab at Auburn University. Recruitment for this study was conducted using local businesses that agreed to hang and distribute flyers to their customers. Recruitment locations included local day care facilities, early education centers, dentists' offices, pediatricians' offices, restaurants, libraries, health and recreation centers, and churches. Families who contacted the Parent-Child Lab were screened via telephone to ensure that they had a child between the ages of 2 and 8. No participants were excluded based on this criterion. For the current study, eight families were excluded from analyses due to missing DPICS data.

Measures

Demographics. Demographic information for Sample A was obtained from client history forms that the child's primary caregiver completed during the AUPSC standard intake procedure. For Sample B, the primary caregiver completed a demographic questionnaire along with other measures for the study. Demographic information used in the current study included the primary caregiver's relationship to the child, the family's ethnicity and annual income, and the child's age, gender, and clinical diagnosis. For sample A, the child's clinical diagnosis was determined by his/her assigned clinician using various assessment methods and was based on the DSM

available at the time when services were provided. When multiple diagnoses were given, only the primary diagnosis was used for the current study. For sample B, the child's clinical diagnosis was reported by the participating caregiver on the demographic sheet.

Eyberg Child Behavior Inventory (ECBI). Parents were asked to complete the ECBI (Eyberg & Pincus, 1999), a 36 item parent-report measure of current child externalizing behavior problems at home, which has been validated for use with children ages 2 to 16. The scale assesses common behavior problems, such as "acts defiant when told to do something," "teases and provokes other children," and "is easily distracted." The measure is composed of two scales: the ECBI Intensity Scale and the ECBI Problem Scale. For the Intensity Scale, parents rate how frequently each behavior occurs using a scale from 1 (*Never*) to 7 (*Always*), with higher scores indicating more frequent behavior problems. After summing the responses for all items, a composite score of 132 or above indicates clinically significant conduct problems (Eyberg & Pincus, 1999). For the Problem Scale, parents respond to the question "Is this a problem for you" by circling YES or NO for each item. After summing the number of "yes" responses, a score of 15 or above indicates that the parent considers a clinically significant number of behaviors to be problematic (Eyberg & Pincus, 1999).

With regards to its psychometric properties, the ECBI has demonstrated good internal consistency, with reported Cronbach's alphas ranging from .92-.95 and .91-.92 for the Intensity and Problem scales, respectively (Burns & Patterson, 2001). Both scales have also demonstrated good test-retest reliability for time periods ranging from three weeks to 10 months (Funderburk, Eyberg, Rich, & Behar, 2003; Robinson, Eyberg, & Ross, 1980). In addition, the ECBI correlates highly with other measures of behavior problems, including both self-report (Child Behavior Checklist; Preschool Behavior Questionnaire-Parent Completed) and observational measures

(Boggs, Eyberg, & Reynolds, 1990; Funderburk et al., 2003; Webster-Stratton & Eyberg, 1982). Finally, the two ECBI scales have been shown to discriminate children with conduct problems from those without as well as children who have received treatment from those who have not (Colvin, Eyberg, & Adams, 1999; Eyberg & Ross, 1978).

Behavior Assessment System for Children-Second Edition, Parent Rating Scale (BASC-2 PRS). Parents were asked to complete the BASC-2 PRS (Kamphaus, VanDeventer, Brueggemann, & Barry, 2007), a parent-report measure of child adaptive behaviors, problem behaviors, and emotional problems at home and in the community. Depending on the child's age at intake, parents completed either the Preschool BASC-2 PRS (134 items; for children ages 2-5) or the Child BASC-2 PRS (160 items; for children ages 6-11). For both versions of the measure, parents rated the frequency of child behaviors, such as "shares toys or possessions with other children," "bullies others," and "changes moods quickly," on a four-point scale (i.e., 1= "*Never*," 2= "*Sometimes*," 3= "*Often*," and 4= "*Almost Always*"). Three composite scores were calculated based on parent responses: Externalizing Problems, Internalizing Problems, and Adaptive Skills. Raw scores for composite variables were converted into *T* scores for normative comparison. For the Externalizing and Internalizing Scales, *T* scores from 60-69 are considered at-risk and above 70 are considered clinically elevated. For the Adaptive Skills scale, *T* scores from 30-39 are considered at-risk and below 30 are considered clinically elevated (Kamphaus et al., 2007).

For each age level version of the measure (preschool through adolescence), the BASC-2 PRS has demonstrated good internal consistency and test-retest reliability for its three composite scales (Externalizing Problems, Internalizing Problems, and Adaptive Skills). Evidence for adequate convergent validity has also been shown for the BASC-2 PRS, with moderate to high correlations between its composite scales and three relevant behavior rating scales. Finally,

differential clinical profiles have been created for several child psychological disorders based on responses to the BASC-2 PRS, including Attention-Deficit/Hyperactivity Disorder, depressive disorders, and behavioral/emotional disturbance disorders (Kamphaus et al., 2007; Tan, 2007).

Dyadic Parent-Child Interaction Coding System, Third and Fourth Edition (DPICS-III/IV). Trained coders used the abridged version of the DPICS-III (Eyberg, 2010) or the DPICS-IV (Eyberg et al., 2014) to code observations for both samples. The abridged version of the DPICS-III/IV was designed for use in clinical settings and has fewer parent and child coding categories compared to the research version (refer to Table 1 and 2 for comparison across DPICS editions). Six additional child categories were also coded for the present study, which are not currently included in the abridged DPICS manuals. Table 3 includes a list of all parent and child codes used in the current study. Coders used the DPICS to record frequency counts of specific parent and child behaviors (e.g., Behavioral Description, Noncompliance, and Labeled Praise). Some categories were then combined using formulas described in the research version of the DPICS-III manual to create various composite categories (Eyberg et al., 2010). For this study, composite categories included Parent Inappropriate Behavior, Parent Prosocial Behavior, Parent Total Verbalizations, Child Total Vocalizations, and Percentage of Child Compliance (formulas displayed in Table 4). Thirteen families were coded using DPICS-IV (10.66%), and the rest of the sample was coded using DPICS-III.

Procedure

Sample A. Parents who requested treatment or assessment services for their young child between the ages of 2 and 11 at the AUPSC underwent standard intake procedures for clients in this age range. Before beginning the intake procedure, parents were asked to sign the AUPSC Client Services Agreement, giving permission for de-identified data collected at the beginning

and end of treatment to be used for research purposes. The AUPSC intake procedure includes a semi-structured interview conducted by a graduate student clinician as well as completion of several assessment measures, including the ECBI, the BASC-2 PRS, and a DPICS observation. These intake data along with the demographic information obtained from the client history forms were de-identified and entered into a database by clinic staff. Permission from the AUPSC clinic director and IRB approval was obtained prior to accessing the de-identified, archival data for the current study.

As part of regular clinical practice in the AUPSC, DPICS observations were conducted in a therapy room with a one-way mirror connected to an adjacent observation room. Parents were given a bug-in-the-ear device, which allowed a graduate clinician to provide instructions to the parent from the observation room. The DPICS observation lasted between 20 to 25 minutes, including the standard CLP, PLP, and CU segments (for more information on the DPICS procedure, see Eyberg et al., 2010 and Eyberg et al., 2013). DPICS observations were video recorded so that they could be coded at a later time by trained undergraduate research assistants.

Sample B. Families who were interested in participating in a larger ABO study contacted the research team either by phone or through e-mail. Following IRB consent procedures, trained research assistants met with each family in order to conduct the DPICS observation session, which included the traditional three coding segments (CLP, PLP, and CU) and lasted 20 to 25 minutes. Each observation session was video recorded so that trained undergraduate research assistants could code them at a later point in time. Following the DPICS observation, the primary caregiver also completed measures (Demographics Questionnaire, ECBI, and BASC-2 PRS). Both parent and child received compensation for participation ($20.00 USD and a small toy, respectively). The entire session lasted approximately two hours.

Training of DPICS Coders

Undergraduate research assistants underwent training in order to reach inter-rater reliability on the DPICS-III. Once the DPICS-IV was released, coders were expected to learn this version and reach inter-rater reliability, as only the most updated version of the DPICS was used for coding purposes. Training activities included completion of the DPICS-III/IV Workbook, attendance of weekly coders meetings led by the faculty supervisor and/or graduate students, and completion of homework assignments for additional practice. Training took place over a period of 4 to 6 months although coders continued to attend and code during weekly meetings after they had reached reliability. Weekly meetings involved reviewing quizzes from the workbook, coding practice videos and role-plays, and resolving any questions or discrepancies that arose in coding. In order for training to be considered complete, coders had to reliably code all three standard segments of the DPICS (CLP, PLP, CU) for child and parent codes, demonstrating at least 80% agreement with the faculty supervisor and/or graduate student on two or more occasions.

Coding Procedure

Video recorded DPICS observation segments (CLP, PLP, CU) were randomly assigned to undergraduate research assistants who had reached the reliability standards in coding as described above. These coders were blind to which sample the videos were from and to any research hypotheses. While watching each segment, the coders made tally marks on a coding sheet (see Figure 1) to record each behavior exhibited, consistent with the version of DPICS used at the time of coding (Eyberg, 2010; Eyberg et al., 2014). Parent and child categories were coded separately, requiring each segment to be viewed twice. Approximately one-third of the DPICS segments (32.38%; CLP, PLP, and CU) were randomly selected to be coded by a reliability coder (typically a more advanced coder, graduate student, or faculty advisor). For these select

videos, the two sets of codes were entered into an Excel document in order to compute the percent agreement, with a score of 80% or higher representing good reliability. For the current study, coders demonstrated a mean reliability for parent codes of 87.23% for CLP (*N*=41, *SD*=4.68), 84.96% for PLP (*N*=42, *SD*=4.52), and 85.31% for CU (*N*=37, *SD*=5.56). For child codes, mean reliability for each segment was as follows: 88.73% for CLP (*N*=38, *SD*=5.20), 88.32% for PLP (*N*=40, *SD*=5.58), and 87.03% for CU (*N*=39, *SD*=7.96).

Analyses

All analyses were run using SPSS version 23. In order to ensure independence between observations, only one caregiver from each family was selected for inclusion in the analyses (e.g., when two parents participated in the DPICS). To address the first goal of the study, means and standard deviations were calculated for parent and child DPICS coding categories (Table 3 and 4), separated based on the DPICS segment (CLP, PLP, CU, and Total) and the child's clinical subgroup. In order to minimize the number of analyses run and to decrease the likelihood of a Type 1 error, only total DPICS frequencies were used for all subsequent analyses, not specific segments (e.g., CLP, PLP). In order to test for any group differences, ANCOVAs were run with group membership as the independent variable and selected parent and child coding categories (e.g., Parent Prosocial, Parent Inappropriate Behavior, Parent Total Commands) as the dependent variable. Given that there was a significant difference in age between clinical subgroups, child age was included as a covariate in these analyses. To increase power, only participants who had a DBD, an anxiety disorder, or no clinical diagnosis were represented in the group membership variable. These groups had sufficient sample size and clear clinical relevance for outcomes. In order to control for the use of multiple comparisons, a *p*-value correction was implemented as suggested by Benjamini and Hochberg (1995) for all ANCOVAs. Post hoc

ANCOVAs were run using two subgroups at a time in order investigate any significant group differences found.

Regarding the second purpose, independent samples *t*-tests were run to compare the frequency of parent and child DPICS categories based on the child's gender, using the same *p*-value correction for multiple comparisons (Benjamini & Hochberg, 1995). Pearson *r* correlations were run to determine significant associations between DPICS codes and child age as well as annual family income. For the final purpose, Pearson *r* correlations were run to determine if the frequency of parent and child DPICS categories were related to parent-reported ECBI Intensity and Problem scores as well as the three BASC-2 PRS composite *T*-scores (Externalizing, Internalizing, and Adaptive Skills).

Results

Demographic information for the total sample and each separate sample (A and B) is reported in Table 5. In order to assess for any demographic differences based on sample, *t*-tests and Pearson chi-squares were run between sample type (A or B), on the one hand, and child age, child gender, family ethnicity, family income, and relation of caregiver, on the other. Significant differences were found in the child's age, $t(95.23)=7.25$, $p<.001$, and the distribution of family income between samples, $\chi^2(4, N=87)=13.765$, $p=0.008$. Children in sample A were significantly older ($M=6.73$, $SD=2.09$) than those in Sample B ($M=4.34$, $SD=1.43$). The distribution of family income for families from sample A also tended to be more extreme (more in the highest or lowest income category) compared to those in sample B (more in the middle income categories).

DPICS Codes by Clinical Subgroup

Means and standard deviations for all parent and child DPICS codes were calculated for participants based on the segment (CLP, PLP, CU, and Total) and the subgroup classification.

Results are reported for parent codes in Tables 6-9 and for child codes in Tables 10-13. In order to assess for any demographic differences based on the child's diagnosis, ANOVA and Pearson chi-square analyses were run between child diagnosis (DBD, anxiety, none), on the one hand, and child age, child gender, family ethnicity, family income, and relation of caregiver, on the other. Significant differences were found in the child's age based on clinical diagnosis, $F(2, 85)=14.87$, $p<.001$. Follow up *t*-tests demonstrated that children with anxiety disorders ($M=6.72$, $SD=1.80$) and DBDs ($M=6.45$, $SD=2.23$) were significantly older compared to children without clinical diagnoses ($M=4.34$, $SD=1.45$), $t(52)=5.27$, $p<.001$ and $t(56.38)=4.66$, $p<.001$. No significant differences were found between subgroups for the other demographic variables.

One-way ANCOVAs were run in order to assess for group differences in composite parent and child codes between the DBD, anxiety, and non-clinical groups. Results showed a significant group difference in the frequency of child total vocalizations, $F(2,82)=4.04$, $p<.021$; however, this finding was not significant after accounting for multiple comparisons. Post-hoc analyses demonstrated that children with DBDs ($M=9.67$, $SD=19.34$) and anxiety disorders ($M=5.35$, $SD=11.19$) had more vocalizations during the DPICS compared to children without clinical diagnoses ($M=2.86$, $SD=4.97$), $F(1,66)=6.80$, $p=.011$ and $F(1,52)=4.63$, $p=.036$, respectively. There was also a significant group difference found in the percentage of child compliance in response to parent commands, $F(2,79)=5.67$, $p=.005$, even after correcting for multiple comparisons. Post hoc tests revealed that there were significant differences in child compliance between children with DBDs and both children with anxiety disorders, $F(1,50)=8.93$, $p=.004$, and those without clinical diagnoses, $F(1,62)=4.63$, $p=.035$. Children diagnosed with a DBD demonstrated significantly less compliance during the DPICS ($M=66.11\%$, $SD=25.17$) compared to children diagnosed with an anxiety disorder ($M=84.52\%$, $SD=12.71$) and to those

without clinical diagnoses (*M*=76.99%, *SD*=16.53). However, the difference in compliance between children with DBDs and those without a diagnosis were not significant after accounting for multiple comparisons. No other significant group differences were found (Table 14).

In order to incorporate the entire sample into our analyses, a follow-up stepwise logistic regression was run that investigated which DPICS codes predicted group membership (clinical vs. nonclinical), including children from all clinical groups (e.g., DBD, ASD). For the first step, child age was entered as a predictor given that there were significant differences in age between clinical subgroups. The parent and child DPICS codes were then entered as predictors in the next step. The final model was significant, $\chi^2(11)=55.06$, $p<.001$, and correctly classified 88.6% of the cases. The Cox and Snell and Nagelkerke R^2 indices showed that the predictors accounted for between 38.3 and 54.7 percent of variance of the model. Child age, frequency of child questions, and frequency of child vocalizations (e.g., yell, whine) were the only significant predictors in the model. The results for all predictors are presented in Table 15.

Demographic Differences in DPICS Codes

In order to examine differences in observed parent and child behaviors during the DPICS based on the child's gender, independent samples *t*-tests were run with child gender as the grouping variable and selected DPICS codes as the dependent variable. The results demonstrated a significant difference in the frequency of child questions based on gender, $t(63.39)=-2.62$, $p=.011$. Girls tended to ask more questions during the DPICS (*M*=17.57, *SD*=12.89) compared to boys (*M*= 11.97, *SD*=7.67); however, this difference was no longer significant after controlling for multiple comparisons. Otherwise, there were no significant differences in the frequency of parent or child DPICS codes based on the child's gender. Findings are presented in Table 16.

Additionally, zero-order correlations were run in order to examine the relationship between the child's age and parent and child observed DPICS behavior. The results demonstrated significant inverse associations between the child's age, on the one hand, and parent total commands, $r(114)=-.50$, $p<.001$, parent overall inappropriate behavior, $r(114)=-.41$, $p<.001$, parent overall prosocial behavior, $r(114)=-.50$, $p<.001$, and parent frequency of verbalizations, $r(114)=-.57$, $p<.001$, on the other. Thus, parents whose children were older tended to use fewer verbalizations overall, including their use of commands, inappropriate behavior, and prosocial behavior. For child DPICS codes, the only significant association was found between child age and child frequency of yelling, $r(117)=-.19$, $p=.036$. This relationship demonstrated that older children tended to yell less during the DPICS observation. All results are presented in Table 17. Finally, Pearson correlations were run to assess the relationship between annual family income and the frequency of parent and child DPICS codes; however, none of the associations were significant (Table 18).

Convergent Validity of the DPICS

In order to investigate the association between DPICS codes and parent-report measures of child functioning, Pearson correlations were run between parent composite DPICS codes, child DPICS codes, and parents' ECBI and BASC-2 PRS scores. There were no significant correlations between parent DPICS codes and parent-report measures of child functioning (e.g., ECBI and BASC-2; Table 19). By contrast, there were several significant associations between child DPICS codes and parents' reports on the ECBI and the BASC-2 (Table 20). In particular, children with higher ECBI intensity and problem scores as well as higher BASC-2 externalizing *T*-scores tended to use more negative talk, whine more, ask fewer questions, and display less compliance throughout the DPICS. In addition, children with higher BASC-2 adaptive *T*-scores

used more commands, questions, and prosocial talk during the DPICS. There were no significant associations found between child DPICS codes and BASC-2 internalizing *T*-scores.

Discussion

Despite the increasing popularity and research devoted to PCIT, the treatment for which the DPICS was developed, the ABO measure has received less attention, evaluation, and clinical use, comparatively. The purpose of the current study was to fill this gap by providing updated psychometric information on the DPICS in order to make it more relevant and interpretable in clinical settings. As such, it is one of the few studies to provide normative data for updated editions of the DPICS and is the only study to use the abridged version of the DPICS (Eyberg et al., 2013). Additionally, the sample of children in this study had a wider age range (2 to 11) compared to previous studies and included more clinical diagnoses, expanding the population with which the DPICS can be used (Bessmer, 1998; Foote, 2000). Finally, the study is one of the first to compare the DPICS and the BASC-2 PRS, which is a commonly used parent-report measure in clinical practice (Kamphaus et al., 2007). Overall, the findings provide additional information about diagnostic and demographic differences in the DPICS as well as demonstrate convergent validity between the DPICS and parent-report measures of child functioning.

Group Differences in DPICS Codes

The first aim of the study was to report updated norm-referenced DPICS coding data for children across a wider range of clinical subgroups. Although this descriptive purpose precluded the creation of hypotheses, several comments can be made about the observed frequencies. In our study, several parent and child codes had a low frequency of occurrence during the DPICS, including parent and child negative talk (NTA), parent labeled praise (LP), parent behavior description (BD), child whine (WH), and child yell (YE). By contrast, the most frequent parent

and child codes observed across DPICS segments were parent commands (CM), parent questions (QU), parent neutral talk (TA), and child prosocial (PRO). Across subgroups, parents tended to use more inappropriate behaviors compared to prosocial behaviors. Parents' frequency of certain codes also differed based on the segment. For example, parents tended to use fewer commands during CLP compared to PLP and CU and used fewer questions during CU compared to CLP and PLP. Across subgroups, children tended to display more compliance during CLP compared to PLP and CU, with mean compliance percentages ranging from 65.86% to 88.65% across the segments. Several of these frequency patterns are consistent with results from other studies using various versions of the DPICS (Bessmer, 1998; Eyberg et al., 2013; Foote, 2000; McCabe et al., 2010). These results provide important clinical information for using the DPICS as an assessment measure as they demonstrate typical levels of parent and child behaviors even among children with psychological disorders. Thus, clinicians can be more confident in determining what level of DPICS behaviors may be indicative of problems (Mash & Hunsley, 2005). For example, high levels of negative talk or more child vocalizations during the DPICS may be indicative of child psychopathology given the reported normed levels of these behaviors for non-clinical and clinical groups.

There were some statistically significant differences found in the frequency of child DPICS codes across the DBD, anxiety, and non-clinical subgroups. Consistent with our hypotheses, the results showed that children diagnosed with DBDs were less compliant during the DPICS compared to children with anxiety disorders and children without clinical diagnoses. This finding is consistent with previous research, showing differences in compliance between DBD and non-clinical children (Bessmer, 1998; Foote, 2000; McCabe et al., 2010; Robinson & Eyberg, 1985); however, this study was one of the first to include a sample of children with

anxiety disorders using the DPICS. In looking across all three groups, a trend appears in that anxious children were more compliant than non-clinical, comparison children who were, in turn, more compliant than children with DBDs. Although not all of these differences were statistically significant after accounting for multiple comparisons, this pattern provides important clinical information about the level of compliance associated with each diagnostic subgroup of children. Additionally, consistent with previous literature (Bessmer, 1998; Robinson & Eyberg, 1981), differences were found in the frequency of child vocalizations, such that children with DBDs and anxiety disorders used more vocalizations (i.e., yell and whine) during the DPICS compared to non-clinical children. Despite the correction of multiple comparisons rendering these findings non-significant, it appears that child vocalizations may be an important behavior to assess in identifying child psychopathology. In fact, our follow up analyses demonstrated that child questions and child vocalizations were the only significant predictors when the DPICS parent and child codes were used to classify clinical group membership (clinical vs. nonclinical). These findings are particularly important because child vocalizations and questions are not included in the abridged version of the DPICS-III or IV (Eyberg, 2010; Eyberg et al., 2014). Although the abridged version has greater clinical utility compared to the research version of the DPICS due to the inclusion of fewer codes, it appears that important clinical information may be sacrificed. Further investigation is required to determine which DPICS parent and child codes provide the most relevant data for clinical purposes.

Overall, despite these findings, there were no significant differences in the frequency of parent DPICS codes across the DBD, anxiety, and non-clinical subgroups, which contradicts both our hypotheses and previous literature (Bessmer, 1998; Bjørseth et al., 2015; Foote, 2000; McCabe et al., 2010; Travis, 2015). One possible explanation for this difference is the make-up

of our clinical subgroups compared to previous studies. While past DPICS studies have generally only included children with one diagnosis (e.g., Oppositional Defiant Disorder, ODD; Conduct Disorder, CD) without comorbidity in their clinic-referred sample (e.g., Bessmer, 1998; Foote, 2000), our sample was more representative of clients seen in community mental health clinics (Weisz, Ugueto, Cheron, & Herren, 2013). As such, we included a wider range of diagnoses in our subgroups (e.g., DBD included ODD, CD, & ADHD) and allowed participants to have comorbid diagnoses. Although these decisions were made in order to increase sample size in groups and subsequent power in analyses, these less restrictive group membership requirements may have diluted some of the differences previously observed in parenting behaviors. Still, our findings may be more representative of clients who seek treatment in community mental health clinics, increasing the generalization of findings to broader clinical settings. Another possible reason for the lack of significant differences may be the type of clients served at the clinic used in data collection. Most of the clinic-referred sample in the current study (sample A) included clients who requested treatment or assessment services from a university-based training clinic. As such, there are features of the sample that may be unique and have contributed to our divergent findings. For example, AUPSC did not accept or file insurance for clients, meaning that families seeking services had to pay out of pocket for their sessions. Additionally, clients who were seeking assessment services were included in our study, whereas previous studies only included families seeking treatment (Bessmer, 1998; Foote, 2000). It may be that the families seeking assessment services in our sample were experiencing different problems (e.g., school-related behavior, academic achievement difficulties) compared to those of the families seeking treatment (e.g., parent-child conflict, defiance), which may reflect different etiological processes for child psychopathology and influence parent and child behaviors observed during the DPICS.

Thus, such features of the sample may have influenced our results and should be considered when generalizing the findings to other populations and clinical settings (e.g., private clinics, community mental health, hospitals). Finally, the smaller sample size of the groups and the low base rate of certain codes (e.g., negative talk) may have limited the power of our analyses, preventing the detection of smaller effect sizes.

In conjunction with the above findings that were significant, some additional patterns can be extracted from closer inspection of the DPICS data, which may provide important information about using the DPICS with other clinical subgroups. However, these patterns should be taken with extreme caution as the differences are small and do not reach statistical significance. First, during CLP and CU, parents of children diagnosed with DBDs tended to use more negative talk, whereas parents of children diagnosed with anxiety disorders tended to use fewer commands compared to parents of children in other groups. Second, parents of children diagnosed with ASD tended to use fewer questions, more praise (labeled and unlabeled), and less neutral talk throughout the DPICS, while children with this diagnosis tended to use fewer commands, questions, and prosocial behaviors. These results suggest a reciprocal parent-child interaction pattern whereby children with ASD are less verbally engaging as are their parents during the DPICS, which may reflect the language impairments that can accompany an ASD diagnosis (American Psychiatric Association, 2013). Third, parents of children who had no clinical diagnosis tended to use more commands, ask more questions, use more reflections, use more neutral talk, and engage in more prosocial behavior compared to parents of clinic-referred children. Obviously, these patterns of behavior require further study in order to verify their validity; however, they may reflect differences in parent and child behaviors associated with certain clinical problems as captured by the DPICS.

Demographic Differences in DPICS codes

There was partial support for our second hypothesis regarding the association between certain demographic characteristics (child age, child gender, family income) and the frequency of DPICS codes. In particular, there was a significant association between child age and several parent and child DPICS codes in that parents tended to demonstrate fewer verbal behaviors (i.e., commands, inappropriate behavior, and prosocial behavior) with older children across DPICS segments, which was consistent with our hypotheses. These results suggest that parents may not need to use as many verbal behaviors to engage older children, whereas younger children may require more direction and stimulation. This finding is consistent with suggested practices for adapting PCIT for older children based on what is developmentally appropriate, including lowering mastery criteria for labeled praise, reflections, and behavior descriptions (i.e., needing to use fewer statements compared to interactions with younger children in order to move through treatment) as well as teaching parents to use fewer, yet more complex demands (McNeil & Hembree-Kigin, 2010). Thus, clinicians should interpret a lower frequency of parent verbalizations as developmentally appropriate for older children as opposed to an indication of a lack of engagement on the parents' part. In addition, the findings showed that older children tended to yell less compared to younger children during the DPICS, which is expected given the increases in behavioral and emotional regulation that occur as children develop (Shonkoff & Phillips, 2000). This association offers important information for interpreting child behaviors during the DPICS. For example, an older child who yells frequently may be demonstrating atypical behavior that is indicative of psychological problems given that this behavior is expected to decrease with age. Expanding the age range for the DPICS allows clinicians to better utilize this ABO measure for a wide range of clients; however, this extension requires further

investigation into the appropriateness of the current DPICS procedure with older children as well as replication of the current pattern of observed parent and child behaviors during the DPICS.

By contrast, there was only one significant difference in DPICS codes based on child gender: girls tended to ask more questions during the DPICS compared to boys. This result was no longer significant after accounting for multiple comparisons. Still, such a finding might indicate that girls are more verbally engaged when interacting with their parents compared to boys. This interpretation would be consistent with previous findings that girls are observed to be more engaged in parent-child interactions (Mandara, Murray, Telesford, Varner, & Richman, 2012; Nordahl et al., 2014) and are reported to have higher social competence compared to boys (Kjøbli & Ogden, 2009). Alternatively, it may be that girls are less assertive when interacting with their parents compared to boys, which may be expressed by asking more questions. This interpretation would be consistent with social learning theory, which states that children are socialized to act differently based on gender (Lytton & Romney, 1991). For example, it has been shown that parents differentially reinforce child behaviors based on gender, with girls being encouraged to display dependence and boys encourage to display autonomy (Denham et al., 1991; Huston, 1983). However, given the lack of significance following correction, this finding should be interpreted cautiously and further investigated in future studies. Otherwise, there were no significant differences found in DPICS codes based on the child's gender, indicating that parent and child behaviors did not differ when interacting during the DPICS based on the gender of the child participating. These findings are inconsistent with some previous literature, which suggests that both parents and children behave differently depending on child gender (Leaper et al., 1998; McKee et al., 2007; Miner & Clarke-Stewart, 2008; Nixon, 2002). Rather, the current study's findings provide support for the idea that parents treat their children similarly regardless

of gender and that boys and girls display similar behaviors when interacting with their parents, which is consistent with other research findings (Parent et al., 2011; Robinson & Eyberg, 1981). However, it should be noted that there were fewer girls than boys in our sample, which likely decreased the power of our analyses. As such, although these findings may represent actual trends in parent and child behaviors, they may also be a result of under-powered analyses. Additionally, given that the majority of caregivers were female, we were unable to investigate possible interactions between parent and child gender during the DPICS. It will be important for future studies to expand on these findings.

Finally, contrary to our hypotheses, there were no significant associations between parent and child behaviors during the DPICS and annual family income. This finding is inconsistent with previous literature, which suggests that parents from a lower socioeconomic status (SES) use more hostile and controlling parenting, are less responsive, and display less warmth with their children compared to higher SES parents (Bornstein, Hahn, Sulwalsky, & Haynes, 2003; Bradley et al., 2001; Dodge, Pettit, & Bates, 1994). Additionally, one previous study involving the DPICS demonstrated that parents from a higher SES use more prosocial behaviors compared to lower SES parents, which is contrary to our findings (Callahan & Eyberg, 2010). One possible explanation for the current results may be the use of annual family income as an indicator of SES compared to other measures (e.g., education, vocation, composite measures). In particular, Callahan and Eyberg (2010) used the Hollingshead Four-Factor Index of Social Status (HI) as a composite measure of SES, which incorporated education and occupation but not annual income. As such, annual family income may be only one factor that contributes to SES. Based on our findings, it appears that parents and children interact in a similar manner regardless of the family's annual income, which is relevant clinical information in understanding how to interpret

the DPICS. Thus, clinicians may be more confident that differences observed in parent and child behaviors during the DPICS are due to factors, such as child age or the presence of psychopathology, as opposed to family income.

Convergent Validity of the DPICS

The final purpose of the study was to provide convergent validity for the DPICS by investigating the association between parent and child codes and parent-report measures of child functioning using the ECBI and the BASC-2, PRS. Consistent with our hypotheses, there were significant associations between several DPICS child codes and parent-report measures. In particular, children who tended to use more negative talk, more commands, and more whining had higher ECBI intensity scores, ECBI problem scores, and BASC-2 externalizing *T*-scores. In addition, children who asked more questions and were more compliant during the DPICS had lower ratings of behavior problems on these three scores. Finally, children who used more commands and prosocial behavior, who asked more questions, and who demonstrated more compliance had higher *T*-scores on the BASC-2 Adaptive skills subscale. There were no significant associations found between the DPICS child codes and the BASC-2 Internalizing scale. These findings are consistent with previous studies investigating the association between child behavior during the DPICS and the ECBI (Bessmer, 1998; Foote, 2000). Given that no prior study has investigated the DPICS and the BASC-2, our study is the first to demonstrate that child behaviors observed during the DPICS are associated with parents' reports of their child's externalizing and adaptive behavior, but not internalizing behavior, on the BASC-2, PRS. These findings support the convergent validity of the child behaviors coded in the DPICS as they appear to be related to parent reports of child behaviors. Additionally, it appears that certain behaviors may be considered more positive (e.g., questions, compliance, prosocial) as they were

related to fewer externalizing problems and greater adaptiveness, whereas other behaviors may be more negative (e.g., noncompliance, negative talk, whining). These patterns provide insight for clinicians in determining which child behaviors may be indicative of child psychopathology.

Contrary to our hypotheses, there were no significant associations between any of the parent-reported ratings of child behavior (ECBI intensity and problem, BASC-2 externalizing, internalizing, and adaptive skills) and DPICS parent codes. This finding is inconsistent with previous research on the DPICS, which has demonstrated relationships between ECBI intensity scores and parent commands, parent inappropriate behavior, and parent prosocial behavior (Bessmer, 1998; Foote, 2000). One possible explanation for these findings is the inclusion of a wider range of diagnoses in our analyses compared to previous studies, which only included children with DBDs and non-clinical children (Bessmer, 1998; Foote, 2000). In order to test this possibility, analyses were re-run including only these two groups; however, there were still no significant associations found between parent-report measures and parent DPICS codes. Other possible explanations for our findings may be generational differences in how parents interact with their children, given that previous DPICS studies are over a decade old (Bessmer, 1998; Foote, 2000), and differences in study methodology (e.g., intake procedure for diagnosis, the use of one vs. two DPICS observations at pre-treatment assessment).

Taken together, these results suggest that child behavior during the DPICS may be more representative of parent-rated behavior problems compared to parent behaviors. Although certain parenting behaviors are believed to be associated with the development of child psychopathology (e.g., American Psychiatric Association, 2013; McLeod et al., 2007; Patterson, 1982), our sample and results suggest that child behavior during the DPICS may be more indicative of the presence and severity of child pathology. By contrast, parent codes may be more relevant for treatment

purposes in highlighting behaviors that need to be modified (e.g., type of commands used, amount of praise given). These findings have important clinical implications given that compliance/noncompliance to parent commands is the only child behavior coded in the abridged version of the DPICS-III and IV (Eyberg, 2010; Eyberg et al., 2014). It might be beneficial for clinicians and researchers to include additional child codes, such as commands, questions, and vocalizations, when using the DPICS for assessment purposes, given their association with parent-reported externalizing problems and adaptive functioning. These codes may provide clinicians with observational data of the child's current functioning that can be used for diagnostic purposes. Thus, future revisions of the DPICS may need to balance the amount of codes included, taking both clinical utility and diagnostic relevance into consideration. Additionally, these findings provide information about the types of child behaviors that the DPICS captures. It is important to note that parent-reported child internalizing problems were not related to parent or child DPICS codes, suggesting that other measures may be needed to assess child internalizing problems.

Limitations and Future Directions

The current study had some limitations. First, data for sample A were collected across several years (2007-2016) as a part of standard clinic procedure. As a result, there were times during which measures relevant to the current study were not used (e.g., ECBI, BASC-2, PRS) due to changes in clinic procedure. Consequently, different participants may have been included in different analyses depending on whether they had responses for the necessary variables. The decision to include participants who did not have data for all measures (e.g., family income, ECBI, BASC-2) was made in order to increase the sample size and power of the analyses; however, findings should be considered within this context. In addition, the lengthy period of

data collection may have influenced DPICS coding, as different cohorts of individuals coded observations and slight changes in DPICS codes occurred across time. However, it may also be argued that the inclusion of different coders over time protected against coder drift by balancing out potential coding biases. The DPICS-IV was also released during data collection. In order to maintain up-to-date coding procedures for clinical purposes, coders at the time were trained on DPICS-IV and used this edition to code subsequent observations, meaning more recent observations were coded using the fourth edition. However, given the minor differences between the third and fourth edition (Eyberg et al., 2013) and the small number of families coded using DPICS-IV (10.66%), the impact on DPICS codes and our findings should be minimal.

Second, despite additional recruitment efforts, the sample size for certain clinical groups was small, particularly for children diagnosed with ASD and anxiety disorders. As such, the normative data presented in the current study should be interpreted with caution as only a small sample of individuals were represented in each subgroup. The "other" clinical subgroup also offered limited clinically relevant information as there was a wide range of diagnoses within this group. As a result, only certain groups (DBD, anxiety, and nonclinical) were included in analyses investigating difference in DPICS codes, limiting the clinical utility of the findings. Third, there was a significant age difference across diagnostic groups, which may have influenced the behaviors observed during the DPICS. However, this difference was controlled for in the analyses comparing clinical subgroups, suggesting that findings are not due to this age difference. Finally, our clinic-referred sample was somewhat unique compared to populations found in other clinical settings (e.g., hospital-based clinics, private practice, community mental health clinics). The setting used in data collection was a university-based, training clinic with some unique requirements. For example, the clinic did not accept insurance, meaning that

families had to be able to pay the fees out-of-pocket. Additionally, the clinic often referred out more severe clients who required greater supervision and coverage, limiting the range of severity in clients included in the sample. Such features limit the generalizability of our current findings.

Despite these limitations, the findings from this study make important contributions to the existing literature on the DPICS and provide implications for future research. First, studies should provide normative data using the DPICS-IV as this version is the most up-to-date. Also, published normative data should include a wide range of clinical diagnoses, including DBDs, anxiety disorders, and ASD. It will be important to understand how parent and child behaviors differ during observations based on diagnosis, particularly given the expansion of PCIT, and consequently the DPICS, to new clinical populations (e.g., Masse, McNeil, Wagner, & Quetsch, 2016; Puliafico, Comer, & Pincus, 2012). This information will allow clinicians to better interpret the data obtained from the DPICS and to draw conclusions about areas of functioning that may be problematic. Additionally, the use of DPICS with children with co-morbid diagnoses should be investigated as this information would increase the clinical utility of the DPICS for certain clinical settings, such as community mental health centers (Weisz et al., 2013).

Second, future studies should compare different coding methods used in the DPICS. For example, previous research studies involving the DPICS tended to code observations using a second-by-second method (Deskin, 2005), whereas clinicians often code DPICS within the context of PCIT in real-time (Eyberg & Funderburk, 2011). It might be important to understand what differences in information gathering are found depending on the coding methods. For example, coding may be more difficult for certain categories that are more involved (e.g., commands, compliance), which may influence the information gained when “live-coding” with the DPICS. In addition, future studies should investigate the appropriateness of using the DPICS

to assess older children given the suggested adaptation for using PCIT with older children (McNeil & Hembree-Kigin, 2010). Certain aspects of the DPICS procedure (e.g., segment length, toys used) may need to be adjusted in order to ensure that the ABO is developmentally appropriate. Finally, given the importance of child codes demonstrated in our findings, it will be important for future studies to re-examine the most clinically useful codes for consideration in the abridged version of the DPICS, balancing clinical utility and diagnostic relevance.

Conclusion

The current study provides updated normative information and psychometric data for the third and fourth edition of the DPICS. It is one of the first studies to use the abridged version of the DPICS, giving greater clinical utility to the findings. In addition, a wider range of ages and clinical problems were included in the sample, expanding the population with which to use the DPICS. The results also demonstrate validity for use of the child DPICS codes as they were found to relate to the child's age, gender, and clinical diagnosis as well as to parent-reported measures of child functioning. Current studies using the DPICS often fail to include child codes in their analyses (Callahan & Eyberg, 2010), and only one child behavior is included in the abridged DPICS manual (Eyberg, 2010; Eyberg et al., 2014). As such, our findings demonstrate the importance of including child codes when using the DPICS as they appear to provide greater diagnostic information. Overall, these findings should allow clinicians to better interpret parent and child behaviors observed during the DPICS, increasing the clinical utility, generalizability, and clinical relevance of the DPICS codes.

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Table 1

Parent DPICS Coding Categories included in the DPICS-II, DPICS-III, Abridged DPICS-III/IV, and DPICS-IV

DPICS-II	**DPICS-III**	**Abridged DPICS-III/IV**	**DPICS-IV**
Acknowledgement	*Neutral Talk*	Neutral Talk	Neutral Talk
Answer	**Answer**		
Behavior Description	Behavior Description	Behavior Description	Behavior Description
Compliance	**Compliance**		
Contingent Labeled Praise			
Criticism			
Descriptive/Reflective Questions	Descriptive/Reflective Questions	*Questions*	Descriptive Questions
Destructive			
Direct Command	Direct Command	Direct Command	Direct Command
Indirect Command	Indirect Command	Indirect Command	Indirect Command
Information Question	Information Question		Information Question
Labeled Praise	Labeled Praise	Labeled Praise	Labeled Praise
Laugh			
No Answer	**No Answer**		
No Opportunity for Answer	**No Opportunity for Answer**		
No Opportunity for Compliance	**No Opportunity for Compliance**		
Noncompliance	**Noncompliance**		
Physical Negative	Negative Touch		Negative Touch
Physical Positive	Positive Touch		Positive Touch
Play Talk	**Play Talk**		
Reflective Statements	Reflection	Reflection	Reflection
Smart Talk	*Negative Talk*	Negative Talk	Negative Talk
Unlabeled Praise	Unlabeled Praise	Unlabeled Praise	Unlabeled Praise
Yell	**Yell**		
Whine	**Whine**		
Warning			

Note. **Bold**=Supplemental coding category. *Italics*=New coding category compared to the previous edition.

Table 2

Child DPICS Coding Categories included in the DPICS-II, DPICS-III, Abridged DPICS-III/IV, and DPICS-IV

DPICS-II	**DPICS-III**	**Abridged DPICS-III/IV**	**DPICS-IV**
Acknowledgement			
Answer			Answer
Behavioral Description			
Compliance	Compliance	Compliance	Compliance
Criticism			
Descriptive/Reflective Questions	*Question*		Question
Destructive			
Direct Command	*Command*		Command
Indirect Command			
Information Question			
Labeled Praise	*Prosocial Talk*		Prosocial Talk
Laugh	**Laugh**		
No Answer	No Answer		No Answer
No Opportunity for Answer	No Opportunity for Answer		No Opportunity for Answer
No Opportunity for Compliance	No Opportunity for Compliance	No Opportunity for Compliance	No Opportunity for Compliance
Noncompliance	Noncompliance	Noncompliance	Noncompliance
Physical Negative	Negative Tough		
Physical Positive	Positive Touch		
Play Talk	**Play Talk**		
Reflective Statements			
Smart Talk	*Negative Talk*		Negative Talk
Unlabeled Praise			
Yell	Yell		Yell
Whine	Whine		Whine

Note. **Bold**=Supplemental coding category. *Italics*=New coding category compared to the previous edition.

Table 3

Parent and Child Behaviors and Respective DPICS Codes included in the Current Study

Parent Behavior (Code)	**Child Behavior (Code)**
Negative Talk (NTA)	Compliance (CO)
Command (CM)	Noncompliance (NC)
Labeled Praise (LP)	No Opportunity for Compliance (NOC)
Unlabeled Praise (UP)	Negative Talk (C_NTA)
Behavior Description (BD)	Commands (C_CM)
Reflection (RF)	Questions (C_Q)
Question (Q)	Prosocial (PRO)
Neutral Talk (TA)	Yell (YE)
	Whine (WH)

Table 4

DPICS Parent and Child Composite Coding Categories and Formulas

Composite Category	**Formula**
Parent Inappropriate Behaviors	$Q_P + NTA_P$
Parent Prosocial Behaviors	$BD_P + RF_P + UP_P + LP_P$
Parent Total Verbalizations	$BD_P + RF_P + UP_P + LP_P + Q_P + NTA_P + CM_P + TA_P$
Child Percentage Compliance	$CO_C \div [CM_P - NOC_C]$
Child Total Vocalizations	$WH_C + YE_C$

Note. The subscripts $_C$ and $_P$ denote child and parent coding categories, respectively. Adapted from the *Manual for the Dyadic Parent-Child Interaction Coding System (3rd Ed.)* by S. M. Eyberg, M. M. Nelson, M. Duke, & S. R. Boggs, 2010, p. 249-250. Copyright 2004 by Sheila Eyberg.

Table 5

Demographic characteristics across the total sample and two subsamples

	Total Sample (*N*=122)			**Sample A** (*N*=86)			**Sample B** (*N*=36)		
	M/SD	*N*	*%*	*M/SD*	*N*	*%*	*M/SD*	*N*	*%*
Family Relation									
Mother		107	87.7		73	84.9		34	94.4
Father		10	8.2		8	9.3		2	5.6
Other		4	3.3		4	4.7		0	0
Missing		1	0.8		1	1.2		0	0
Child Age*	6.01/2.20			6.73/2.09			4.34/1.43		
Child Gender									
Male		74	60.7		56	65.1		18	50.0
Female		46	37.7		28	32.6		18	50.0
Missing		2	1.6		2	2.3		0	0
Ethnicity									
Caucasian		103	84.4		75	87.2		28	77.8
African American		9	7.4		5	5.8		4	11.1
Hispanic		2	1.6		1	1.2		1	2.8
Asian		1	0.8		0	0		1	2.8
Multi-racial		3	2.5		2	2.3		1	2.8
Other		2	1.6		1	1.2		1	2.8
Missing		2	1.6		2	2.3		0	0
Family Annual Income*									
< $25,000		17	13.9		14	16.3		3	8.3
$25,000-$49,999		23	18.9		16	18.6		7	19.4
$50,000-$74,999		20	16.4		7	8.1		13	36.1
$75,000-$100,000		11	9.0		4	4.7		7	19.4
>$100,000		16	13.1		12	14.0		4	11.1
Missing		35	28.7		33	38.4		2	5.6

Note: *=significant difference between the two samples

Table 6

Means and standard deviations for parent DPICS codes in CLP based on subgroup classification

	Disruptive Behavior Disorders (*N*=33)		**Anxiety Disorders** (*N*=18)		**Autism Spectrum Disorder** (*N*=10)		**Other Clinical Diagnoses** (*N*=24)		**Community Sample (No Diagnosis)** (*N*=33)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
NTA	1.24	3.48	0.50	0.99	0.60	0.70	0.38	0.71	0.88	1.39
CM	4.88	4.99	5.50	3.26	3.90	3.57	2.67	3.06	5.24	3.91
LP	0.21	0.55	0.44	0.71	0.00	0.00	0.13	0.34	0.33	0.65
UP	1.48	2.14	2.06	2.10	1.70	1.89	1.13	1.73	2.45	2.65
Q	18.70	10.70	16.44	7.31	15.80	6.23	17.29	8.62	17.88	8.53
RF	1.48	2.02	1.11	1.18	1.60	1.96	1.46	2.15	2.48	1.68
BD	0.27	0.63	0.11	0.32	0.30	0.68	0.13	0.34	0.06	0.24
TA	26.12	13.44	27.94	10.34	22.30	10.02	24.04	9.54	28.79	11.40
Inapp	19.94	11.93	16.94	7.76	16.40	6.19	17.67	8.73	18.76	8.66
Pro	3.45	3.45	3.72	2.74	3.60	3.17	2.83	3.80	5.33	3.97
Total	54.39	26.49	54.11	17.75	46.20	12.53	47.21	18.21	58.12	19.50

Table 7

Means and standard deviations for parent DPICS codes in PLP based on subgroup classification

	Disruptive Behavior Disorders (*N*=34)		**Anxiety Disorders** (*N*=19)		**Autism Spectrum Disorder** (*N*=10)		**Other Clinical Diagnoses** (*N*=24)		**Community Sample (No Diagnosis)** (*N*=35)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
NTA	2.91	4.27	1.95	1.84	3.60	3.57	1.96	4.25	1.51	2.55
CM	14.88	10.60	11.63	6.39	20.60	11.81	15.13	12.07	17.86	10.23
LP	0.41	0.74	0.26	0.56	0.50	0.97	0.46	0.83	0.29	0.62
UP	2.29	3.07	2.21	2.10	3.50	2.95	2.00	3.35	3.23	2.77
Q	14.50	8.73	14.79	11.51	14.70	6.43	13.13	8.17	17.74	8.99
RF	1.32	1.93	1.68	1.83	0.90	1.10	1.71	2.12	1.71	1.69
BD	0.44	0.89	0.05	0.23	0.00	0.00	0.17	0.48	0.97	3.75
TA	30.50	16.30	31.26	12.62	33.70	6.21	30.12	13.29	34.40	10.16
Inapp	17.41	9.84	16.74	11.53	18.30	6.02	15.08	8.36	19.26	9.44
Pro	4.47	4.53	4.21	3.41	4.90	3.93	4.33	5.09	6.20	5.12
Total	67.26	29.38	63.84	21.88	77.50	15.05	64.67	24.48	77.71	20.01

Table 8

Means and standard deviations for parent DPICS codes in CU based on subgroup classification

	Disruptive Behavior Disorders (*N*=34)		**Anxiety Disorders** (*N*=19)		**Autism Spectrum Disorder** (*N*=10)		**Other Clinical Diagnoses** (*N*=24)		**Community Sample (No Diagnosis)** (*N*=34)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
NTA	3.03	4.01	1.11	1.73	1.60	3.06	1.92	2.17	1.62	2.13
CM	18.88	15.63	12.74	7.65	19.10	11.52	12.33	7.94	19.74	11.90
LP	0.56	1.08	0.26	0.56	1.70	2.79	0.58	1.10	0.41	0.70
UP	2.97	4.12	3.05	2.99	4.70	3.43	3.67	3.40	4.44	3.50
Q	7.65	7.15	9.05	6.30	5.40	3.89	5.00	3.23	10.88	9.99
RF	0.71	1.17	0.37	0.60	0.10	0.32	0.63	0.97	0.91	1.16
BD	0.15	0.44	0.11	0.32	0.00	0.00	0.08	0.41	0.09	0.29
TA	24.47	14.47	29.84	17.84	20.00	16.62	25.21	18.17	33.47	10.23
Inapp	10.68	8.72	10.16	6.80	7.00	5.27	6.92	4.07	12.32	10.47
Pro	4.38	5.36	3.79	3.29	6.50	5.56	4.96	4.67	5.85	4.10
Total	58.41	33.98	56.53	27.57	52.6	28.43	49.42	26.54	71.38	25.10

Table 9

Means and standard deviations for parent DPICS codes across all three segments based on subgroup classification

	Disruptive Behavior Disorders (*N*=33)		**Anxiety Disorders** (*N*=18)		**Autism Spectrum Disorder** (*N*=10)		**Other Clinical Diagnoses** (*N*=24)		**Community Sample (No Diagnosis)** (*N*=32)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
NTA	7.36	8.99	3.67	3.55	5.80	6.46	4.25	5.38	4.25	4.76
CM	39.39	25.81	29.61	12.04	43.60	23.86	30.125	18.30	44.16	21.12
LP	1.21	1.88	0.94	1.26	2.20	2.82	1.17	1.88	1.06	1.37
UP	6.91	7.00	6.67	4.80	9.90	7.03	6.79	6.52	9.59	6.52
Q	41.39	22..72	40.44	20.02	35.90	12.40	35.42	15.55	46.88	25.57
RF	3.58	4.38	3.28	2.87	2.60	2.59	3.79	4.05	5.06	3.49
BD	0.88	1.43	0.28	0.46	0.30	0.67	0.38	0.77	1.13	3.90
TA	82.30	36.37	88.72	31.17	76.00	20.75	79.38	31.15	96.41	24.93
Inapp	48.76	24.87	44.11	20.15	41.70	12.91	39.67	16.15	51.13	24.97
Pro	12.58	11.17	11.17	7.19	15.00	10.66	12.13	10.99	16.84	9.47
Total	183.03	78.61	173.61	56.87	176.30	47.08	161.29	56.11	208.53	55.12

Table 10

Means and standard deviations for child DPICS codes in CLP based on subgroup classification

	Disruptive Behavior Disorders (*N*=33)		**Anxiety Disorders** (*N*=18)		**Autism Spectrum Disorder** (*N*=10)		**Other Clinical Diagnoses** (*N*=24)		**Community Sample (No Diagnosis)** (*N*=35)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
NOC	3.15	3.50	3.50	2.53	2.60	3.37	1.63	1.95	3.21	2.90
CO	1.30	2.07	1.72	1.41	0.90	0.74	0.96	1.46	1.79	1.50
NC	0.42	0.87	0.28	0.46	0.40	0.70	0.12	0.34	0.24	0.50
% CO	77.17*	33.16	86.92*	18.28	76.19*	30.21	83.33*	32.57	88.27*	24.60
C_NTA	0.73	1.44	0.50	1.20	1.60	4.06	0.75	2.66	0.94	2.34
C_CM	3.12	4.39	4.61	4.37	1.30	2.36	2.58	2.81	4.89	4.84
C_QU	3.24	2.68	4.74	3.38	0.80	1.23	3.54	2.57	5.63	3.61
PRO	34.73	36.35	32.78	12.08	22.10	10.18	30.79	13.22	34.57	13.50
YE	0.30	0.81	3.06	11.51	0.60	1.27	0.04	0.20	0.26	0.61
WH	0.15	0.44	0.28	0.83	0.00	0.00	0.04	0.20	0.09	0.37
Total Voc	0.45	0.87	3.33	11.46	0.60	1.26	0.083	0.28	0.34	0.68

Note: *=different sample size for particular DPICS code.

Table 11

Means and standard deviations for child DPICS codes in PLP based on subgroup classification

	Disruptive Behavior Disorders (*N*=34)		**Anxiety Disorders** (*N*=19)		**Autism Spectrum Disorder** (*N*=10)		**Other Clinical Diagnoses** (*N*=24)		**Community Sample (No Diagnosis)** (*N*=35)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
NOC	7.24	6.50	5.16	3.61	11.50	7.26	8.08	7.76	8.57	6.19
CO	4.79	4.26	4.95	3.47	5.90	5.59	4.67	3.92	7.20	5.39
NC	2.85	3.47	1.53	3.51	3.20	3.29	2.33	3.63	2.09	2.83
% CO	65.86*	29.00	87.07	19.49	67.59	26.79	69.74*	28.83	78.25*	21.35
C_NTA	2.06	2.77	1.32	2.08	2.50	2.84	1.92	4.15	1.77	2.97
C_CM	4.12	4.90	3.42	3.49	3.10	4.95	2.71	2.31	3.40	2.85
C_QU	3.76	2.86	4.68	5.13	1.90	2.03	3.25	2.97	5.74	3.67
PRO	25.15	14.95	31.47	13.38	23.60	15.93	29.33	14.94	31.54	11.60
YE	1.06	2.31	0.79	2.57	0.40	0.97	0.08	0.28	0.66	2.26
WH	1.88	4.62	0.79	1.51	0.30	0.95	1.67	4.72	0.11	0.40
Total Voc	2.94	5.66	1.58	2.76	0.70	1.89	1.75	4.70	0.77	2.30

Note: *=different sample size for particular DPICS code.

Table 12

Means and standard deviations for child DPICS codes in CU based on subgroup classification

	Disruptive Behavior Disorders (*N*=34)		**Anxiety Disorders** (*N*=19)		**Autism Spectrum Disorder** (*N*=10)		**Other Clinical Diagnoses** (*N*=24)		**Community Sample (No Diagnosis)** (*N*=32)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
NOC	8.76	10.79	5.95	4.02	7.90	7.55	4.88	4.92	8.94	8.25
CO	6.21	5.31	5.95	3.98	8.20	5.25	4.67	3.06	8.03	5.50
NC	3.91	4.83	0.84	1.12	3.00	3.62	2.79	3.12	3.03	3.87
% CO	66.50	30.11	88.65	15.13	75.83	25.63	68.95	29.09	73.99	21.12
C_NTA	2.06	3.43	0.53	1.02	1.00	1.41	1.46	2.81	2.20	4.09
C_CM	3.32	5.17	2.11	3.10	0.70	1.06	2.42	3.53	2.69	3.50
C_QU	5.74	6.68	6.79	6.21	1.70	1.77	4.67	4.95	7.00	5.12
PRO	16.00	11.07	22.84	8.90	7.50	3.92	16.08	8.24	22.91	11.85
YE	1.56	4.20	0.21	0.92	0.50	1.08	0.46	0.98	0.51	1.58
WH	4.44	11.66	0.74	1.05	1.00	1.49	1.58	2.65	1.23	2.38
Total Voc	6.00	13.65	0.95	1.27	1.50	1.90	2.04	3.22	1.74	3.27

Table 13

Means and standard deviations for child DPICS codes across all three segments based on subgroup classification

	Disruptive Behavior Disorders (*N*=33)		**Anxiety Disorders** (*N*=18)		**Autism Spectrum Disorder** (*N*=10)		**Other Clinical Diagnoses** (*N*=24)		**Community Sample (No Diagnosis)** (*N*=35)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
NOC	19.52	17.57	14.39	7.42	22.00	15.73	14.58	11.74	21.66	13.45
CO	12.55	9.06	12.44	5.93	15.00	10.77	5.66	5.66	17.19	9.74
NC	7.33	7.16	2.78	3.56	6.60	6.67	5.52	5.52	5.59	6.08
% CO	66.11	25.17	84.52	12.71	72.89	23.56	69.42	23.46	76.99*	16.63
C_NTA	4.97	6.13	2.33	3.34	5.10	7.09	4.13	6.70	4.91	7.55
C_CM	10.79	12.73	10.28	8.13	5.10	7.40	7.71	6.88	10.97	7.72
C_QU	12.97	9.50	16.28	12.69	4.40	3.72	11.46	7.96	18.37	9.75
PRO	77.06	49.24	81.61	29.00	53.20	25.59	76.21	30.51	89.03	29.65
YE	3.00	6.28	4.11	11.60	1.50	3.17	0.58	1.35	1.43	4.06
WH	6.67	16.23	1.78	2.13	1.30	1.57	3.29	6.26	1.43	2.44
Total Voc	9.67	19.34	5.89	11.70	2.80	4.08	3.88	6.52	2.86	4.97

Note: *=different sample size for particular DPICS code.

Table 14

ANCOVA results for group differences in parent and child DPICS codes accounting for child age

	df	*F*	*p*
Parent Commands	82	1.66	.20
Parent Inappropriate Behavior	82	0.94	.40
Parent Prosocial	82	0.14	.87
Child % Compliance	82	5.67	*.005***
Child NTA	85	1.09	.34
Child CM	85	0.013	.99
Child QU	85	2.36	.10
Child Pro	85	1.19	.31
Child YE	85	3.86	.025*
Child WH	85	2.77	.069
Child Vocalizations	85	4.04	.021*

Note: *=significance at p<.05, **=significance at p<.01. *Italics*=statistically significant after controlling for multiple comparisons

Table 15

Binary logistic regression results for the parent and child DPICS codes predicting clinical vs. non-clinical group membership

Predictor	*B(SE)*	*Wald*	*p*	*Exp(B)*
Child Age	-.97(.24)	16.61	.000*	.38
Parent Commands	-.008(.021)	.16	.69	.99
Parent Inappropriate Behavior	-.010(.023)	.20	.66	.99
Parent Prosocial	-.014(.036)	.16	.69	.99
Parent Total Vocalizations	.002(.011)	.029	.87	1.00
Child % Compliance	.015(.021)	.52	.47	1.02
Child NTA	.066(.063)	1.10	.29	1.07
Child CM	-.010(.041)	0.066	.80	.99
Child QU	.092(.037)	6.09	.014*	1.10
Child Pro	.013(.010)	1.80	.18	1.01
Child Vocalizations	-.109(.049)	4.99	.026*	.90
Constant	1.72(2.51)	.468	.49	5.85

Note: *=significance at $p<.05$

Table 16

Results from independent samples t-tests comparing parent and child DPICS codes based on gender

		N	*M*	*SD*	*t*	*df*	*p*
Parent CM	*Males*	72	36.81	21.04	-0.64	113	.52
	Females	43	39.51	23.37			
Parent Inapp.	*Males*	72	46.90	23.78	0.240	113	.81
	Females	43	45.88	18.59			
Parent Pro	*Males*	72	13.44	8.50	-0.57	65.66*	.57
	Females	43	14.56	12.45			
Percent Child Compliance	*Males*	72	73.13	21.82	-0.166	113	.87
	Females	43	73.82	21.70			
Child NTA	*Males*	74	4.70	6.76	0.99	116	.32
	Females	44	3.52	5.26			
Child CM	*Males*	74	8.74	8.37	-1.47	116	.14
	Females	44	11.36	10.79			
Child QU	*Males*	74	11.97	7.67	-2.62	63.39*	.011**
	Females	44	17.57	12.89			
Child PRO	*Males*	74	78.00	39.01	-0.52	116	.60
	Females	44	81.68	33.03			
Child YE	*Males*	74	1.85	4.30	-0.55	116	.58
	Females	44	2.50	8.41			
Child WH	*Males*	74	2.19	3.35	-1.70	45.73*	.186
	Females	44	5.18	14.57			
Child Vocalizations	*Males*	74	4.05	0.72	-1.29	49.10*	.20
	Females	44	7.68	2.72			

Note: *=Variances were found to be significantly different. Test results in which equal variances were not assumed is reported. **=significance at $p<.05$.

Table 17

Correlations between parent and child DPICS codes and child age

	Child Age	**P_CM**	**P_Inapp**	**P_Pro**	**P_Verb**	**% Comp**	**C_NTA**	**C_CM**	**C_QU**	**C_PRO**	**C_YE**	**C_WH**
Child Age	1	-	-	-	-	-	-	-	-	-	-	-
P_CM	-.50**	1	-	-	-	-	-	-	-	-	-	-
P_Inapp	-.41**	.32**	1	-	-	-	-	-	-	-	-	-
P_Pro	-.50**	.40**	.50**	1	-	-	-	-	-	-	-	-
P_Verb	-.57**	.70**	.74**	.66**	1	-	-	-	-	-	-	-
% Comp	-.004	-.213*	-.080	.097	-.015	1						
C_NTA	-.075	.20*	.12	.011	.12	-.35**	1	-	-	-	-	-
C_CM	-.079	.14	.042	-.021	.17	-.14	.33**	1	-	-	-	-
C_QU	-.055	.023	-.12	-.19*	.049	.058	-.085	.31**	1	-	-	-
C_PRO	.016	-.009	.26**	-.009	.17	-.053	.39**	.38**	.31**	1	-	-
C_YE	-.19*	.14	.18	.016	.15	-.22*	.085	.26**	.17	-.050	1	-
C_WH	-.022	.18	-.035	-.11	-.008	-.38**	.19*	.097	.20*	.038	.19*	1

Note: *=p<.05, **=p<.01

Table 18

Correlations between parent and child DPICS codes and annual family income

	Family Income	**P_CM**	**P_Inapp**	**P_Pro**	**P_Verb**	**% Comp**	**C_NTA**	**C_CM**	**C_QU**	**C_PRO**	**C_YE**	**C_WH**
Family Income	1	-	-	-	-	-	-	-	-	-	-	-
P_CM	-.096	1	-	-	-	-	-	-	-	-	-	-
P_Inapp	.040	.32**	1	-	-	-	-	-	-	-	-	-
P_Pro	.18	.40**	.50**	1	-	-	-	-	-	-	-	-
P_Verb	.056	.70**	.74**	.66**	1	-	-	-	-	-	-	-
% Comp	.078	-.213*	-.080	.097	-.015	1						
C_NTA	.11	.20*	.12	.011	.12	-.35**	1	-	-	-	-	-
C_CM	-.16	.14	.042	-.021	.17	-.14	.33**	1	-	-	-	-
C_QU	-.15	.023	-.12	-.19*	.049	.058	-.085	.31**	1	-	-	-
C_PRO	.038	-.009	.26**	-.009	.17	-.053	.39**	.38**	.31**	1	-	-
C_YE	-.19	.14	.18	.016	.15	-.22*	.085	.26**	.17	-.050	1	-
C_WH	-.054	.18	-.035	-.11	-.008	-.38**	.19*	.097	.20*	.038	.19*	1

Note: *=p<.05, **=p<.01

Table 19

Correlations between parent DPICS codes and parent-report measures of child functioning

	Par_CM	**Par_Inapp**	**Par_Pro**	**Par_Verb**	**ECBI Intensity**	**ECBI Problem**	**BASC Externalizing**	**BASC Internalizing**	**BASC Adaptive**
Par_CM	1		-	-	-	-	-	-	-
Par_Inapp	.317**	1	-	-	-	-	-	-	-
Par_Pro	.397**	.497**	1	-	-	-	-	-	-
Par_Verb	.700**	.742**	.663**	1	-	-	-	-	-
ECBI Intensity	.043	.094	.083	0.82	1	-	-	-	-
ECBI Problem	.000	.035	-.085	-.025	.707**	1	-	-	-
BASC Externalizing	.004	-.015	.000	-.120	.804**	.654**	1	-	-
BASC Internalizing	-.136	-.107	-.004	-.137	.196	.187	.322**	1	-
BASC Adaptive	.061	.105	.050	.189	-.612**	-.526**	-.544**	-.281**	1

Note: *=p<.05, **=p<.01

Table 20

Correlations between child DPICS codes and parent-report measures of child functioning

	C_NTA	C_CO	C_QU	C_PRO	C_YE	C_WH	% Comp	ECBI Inten	ECBI Prob	BASC Ext	BASC Intern	BASC Adaptive
C_NTA	1		-	-	-	-	-	-	-	-	-	-
C_CO	.33**	1	-	-	-	-	-	-	-	-	-	-
C_QU	-.085	.31**	1	-	-	-	-	-	-	-	-	-
C_PRO	.30**	.38**	.31**	1	-	-	-	-	-	-	-	-
C_YE	.085	.26**	.17	-.050	1	-	-	-	-	-	-	-
C_WH	.19*	.097	.20*	.038	.19*	1	-	-	-	-	-	-
% Comp	-.35**	-.14	.058	-.053	-.22*	-.38*	1					
ECBI Intensity	.34**	.27*	-.31**	-.076	.14	.31*	-.32**	1	-	-	-	-
ECBI Problem	.158	.18	-.28**	-.001	-.074	.28*	-.32**	.71**	1	-	-	-
BASC Externalizing	.23*	.043	-.29**	-.16	.12	.063	-.29**	.80**	.65**	1	-	-
BASC Internalizing	.11	.12	-.002	.039	.074	-.015	-.039	.20	.187	.32**	1	-
BASC Adaptive	-.030	.22*	.24*	.28**	-.099	-.154	.21*	-.61*	-.53**	-.54**	-.28**	1

Note: *=p<.05, **=p<.01

Figures

Coding Sheet

Tape #: _____ Caregiver: _____ Date of Observation: _____

Circle DPICS Segment: CLP PLP CU

Segment Start/End Time: _____ First statement: _____

Parent Code	Frequency Count		Totals
NTA			
DC	NOC:		
	CO:		
	NC:		
IC	NOC:		
	CO:		
	NC:		
LP			
UP			
Q			
RF			
BD			
TA			
Coder: _____ Primary or Reliability (Circle One) Date Coded: _____			

Child Code	Frequency Count	Totals
NTA		
CM		
QU		
PRO		
YE		
WH		
Coder: _____ Primary or Reliability (Circle One) Date Coded: _____		

Figure 1. An example of the coding sheets used by trained coders to record the frequency of certain parent and child behaviors during each video-recorded DPICS observation.