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Psychometric Properties and Normative Data of the Dyadic Parent-Child Interaction Coding System Fourth Edition in a Clinically Referred Taiwanese Sample

Yi-Chuen Chen
Department of Psychology, National Chung Cheng University

The Dyadic Parent-Child Interaction Coding System, fourth edition (DPICS IV) is a behavioral observation measure used to assess parent-child interactions. The purpose of this study was threefold: (1) to examine the psychometric properties of the DPICS IV in a clinically referred Taiwanese sample of children aged 3-11 and their caregivers, (2) to provide normative data for this population, and (3) to examine normative age differences. A total of 104 Taiwanese clinically referred caregiver-child dyads completed the pre-treatment assessment for Parent-Child Interaction Therapy. Parent-report measures completed by the caregivers, as well as the DPICS IV observational data, were used for analysis. The DPICS IV had good inter-observer reliability and adequate discriminant, convergent and divergent validity for some DPICS IV indicators, including negative talk in child-led play and child compliance in parent-led play and clean-up. Differences were noted in parent-child interactions assessed by the DPICS IV based on the child's age. The results of this study highlight good psychometrics for the DPICS IV in a clinically referred Taiwanese sample, and its established normative data can provide performance reference on the DPICS IV for this population. Future studies are needed to examine the test-retest reliability and predictive validity of the DPICS IV and to establish its normative data and psychometric properties with a non-referred Taiwanese sample.

Keywords: *behavioral observation, behavior problem, norm, parent-child interaction, psychometric properties*

Extended Abstract

Children are greatly affected by their family environment during their growth and development. In infancy, they rely on their parents/caregivers to provide for their physical, emotional, and safety needs. During the toddler and pre-school years, children begin to have more interactions with people (e.g., teachers, classmates) outside of their families, in settings outside of the home (e.g., daycare center). During this stage of development, children learn how to get along with other people and begin to obey the values and social norms of their culture (e.g., greeting other people, standing in line). At this point, parental responsibility also includes teaching and disciplining one's child so that he/she develops into a self-disciplined and morally grounded individual (Holden, 2010).

Maladaptive parenting practices, including negative and controlling behaviors (e.g., yelling, threatening), ineffective or inconsistent discipline, and neglect of

Author's note
Yi-Chuen Chen: Professor, Department of Psychology, College of Social Sciences, National Chung Cheng University; Clinical Psychologist, Mental Health Promotion Center, National Chung Cheng University.
(Corresponding Author: psyycc@ccu.edu.tw; psyycc@gmail.com)

nurturing and discipline for children, are positively correlated with disruptive behavior problems (which mainly consist of oppositional defiant and conduct problems) in early childhood and early adolescence (Gardner, 1992; Larsson, Viding, Rijsdijk, & Plomin, 2008; Mash & Wolfe, 2016; Pettit, Laird, Dodge, Bates, & Criss, 2001; Trentacosta & Shaw, 2008). It has been speculated that maladaptive parenting practices may lead to negative parent/caregiver-child interactions, which may exacerbate the occurrence of disruptive behavior problems and vice versa. The emergence of disruptive behavior problems also is positively related to children's academic and social difficulties, as well as their later anti-social behavior and criminal activities in adolescence and adulthood (McNeil & Hembree-Kigin, 2010; Werba, Eyberg, Boggs, & Algina, 2006).

Given the potential adverse effects of negative parent/caregiver-child interactions, it is important to detect and intervene as early as possible. The Dyadic Parent-Child Interaction Coding System (DPICS) is a behavioral observation measure used to assess the quality of parent-child interactions. It has undergone several revisions and is now in its 4th edition (DPICS IV; Eyberg, Nelson, Ginn, Bhuiyan, & Boggs, 2013; Eyberg, Chase, Fernandez, & Nelson, 2014).

The previous version of the DPICS, DPICS III, has good psychometrics including: (a) inter-coder reliability with US (Bagner, et al., 2016; Danko, Garbacz, & Budd, 2016; Ginn, Clionsky, Eyberg, Warner-Metzger, & Abner, 2017), Norwegian (Bjørseth, McNeil, & Wichstrøm, 2015; Bjørseth &Wichstrøm, 2016), Hong Kong (Leung, Tsang, Sin, & Choi, 2015), Australian (Thomas & Zimmer-Gembeck, 2011), and Taiwanese (Chen & Fortson, 2015; Tseng, 2013) samples, (b) discriminative validity with US (McCabe et al., 2010), Norwegian (Bjørseth et al., 2015), and Taiwanese (Tseng, 2013) samples, (c) convergent validity with a Taiwanese sample (Tseng, 2013), and (d) predictive validity with US samples (Bagner & Eyberg, 2007; Graziano, Bagner, Sheinkopf, Vohr, & Lester, 2012; Shanley & Niec, 2010). Although the DPICS IV is newer, inter-coder reliability has been established with US (Barnett et al., 2016) and Dutch (Abrahamse et al., 2016) samples. DPICS III normative data has been established for US (McCabe et al., 2010; Shanley & Niec, 2011) and Norwegian (Bjørseth et al., 2015) samples. Cotter (2016) provides DPICS IV normative data for 122 clinical and non-clinical US children and their parents.

Given its limited time in circulation, research on the DPICS IV is limited. The purpose of the current study was threefold: (a) to examine the psychometric properties of the DPICS IV in a clinically referred Taiwanese sample of children aged 3-11 and their caregivers, (b) to provide normative data for this specific population, and (c) to exam age differences on the normative data.

Participants

Participants of this study included 104 clinically referred Taiwanese caregivers (ages 23 to 66, M = 39.4, SD = 6.65) and their children (ages 3 to 11, M = 6.27, SD = 2.19). Approximately 59.6% (n = 62) of children were boys and 40.4% (n = 42) were girls. Approximately 79.8% (n = 83) of caregivers were females (including 77 mothers, 2 grandmothers, 2 foster mothers, and 2 aunts).

Procedure

The institutional review board approved all of the experimental procedures of this study before data collection. A total of 108 caregivers and their children (ages 3 to 11) referred by mental health professionals due to child behavior problems were recruited from Northern and Southern Taiwan. Of the 108 caregiver-child dyads, four dropped out of the study, as they were unable to be reached or had scheduling conflicts. A total of 104 caregiver-child dyads completed the pre-treatment assessment for Parent-Child Interaction Therapy (PCIT; Eyberg & Funderburk, 2011), which included completion of a packet of measures, a semi-structured intake interview, and the DPICS IV observations of parent-child interactions. Every caregiver was compensated with $300 New Taiwan Dollars (equivalent of $10 US dollars) when the pre-treatment assessment was completed.

Instruments

The caregiver-completed measures used for analysis

included: (a) the demographic questionnaire developed by the investigator, (b) the Child Behavior Checklist (CBCL) for ages 1.5-5 (CBCL 1.5-5; Achenbach & Rescorla, 2000, 2010) and the CBCL for ages 6-18 (CBCL 6-18; Achenbach & Rescorla, 2001, 2007), (c) Eyberg Child Behavior Inventory (ECBI; Eyberg & Pincus, 1999; Chen & Fortson, 2015; Chen, Fortson, & Tiano, 2018a; Chen, Fortson, & Tiano, 2018b), and (d) Parenting Stress Inventory (PSI; Abidin, 1995; Weng, 2003).

The DPICS IV observations consist of a 5-minute child-led play (CLP) warm-up and three 5-minute formal parent-child interaction situations that were used for analysis (including 5-minute CLP, 5-minute parent-led play [PLP], and 5-minute clean-up [CU]) that vary in the degree of parental control required; Eyberg et al., 2013; Eyberg et al., 2014). DPICS IV indicators (including nine parent behavior categories, three child behavior categories, four parent composites, and three parent and child composites) commonly used in past studies (e.g., Abrahamse et al., 2016; Barnett et al., 2016; Bjørseth et al., 2015; Bjørseth & Wichstrøm, 2016; Danko et al., 2016; McCabe et Al., 2010; Niec et al., 2015; Ros et al., 2016; Shanley & Niec, 2011; Timmer et al., 2016) were selected to examine the inter-observer reliability of the DPICS IV for the CLP, PLP, and CU situations (whether combined or examined separately; see Table 3) and the discriminant (see Table 4), convergent, and divergent (see Table 5) validity of the DPICS IV with the above caregiver-completed measures in each of the three situations.

Results

Normative Data for Specific Populations and Age Difference

The DPICS IV normative data for the clinically referred Taiwanese children were compiled in three ways: (1) for the entire sample (N = 104), (2) for the 3 to 6-year-old children (n = 60), and (3) for the 7 to 11-year-old children (n = 44) (see Table 2). One-sample z tests were conducted to examine differences in DPICS indicators as assessed by the DPICS III in the study of Tseng (2013) and those assessed by the DPICS IV in the present study. Except for the average number of occurrences of neutral talk [TA] by parents in the CLP situation, $z = 3.55$, $p < .01$ (DPICS III: $M = 18.97$, $SD = 8.94$, DPICS IV: $M = 25.76$, $SD = 12.72$), no significant differences were found on other DPICS indicators in the CLP, PLP, and CU situations, respectively. Independent-sample t tests examining age differences on the DPICS IV indicators included in Table 2 suggest that caregivers of the 7 to 11-year-old children, when compared with the caregivers of the 3 to 6-year-old children: (a) used more unlabeled praises (UP), behavioral descriptions (BD), reflections (RF), questions (QU), and TA, in the CLP situation, (b) had higher scores on several composite measures in the CLP situation, including positive following (PF), which combines scores for labeled praises [LP], UP, RF, and BD (PF = LP + UP + RF + BD), do skills (DS), which combines scores for BD, RF, and LP (DS = BD + RF + LP), and negative leading/"don't do skills", which combines scores for direct commands (DC), indirect commands (ID), QU, and negative talk (NTA) (NL = DC + IC + QU + NTA), and (c) had higher scores in the PLP and CU situations for the total commands (TC) composite, which combines DC and IC (TC = DC + IC). Compared to the 7 to 11-year-old children, the 3 to 6-year-old children showed more on-compliance (NC) to the caregiver's commands in the PLP situation and more compliance (CO), NC, and no opportunity for compliance (NOC) in the CU situation. Lower scores also were observed in the CU situation for the younger children (3 to 6-year-olds) than for the older children (7 to 11-year-olds) on two composites: (a) child alpha compliance rate (CO/[DC + IC - NOC]) and (b) child beta compliance rate (CO/[DC + IC]).

Inter-observer Reliability

The mean percent agreements for the DPICS IV parent behaviors in the CLP, PLP, and CU situations ranged from 97.19% to 100%, while the mean kappas ranged from .87 to 1.0 (whether combined or examined separately). In the PLP and CU situations, the mean percent agreements for the DPICS IV child behaviors ranged from 98.10% to 99.72%, while the mean kappas ranged from .92 to .97 (whether combined or examined

separately; see Table 3).

Discriminant Validity

The univariate analyses of covariance (using child age as the covariate) suggests that children with clinically elevated scores on the CBCL externalizing problems scale received more NTA in the CLP situation than children without clinically elevated scale scores, $F(1, 101) = 7.36$, $p < .05$. Moreover, children with clinically elevated scores on the ECBI intensity scale received (a) fewer UPs, $F(1, 101) = 5.25$, $p < .05$, fewer BDs, $F(1, 101) = 6.10$, $p < .05$, and were more likely to have lower composite scores in the CLP situation on PF, $F(1, 101) = 6.46$, $p < .05$, and DS, $F(1, 101) = 4.00$, $p < .05$. Children with clinically elevated scores on the ECBI intensity scale (when compared to those without clinically elevated scores) also were less likely to comply, as indicated by lower scores on the child alpha compliance composite in the PLP, $F(1, 101) = 6.53$, $p < .05$, and CU, $F(1, 101) = 6.44$, $p < .05$, situations and lower scores on the child beta compliance composite in the CU situation, $F(1, 101) = 6.35$, $p < .05$. In the CLP situation, children with clinically elevated scores on the ECBI problem scale (when compared to children without clinically elevated scores; see Table 4) were more likely to receive more NTA, $F(1, 101) = 4.76$, $p < .05$ and were less likely to receive PF, $F(1, 101) = 3.97$, $p < .05$, and DS, $F(1, 101) = 4.66$, $p < .05$. These children also were less likely to comply in the CU situation, as evidenced by lower scores on the child alpha compliance rate, $F = 6.29$, $p < .05$, and child beta compliance rate, $F(1, 101) = 7.52$, $p < .05$ (see Table 4).

Convergent and Divergent Validity

Pearson's correlation coefficients were conducted to examine convergent and divergent validity of the measures. The CBCL externalizing scale was negatively correlated with several behaviors/constructs in the CLP situation, including RF, $r(102) = -.20$, $p < .05$, PF, $r(102) = -.23$, $p < .05$, and DS, $r(102) = -.21$, $p < .05$. On the other hand, NTA was positively correlated with the CBCL externalizing problem scale, $r(102) = .23$, $p < .05$, the ECBI problem scale, $r(102) = .22$, $p < .05$, and PSI total scale, $r(102) = .27$, $p < .01$, the PSI child domain scaled score, $r(102) = .23$, $p < .05$, and the PSI parent domain scaled score, $r(102) = .25$, $p < .05$. In the PLP situation, child alpha compliance rates, $r(102) = -.28$, $p < .01$, and child beta compliance rates, $r(102) = -.23$, $p < .05$, were negatively correlated with the ECBI intensity scale scores. In the CU situation, child alpha compliance rates were negatively correlated with the ECBI intensity, $r(102) = -.21$, $p < .05$, and problem, $r(102) = -.26$, $p < .01$, scales, as well scaled scores for the PSI child domain, $r(102) = -.20$, $p < .05$. Likewise, child beta compliance rates were negatively correlated with the ECBI intensity, $r(102) = -.23$, $p < .05$, and problem, $r(102) = -.30$, $p < .01$, scales, as well as the PSI total scaled score, $r(102) = -.28$, $p < .01$, and PSI child domain scaled score, $r(102) = -.30$, $p < .01$. As expected, all DPICS IV indicators in CLP, PLP, and CU situations were not correlated with the CBCL internalizing problem scaled scores (see Table 5).

Discussion

Normative Data for Specific Populations and Age Differences

The present study established the DPICS IV normative data for a clinically referred Taiwanese sample. Except for the use of TA in the CLP situation, the DPICS IV normative data established for a clinically referred Taiwanese sample in the present study ($n = 104$) is similar to the DPICS III data in the study of Tseng (2013; $n = 66$). The difference in the use of TA in the CLP situation may be explained by the use of an updated version of the DPICS.

The present study also found that compared with the caregivers of the 7 to 11-year-old children, the caregivers of the 3 to 6-year-old children displayed more positive and negative interactions with their children in the CLP situation and gave more commands to their children in the PLP and CU situations. The 3 to 6-year-old children were less compliant with commands given by their caregivers than the 7 to 11-year-old children in the PLP and CU situations (particularly in the CU situation). Possible explanations for the findings are as follows.

First, younger children often have a shorter attention span and more limited play skills than older children (Ruff & Rothbart, 2001), which may lead their caregivers to engage in more positive and negative interactions in the CLP situation. Second, according to the DPICS IV manual (Eyberg et al., 2013), caregivers are supposed to be more controlling/dominant in the PLP and CU situations than in the CLP situation, as the goal is to make their children follow their lead. . Moreover, prior research has found that preschool children tend to display more disruptive behavior problems than school-aged children in Taiwan (Chen et al., 2018a). The above reasons may be whyt more commands were given to younger children and lower compliance rates were observed.

Psychometric Properties

The results of the present study highlight good psychometrics for the DPICS IV in a clinically referred Taiwanese sample. The DPICS IV had good inter-observer reliability for all parent and child behaviors assessed in the present study. Moreover, discriminant, convergent, and divergent validity were observed with the ECBI, PSI, and/or CBCL.

As mentioned earlier, maladaptive parenting practices are correlated with disruptive behavior problems in early childhood and early adolescence (Gardner, 1992; Larsson et al., 2008; Mash & Wolfe, 2016; Pettit et al., 2001; Trentacosta & Shaw, 2008). Children's non-compliance may lead to harsh and punitive disciplinary behaviors by parents (Lansford et al., 2011). The present study recruited a clinically referred Taiwanese sample (at least 57.69% of children had clinically significant disruptive/externalizing behavior problems, see Table 4). It is expected that even in the CLP situation wherein caregivers were instructed to follow their child's lead, the child may still have displayed externalizing or disruptive behaviors and the caregivers felt the need to use NTA (i.e., harsh/punitive verbal behaviors) to make their child engage in appropriate play behaviors.

The present study also found child compliance in PLP and CU to have better psychometric properties than other DPICS IV indicators in these situations. When taking a closer look at the data (see Table 2), the total number of commands given was higher and child compliance lower in the PLP situation than in the CU situation overall and by age group. Thus, the caregivers appeared to be more dominant in the PLP situation, which is not entirely consistent with the expectations of parental behavior as described in the DPICS IV manual (Eyberg et al., 2013). The DPICS IV manual would suggest that parent behaviors would be more controlling in the CU situation. The possible explanations for the findings are as follows. First, the qualitative behavioral observations suggest that the caregivers in the present study tended to have limited play skills, so the children gradually lost interest in playing with them across the different situations. Thus, the child compliance in the CU situation may be higher than in the PLP situation because the child was ready to clean up the toys. Second, after completion of the DPICS IV observations, many caregivers commented that cleaning up toys was what they usually asked their child to do at home. Therefore, compared with the PLP situation, the child may be more accustomed to "following the rules" and obeying commands in the CU situation such that child compliance in the CU situation was higher.

Limitations

There were several limitations to the present study. First, participants were recruited through convenience sampling. Second, the sample was comprised solely of clinically referred Taiwanese children with behavioral problems and their caregivers. Third, the sample size was small (N = 104). These weaknesses limited the sample characteristics (e.g., a majority were Minnan, most were from middle income families, many caregivers were mothers, half of the caregivers had a college or bachelor's degree) and the conclusions made in this study may not be generalizable/applied beyond the sample. Fourth, because this study did not examine test-retest reliability and predictive validity of the DPICS IV for the clinically referred Taiwanese sample, it was not known whether the parent-child interaction behaviors assessed by DPICS IV had good stability and which DPICS IV indicators will have good predictability.

Future Research

Future studies are needed to examine the test-retest reliability and predictive validity of the DPICS IV and to establish its normative data and psychometric properties with a non-clinically referred Taiwanese sample. After collecting a large number of samples, future studies can further examine the effect of child psychopathology (e.g., a non-clinically referred versus a clinically referred Taiwanese sample) and demographic variables (e.g., caregiver's age, caregiver's sex) on parent-child interaction behaviors assessed by the DPICS IV. This information will help clinicians in determining whether a caregiver-child dyad whose interaction behaviors assessed by the DPICS IV need further treatment and how the treatment plan should be developed and revised. With the development of DPICS IV, researchers may continue to explore how to use it for other ethnic groups or situations (e.g., home, school).