IDENTIFICATION OF SPECIAL EDUCATION NEEDS
WITH THE PERSONALITY INVENTORY FOR CHILDREN
(PIC): A PROFILE-MATCHING STRATEGY

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In earlier studies we developed a hierarchical classification model for the Personality Inventory for Children (PIC)—a parent-informant questionnaire of child adjustment status—intended for use in school settings. In the present study, we constructed and evaluated a profile-matching classification model that extends the usefulness of the PIC as a screening measure in school assessments. This model allows psychologists to determine the similarity of PIC profiles to the mean profile of children in regular classrooms and to the mean profiles of children who are learning disabled, emotionally-behaviorally disturbed, or mentally impaired. The overall accuracy of the profile-matching model was reasonable, and classification of children's PIC profiles by this model did not differ by race. We also present a case example that illustrates the application of the PIC in a school-related evaluation.

Psychologists who conduct assessments for special education placement are obliged to incorporate parent observations into their evaluations (e.g., PL 94-142, Federal Register, 1977). Although this requirement could conceivably be met through unstructured interviews, parent-informant questionnaires offer another way to systematically collect this information. The parent measure discussed in this work, the Personality Inventory for Children (PIC; Wirt, Lachar, Klindinst, & Seat, 1984), has features that may be advantageous for school-related assessments. For example, the PIC has validity scales that detect response sets such as denial of child problems. Also, the presence of parent psychopathology does not seem to compromise the
external validity of the PIC (Lachar, Kline, & Gdowski, 1987), a concern that many psychologists have about parent-informant questionnaires.

More important than the above properties, however, is the presence of a relatively large research base that supports the PIC's validity against school-relevant criteria, including IQ and achievement scores (e.g., Byrne, Backman, Gates, & Clark-Touesnard, 1986; Dollinger, Goh, & Cody, 1984); teacher ratings of adjustment (e.g., Lachar, Gdowski, & Snyder, 1984); and educational placement (e.g., Breen & Barkley, 1984; Clark, Kehle, Bullock, & Jenson, 1987; DeKrey & Ehy, 1981, 1985; Ehy, Keith, Reimers, & DeKrey, 1986; Forbes, 1987; Kelly, 1988). Also, there are two empirically-based typologies for the PIC, one constructed within psychiatric samples (e.g., Kline, Lachar, & Gdowski, 1992; Lachar & Kline, 1994) and the other within samples of learning disabled children (e.g., Fuerst, Fisk, & Rourke, 1989, 1990; Porter & Rourke, 1985), each of which facilitates configural interpretation of PIC profiles.

As a way to integrate the aforementioned research findings, we recently developed a PIC-based hierarchical classification model in which educational disability categories are the external criteria. We collected PIC profiles from children in different parts of the United States who were receiving either regular or special education services for the mentally impaired, learning disabled, or emotionally-behaviorally disturbed. We then used discriminant function analyses to identify PIC scales that differentiated these groups, and finally we organized the results into a set of sequentially-applied decision rules (Kline, Lachar, & Boersma, 1993; Lachar, Kline, & Boersma, 1986). Presented in Table 1 are these decision rules, which are based on sums of $T$ scores from PIC scales. The classification accuracies of each decision rule are also presented in Table 1. As expected, the accuracies of the broader rules (e.g., rule 1, regular vs. special education, 87%) are generally higher than those of more specific rules (e.g., rule 4, learning disabled vs. mentally impaired, 67%).

Although the classification model summarized in Table 1 is relatively easy to apply and reasonably accurate for screening purposes, this system nevertheless has two significant limitations. First, children's PIC profiles are ultimately classified into a single educational category, which may not adequately represent the status of children with multiple problems (e.g., children who have poor academic skills and behavior problems). A second and related limitation is insensitivity to "borderline" profiles. For example, a child's PIC profile may have a total score on decision rule 2 of 574, which is just below the cutoff (575) for classification as a "cognitive impairment" profile. Nevertheless, classification of the child's profile would continue to the next decision point (rule 3) of "emotionally impaired" versus "school social work."

Before we describe the goals and methods of the present study which was conducted to refine the classification model summarized in Table 1, readers should note some important caveats about the status of educational disability categories as external criteria for psychological tests. Some categories are notorious for their imprecision. For example, definitions of "learning disability" vary not only from state to state, but can also vary from school to school within the same region (e.g., Frankenberger & Fronzaglio, 1991). Consequently, whether one considers scores from individually-administered ability tests or from tests of psychosocial status like the PIC, groups of children designated as "learning disabled" are very heterogenous (e.g., Kline, Lachar, & Boersma, 1987; Nussbaum & Bigler, 1986; Nussbaum, Bigler, & Koch, 1986; Rourke, 1988). The same criticism could be applied to disability categories that indicate emotional or behavioral disturbance. In addition, some types of educational distinctions (e.g., "self-contained" placements vs. "mainstreaming") may be more influenced by resource availability than by child characteristics. These shortcomings of educational disability categories have two implications for their role as external criteria: (a) the reliabilities of psychological tests like the PIC are probably higher than the reliabilities of disability categories; and, therefore, (b) one would expect only moderate convergence between quantitative test scores and disability group membership (e.g., Kline, 1988).

In the present study, we sought to develop a special education-based classification model for the PIC that could serve as an alternative to the hierarchical model outlined in Table 1. More specifically, we constructed a profile-matching model wherein a child's PIC profile is compared to the mean profiles of different educational
Table 1
Hierarchical Classification of Personality Inventory for Children (PIC) Profiles into Special Education Groups

<table>
<thead>
<tr>
<th>Decision rule</th>
<th>Composite</th>
<th>Cutting score, decision</th>
<th>Accuracy$^a$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>$3 \times ACH + 1S + 4 \times DVL + 3 \times D + 2 \times FAM + 2 \times HPR - 2 \times PSY$</td>
<td>$&lt; 700$, classify REGULAR EDUCATION, stop; $\geq 700$, classify SPECIAL EDUCATION, go to rule 2.</td>
<td>87%</td>
</tr>
<tr>
<td>2.</td>
<td>$(5 \times ACH + 2 \times IS) - (3 \times DLQ + 2 \times ANX + SSK) + 500$</td>
<td>$&lt; 575$, classify EMOTIONAL-BEHAVIORAL, go to rule 3.; $\geq 575$, classify COGNITIVE, go to rule 4.</td>
<td>76%</td>
</tr>
<tr>
<td>3.</td>
<td>$5 \times IS + 4 \times DLQ$</td>
<td>$&lt; 560$, classify SCHOOL SOCIAL WORK, stop; $\geq 560$, classify EMOTIONALLY IMPAIRED, stop</td>
<td>76%</td>
</tr>
<tr>
<td>4.</td>
<td>$4 \times IS + 4 \times PSY - 3 \times DLQ$</td>
<td>$&lt; 460$, classify LEARNING DISABLED, go to rule 5.; $\geq 460$, classify MENTALLY IMPAIRED, go to rule 6.</td>
<td>67%</td>
</tr>
<tr>
<td>5.</td>
<td>$(IS - SOM) + 100$</td>
<td>$\geq 125$, classify LEARNING DISABLED, TEACHER CONSULTANT, stop; $&gt; 125$, classify LEARNING DISABLED, SELF-CONTAINED, stop</td>
<td>46%</td>
</tr>
<tr>
<td>6.</td>
<td>$10 \times D + 3 \times HPR - 8 \times PSY + 600$</td>
<td>$&lt; 660$, classify TRAINABLE MENTALLY IMPAIRED, stop; $\geq 660$, classify EDUCABLE MENTALLY IMPAIRED, stop</td>
<td>71%</td>
</tr>
</tbody>
</table>

Overall: 65%

Note. PIC scales: ACH = Achievement; IS = Intellectual Screening; DVL = Development; FAM = Family Relations; HPR = Hyperactivity; PSY = Psychosis; DLQ = Delinquency; ANX = Anxiety; SSK = Social Skills; SOM = Somatic Concern; D = Depression.

$^a$Correct classification rates were derived by applying each decision rule within separate derivation ($N = 248$) and replication ($N = 423$) samples (Kline, Lachar, & Boersma, 1999).
groups, and a similarity coefficient is produced for each comparison. The outcome of this process is not a single, categorical “diagnosis,” but instead a set of similarity coefficients that are interpretable as correlations (i.e., 0 indicates no similarity, 1 indicates identity).1 Within two separate samples of regular and special education children, we classified PIC profiles into the groups they most closely resembled, and we evaluated the accuracies of classifications based on the similarity coefficients. Within a third sample of IQ-matched Caucasian and African-American children, we evaluated whether the frequency of PIC-based special education classifications differed by race. This latter sample and analysis were crucial to determine whether the PIC-based profile-matching is potentially biased by race, an issue of longstanding concern in the child assessment literature. Finally, we demonstrate the potential application of a PIC-based profile-matching model with a case example.

Method

Subjects
Data from three samples were analyzed for this study. The derivation sample was comprised of 248 children (mean age = 10.0 years; 68% boys; 98% Caucasian) who attended four public elementary schools in Michigan. Some of these children were enrolled in regular classrooms (n = 56) or in self-contained classrooms for the learning disabled (n = 30), emotionally impaired (n = 24), educable mentally impaired (n = 30), or trainable mentally impaired (n = 29). Another group of children was classified as learning disabled, but these children were “mainstreamed” in regular classrooms and received part-time remedial services (learning disabled, teacher-consultant; n = 38). A final group of children (n = 41) attended regular classrooms and had grade-appropriate achievement, but received school social work services due to some recent stressor such as parental divorce.

Replication sample children (N = 423) attended public schools from a broader geographic area (California, Iowa, & Michigan), and these data were collected by researchers other than the authors (Clark, Kehe, Bullock, & Jensen, 1987; DeKrey & Ehy, 1985; Schnell, 1982). The special education composition of the replication sample was not exactly parallel to that of the derivation sample, but cross-validation of at least some analyses across these samples was possible. The mean age of replication sample cases was 10.2 years; 72% were boys, and all of the children were Caucasian. A total of 143 children attended regular classes, 67 were enrolled in self-contained classes for the emotionally impaired, and 37 were in self-contained classrooms for the educable mentally impaired. A total of 176 children were classified as learning disabled, but we do not know which of these children were placed in self-contained classrooms or were mainstreamed. Thus, the learning disability group of the replication sample is not directly comparable to the derivation sample learning disability groups. Instead, this group should be considered a general learning disability group that is probably very heterogeneous.

Because the derivation and replication samples had so few non-Caucasian children, we formed the clinic sample, which was comprised of 120 Caucasian and 120 African-American children who were matched on Full Scale IQ scores from the Wechsler Intelligence Scale for Children–Revised (WISC-R; Wechsler, 1974). The 240 IQ-matched cases (mean age = 11.4 years; 71% boys) were collected from a larger sample of 324 children who were tested at a large psychiatric facility in southeastern Michigan. The African-American children had a mean Full Scale IQ score of 86, and the mean for the Caucasian children was 87. Although the clinic sample allowed evaluation of whether the frequency of PIC-based classifications differed for Caucasian and African-American children, we did not know the special education status of clinic sample cases. Thus, we could not determine whether such classifications were accurate, only whether their occurrence varied by race.

Measures
The version of the PIC we used for this study is comprised of 280 true-false items (Witt et al., 1984), which requires about 1-1/2 hours for

1Although relatively few in number, there are some applied examples of the use of profile-matching models in the assessment literature. Achenbach (1993) developed a typology with cluster analysis for the parent-informant Child Behavior Checklist for ages 4-18 years (CBCL/4-18; Achenbach, 1991a), and this typology is comprised of a total of seven profile types. The micro-computer scoring program for the CBCL/4-18 calculates intraindividual correlations that indicate the similarities between a child's profile and each of the mean profiles of the seven profile types.
parents to complete. This version has a total of 20 scales, 3 of which are validity scales (Lie, Frequency, Defensiveness), and one (Adjustment) is a general screening scale. The remaining scales include 12 substantive clinical scales (Achievement, Intellectual Screening, Development, Somatic Concern, Depression, Family Relations, Delinquency, Withdrawal, Anxiety, Psychosis, Hyperactivity, Social Skills) and four broad-band, factor-derived scales (Undisciplined/Poor Self-Control, Social Incompetence, Internalization/Somatic Symptoms, and Cognitive Development). The four factor scales are scored within the first 131 items of the PIC administration booklet, which may be administered as an abbreviated form. The analyses of the present study, however, concern the 12 clinical scales. PIC scales are normed by child age and gender, and clinically elevated standard scores (i.e., T scores) indicate either informant distortion (validity scales) or significant adjustment problems (all other scales).

We previously cited numerous studies of the validity of the PIC in school settings. Results of other types of validation studies and information about the psychometric characteristics of PIC scales are summarized in the test manuals (Lachar, 1982; Wirt et al., 1984); a more recent summary is available in Lachar and Kline (1994). Readers can also consult reviews of the PIC by Knoff (1989) and Rothermel and Lovell (1985), and should also note that Spanish, French, Italian, and Norwegian versions of the PIC are available.2

In addition to the WISC-R, clinic sample children were also administered the Peabody Individual Achievement Test (PIAT; Dunn & Markwardt, 1970) and the Peabody Picture Vocabulary Test (PPVT; Dunn, 1959). Both tests are probably familiar to psychologists who conduct individual assessments; thus, they will not be described in detail here. Interested readers can, however, consult reviews by Williams and Vincent (1985) and Lyman (1965, 1971).

Analyses

Although numerous coefficients can indicate the similarity between two profiles (e.g., Euclidean distances, Pearson correlations), we selected intraclass correlations (ri) in the present study because (a) their range (and interpretation) is the same as for Pearson correlations, (b) ri values represent all aspects of profile data (elevation, shape, and scatter; e.g., Nunnally & Bernstein, 1994, pp. 599-603; Wiggins, 1980, pp. 97-105), and (c) ri coefficients compare well to other alternative similarity indexes in computer simulation studies of classification accuracy (e.g., Edelbrock & McLaughlin, 1980).

In the derivation sample (N = 248), we calculated for each child's PIC profile seven ri values, each of which indicated similarity to the mean profiles of the educational groups in the derivation sample.3 These mean PIC profiles are presented in Figure 1. Within the replication sample (N = 423), we also calculated for each case seven ri values that indicated similarity to the mean profiles in Figure 1. Because it is possible that some children had PIC profiles that did not resemble any of the mean profiles presented in the figure, we identified the cases in the derivation and replication samples who had intraclass correlations that were all zero or negative (ri ≤ 0). These cases were excluded from subsequent analyses.

We sought to evaluate the accuracy of classification based on the intraclass correlations, but unfortunately there is no direct way to do so. Similarity coefficients do not themselves indicate membership in a particular group. Also, a child's profile may be very similar to the mean profiles of more than one educational group. To have some means to evaluate the accuracy of the profile-matching model, however, we adopted the following strategy: We estimated classification accuracy based on the two greatest similarity coefficients for each case. That is, we counted a classification as "correct" if a child's actual educational group was indicated among his or her two highest ri values. We believed that limiting the definition of a "correct" classification to only the greatest ri value was too restrictive, but we also thought that more liberal criteria (e.g., based on the three largest correlations) would yield unrealistically high accuracy estimates.

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2Readers interested in foreign language versions of the PIC can contact David Lachar, Department of Psychiatry and Behavioral Sciences, Health Science Center at Houston, Medical School, The University of Texas, P.O. Box 20708, Houston, Texas, 77225.
3The similarity coefficients described here are calculated by the PIC micro-computer scoring program; they are also calculated for protocols submitted for automated scoring to the test's publisher.
Because the replication sample did not have all of the same educational groups contained in the derivation sample, we were not able to fully cross-validate the classification analyses. For example, the replication sample contained no children classified as trainable mentally impaired. Also, we had to count any type of learning disability classification (i.e., self-contained or teacher-consultant) as “correct” for the replication sample learning disabled group. Because we did not know whether these children were placed in self-contained classrooms, we could not determine which of the more specific classifications was the most appropriate.

**Results**

**Classification Analyses**

Within the derivation sample, a total of 22 children (9%) had sets of intraclass correlations that were all ≤ 0. These children had PIC profiles that did not resemble any of the mean profiles in Figure 1, and were thus excluded from subsequent analyses. The remaining 226 cases of the derivation sample were classified into one of seven educational groups based on the values of their intraclass correlations. Reported in the left side of Table 2 are rates of correct classification for each educational group in this sample. For purposes of comparison, also reported in Table 2 are the correct classification rates for these groups when the hierarchical decision rules (Table 1) are applied. Overall, classification based on profile-matching (i.e., using intraclass correlations) is slightly more accurate (71%) than when the hierarchical rules are used (65%). Also, the profile-matching model was somewhat more accurate in the classification of regular education children who were receiving counseling (65% vs. 41%) and of learning disabled students in self-contained classrooms (60% vs. 43%). Neither model, however, was very accurate in the classification of PIC profiles from emotionally impaired children or from “mainstreamed” learning disabled children. Considering the likely heterogeneity of these two disability groups, these relatively low classification accuracies are not surprising.

Within the replication sample, a total of 54 children (13%) had PIC profiles that did not resemble any of the group mean profiles presented in Figure 1; these cases were excluded from the analyses. The PIC profiles of the remaining 369
Table 2
Accuracy of Classifications Based on Similarity Coefficients from the Personality Inventory for Children

<table>
<thead>
<tr>
<th>Educational group</th>
<th>Derivation sample</th>
<th>Replication sample</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Profile-matching</td>
</tr>
<tr>
<td>Regular</td>
<td>48</td>
<td>88</td>
</tr>
<tr>
<td>Regular with social work</td>
<td>37</td>
<td>65</td>
</tr>
<tr>
<td>Emotionally impaired</td>
<td>22</td>
<td>55</td>
</tr>
<tr>
<td>Learning disabled, self-contained</td>
<td>30</td>
<td>60</td>
</tr>
<tr>
<td>Learning disabled, teacher consultant</td>
<td>36</td>
<td>33</td>
</tr>
<tr>
<td>Learning disabled, general</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Educable mentally impaired</td>
<td>30</td>
<td>93</td>
</tr>
<tr>
<td>Trainable mentally impaired</td>
<td>29</td>
<td>97</td>
</tr>
<tr>
<td>Overall</td>
<td>232</td>
<td>71</td>
</tr>
</tbody>
</table>

\(^a\)These results are from Kline, Lachar, and Boersma (1993).

cases were classified into the seven educational groups in Figure 1 based on their intraclass correlations. Reported in the right side of Table 2 are the rates of correct classification for both the profile-matching and the hierarchical model. Overall, these two models are equally accurate in the replication sample, and these accuracies are only somewhat lower than the comparable rates in the derivation sample. The profile-matching model is less accurate in the classification of regular education cases in the replication sample, however, than in the derivation sample (60% vs. 88%). Also, relatively few PIC profiles of children designated emotionally impaired were accurately classified (29%), which parallels findings for this group in the derivation sample.

Unclassified Profiles

We examined PIC profiles within both samples that did not resemble any of the group mean profiles of Figure 1. Most of these profiles (46) were from regular education children, and most of them were within-normal-limits profiles with subclinical elevations on one or two scales (e.g., \(T = 65\) on the Withdrawal scale).\(^4\) Application of the first decision rule of Table 1 (i.e., regular vs. special education) correctly classified all of these profiles. We also applied the first decision rule to the remaining 30 unclassified profiles from special education children, but only 10 of these were correctly classified as "special education" profiles.

Race Differences

For every case of the clinical sample, we calculated seven intraclass correlations, each of which indicated similarity to the mean PIC profiles in Figure 1. Only three children in each race group (1% of all profiles) had \(r\) values that were all \(\leq 0\), and these protocols were excluded from subsequent analyses. To evaluate whether the profile-matching model differentially identified Caucasian versus African-American children as needing special education services, we conducted a two-group multivariate analysis of variance across the values of the seven similarity coefficients. Although the overall multivariate mean difference was marginally significant, Wilks' \(\lambda = .93, F(7, 226) = 2.45, p < .05\), this effect accounted for less than 4% of the variance among the similarity coefficients. Also, none of the univariate comparisons (i.e., \(t\) tests) of the two groups on the individual coefficients were significant, and the range of point-biserial correlations between race and each of the similarity indexes was \(-.05\) to \(.10\). Overall, the magnitudes of race differences were small, which suggests that the profile-matching model may not differentially classify referred Caucasian and African-American children.

\(^4\)Scores in this range may indicate the presence of mild or transient adjustment problems, but eligibility for some types of special education services may require that such problems are severe enough to negatively affect academic achievement.
Relation to IQ and Achievement Scores
Because the sizes of race differences on the similarity coefficients were small, we combined the Caucasian and African-American cases into a single sample. We then correlated the cognitive and achievement test scores of these children with each of the seven PIC-based similarity coefficients. One would expect that children who have PIC profiles that resemble the mean profiles of children with cognitive deficits (e.g., children who are mentally impaired or learning disabled) should also have relatively lower IQ and achievement tests scores. By the same token, high resemblance to the mean profiles of groups such as regular education children or to groups with mild problems (e.g., regular classroom with counseling) should be associated with higher test scores.

Reported in Table 3 are correlations between each of the seven PIC-based similarity coefficients and test scores. These results are generally as expected, but two exceptions are noteworthy. First, similarity to the mean profiles of “mainstreamed” learning disabled children or emotionally impaired children was unrelated to IQ and achievement scores. Thus, the PIC profiles of children that resemble either of these two mean profiles and no other mean profile may provide little useful information about their levels of cognitive and academic functioning. Second, the remainder of the results in Table 3 indicate a nonspecific relation to IQ and achievement test scores. Thus, although the PIC relates in a general way to children’s cognitive and academic skills, the PIC does not identify specific types of achievement problems, such as poor reading or math ability.

Discussion and Case Example
We developed in this study a profile-matching model for the PIC that indicates the similarity between a child’s profile and the group mean profiles of various educational groups. Although this model is only practical for test users who score the PIC with computers, it is an alternative to the hierarchical rules of Table 1 that classify profiles into discrete categories. Presented below is an integrative summary of using the PIC in assessments for special education placement. The following interpretive guidelines are based not only on the results of the present study but also reflect the findings of the studies cited in the literature review. After these guidelines are presented, we discuss some important limitations about the role of the PIC in school-related assessments.

We recommend that psychologists consider PIC profiles from two perspectives. The first is child-oriented in which the PIC is regarded as a measure of psychosocial characteristics that may impede scholastic performance. This perspective has little to do with formal educational disability categories, but instead concerns external correlates of PIC scales and whole profiles. These external correlates indicate the types of problems for which children may be at risk, and include such difficulties as deficient achievement, general cognitive dysfunction, poor peer relations, depression-anxiety, conduct problems, and family conflict. Some of these types of problems may be responsive to subsequent special education placement, but others may require different types of interventions (e.g., referral for family therapy). Again, the focus here concerns the problems of individual cases, not classification of children into discrete disability categories.

Perhaps the most efficient way for psychologists to interpret the PIC from a child-oriented perspective is to apply the empirically-based typologies cited earlier. Our own 12-group profile typology could be used to identify external correlates of children who are seen in psychiatric or child guidance settings (e.g., see Lachar & Kline, 1994). Also, the profile typology developed by Rourke and his associates within samples of learning disabled children would be useful for children who are being considered for their eligibility for these types of services (e.g., see Rourke, 1988).

The second perspective about the use of the PIC in school-related assessments concerns educational disability categories. However poorly defined and vague categories such as “learning disabled” and “emotionally impaired” are, these categories (and others) are nevertheless the ones with which psychologists must currently contend. For disability category-oriented screening, we recommend that psychologists use a “hybrid” model that is a combination of the hierarchical rules (Table 1) and the similarity coefficients developed in the present study. This “hybrid” model is outlined below.

Psychologists could begin by using the first decision rule in Table 1, which classifies PIC profiles as
Table 3

Relation of Similarity Coefficients to Cognitive and Achievement Test Scores in the Clinic Sample

<table>
<thead>
<tr>
<th>Test/scale</th>
<th>Coefficients that indicate similarity to the mean PIC profiles of:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Learning disabled</td>
</tr>
<tr>
<td></td>
<td>Regular</td>
</tr>
<tr>
<td>Peabody Individual Achievement Test</td>
<td></td>
</tr>
<tr>
<td>Mathematics</td>
<td>.36</td>
</tr>
<tr>
<td>Reading Recognition</td>
<td>.38</td>
</tr>
<tr>
<td>Reading Comprehension</td>
<td>.34</td>
</tr>
<tr>
<td>Spelling</td>
<td>.40</td>
</tr>
<tr>
<td>General Information</td>
<td>.33</td>
</tr>
<tr>
<td>Peabody Picture Vocabulary Test</td>
<td></td>
</tr>
<tr>
<td></td>
<td>.29</td>
</tr>
<tr>
<td>Wechsler Intelligence Scale for Children—Revised</td>
<td></td>
</tr>
<tr>
<td>Verbal IQ</td>
<td>.45</td>
</tr>
<tr>
<td>Performance IQ</td>
<td>.28</td>
</tr>
<tr>
<td>Full Scale IQ</td>
<td>.41</td>
</tr>
</tbody>
</table>

Note. PIC = Personality Inventory for Children; – indicates nonsignificant correlations. All correlations reported above are based on N = 236 and are significant at the .01 level.
either "regular" or "special education" profiles. For children who are not currently in special education but who have been referred due to behavioral or achievement problems, this rule might be useful as a screening procedure. Not only does this decision rule have a cross-validated accuracy of about 90%, but it also avoids two problems of the profile-matching model. First, the profile-matching model requires a computer, but application of decision rule 1 does not. Second, we found in this study that about 1 PIC profile in 10 may not resemble any of the group mean profiles in Figure 1 in the profile-matching model. Although this percent of "outlier" profiles is not remarkable (e.g., Achenbach [1993] reported that 8.9% of CBCL/4-18 were "outliers" in his empirically derived typology), this problem does not occur with decision rule 1. Also, most of the "outlier" PIC profiles in this study were from regular classroom children that could be correctly classified using this decision rule.

For PIC profiles that are classified as "special education" using decision rule 1, however, we recommend subsequent use of the intraclass correlations of the profile-matching model. This recommendation is based on the limitations of the more-specific hierarchical rules (i.e., rules 2-5 in Table 1) discussed earlier. Users of the PIC who hand-score the test cannot exercise this option, however, and should carefully consider the accuracies reported in Table 1 if they use the hierarchical rules for screening uses.

PIC users who machine-score the test and thus have available the intraclass correlations may wonder, "How high should an intraclass correlation be to conclude that a child's profile resembles the mean profile of a certain educational group?" Unfortunately, we cannot offer a specific, single-number answer to this question. Like all correlation coefficients, the intraclass correlations of the profile-matching model indicate degree of similarity. Short of $r_i$ values of 1.00, there is no discrete, nonarbitrary correlation value that clearly distinguishes between 'similar' and "not similar." We can offer, however, an interpretive rule-of-thumb that reflects the fact that intraclass correlations tend to be lower than Pearson correlations for the same data. For example, intraclass correlations of about .30, .50, and .70 correspond to Pearson correlations of about .40, .60, and .80, respectively (e.g., see Achenbach, 1993, p. 71). Thus, we recommend that intraclass correlations of .40 or greater indicate at least moderate similarity to the mean PIC profile of an educational group. This value is not intended to be applied in a rigid manner, however, as this would be antithetical to the rationale of the profile-matching model.

Readers who use the PIC in the ways recommended above should also keep in mind some important limitations. The PIC could be used as a screening procedure to help psychologists establish priorities among referrals for testing, especially when they receive more requests for individual assessments than they can complete with dispatch. The PIC is not intended to replace other screening procedures for new referrals, such as teacher-informant questionnaires (e.g., the Teacher's Report Form [Achenbach, 1991b]), but instead should be used in combination with them. Also, the PIC should not be viewed as a means to omit aspects of a more complete, individual assessment. For example, although scores from PIC scales that reflect child cognitive status correlate positively with scores from individually-administered tests, these correlations are not so high or specific as to indicate omission of individually-administered tests from a larger assessment battery. Finally, we reemphasize the limitation that the decision models developed here do not classify with great accuracy the PIC profiles of children designated as "emotionally impaired" or as "mainstreamed" learning disabled. Thus, we recommend that test users exercise caution when they find PIC profiles from individual children that resemble the mean profiles of either of these two groups. Because these disability categories are so heterogeneous, high similarity of a child's PIC profiles to the mean profiles of these two groups may not be very clinically meaningful. For such profiles, readers would be advised to use the "child-oriented" view of the PIC described earlier.

With the above limitations in mind, the following case example demonstrates application of the PIC in a school-related assessment. This case example is about a child who was already receiving special education services, but the referral was initiated by the mother due to concern about behavioral problems that originally led to the child's placement in a special classroom.
KB is an 11-year-old boy in Grade 5 who was seen at a child psychiatric facility. His mother sought help regarding management of behavior problems, including noncompliance and fighting with peers and siblings. KB also has a history of behavior problems at school: for 2 years he has attended a self-contained classroom for children who are emotionally impaired. As part of the initial evaluation, the clinician spoke with KB’s teacher, interviewed KB and his mother, and asked KB’s mother to complete the PIC. KB’s teacher reported that he was often disruptive, inattentive, and often had trouble following instructions. Also, his academic performance was poor despite receiving much individual attention in a relatively small class of about 12 students. The clinician described KB as overactive, immature, and impulsive; an initial diagnosis of Attention-Deficit Hyperactivity Disorder was assigned.

KB’s PIC profile is presented in Figure 2. The elevated scores on scales such as Delinquency, Psychosis, and Social Skills are consistent with KB’s history and indicate a child who may be disobedient, aggressive, and socially isolated. But especially striking about KB’s profile are the scores on the “cognitive triad” scales (Achievement, Intellectual Screening, Development), which are so high as to suggest serious cognitive or academic impairment. From a configural perspective, KB’s profile resembles a Type 4 profile within our own profile typology (e.g., Lachar & Kline, 1994). These profiles have elevations on PIC cognitive and externalizing scales, and children with these profiles tend to exhibit poor achievement, aggression, and low self-esteem that first appear during the early school years. KB’s profile does not resemble any of the groups identified by Rourke and associates in their PIC typology among learning disabled children (e.g., Fuerst et al., 1989, 1990). More specifically, KB’s scores on the “cognitive triad” scales are much higher than those usually found within learning disabled samples.

Application of the hierarchical classification rules of Table 1 yields a total score of 978 at the first decision point (rule 1) and a total score of 799 at rule 2, which classifies his profile as a “cognitive deficit” profile. At the next decision point for his profile (rule 4), however, KB’s total score of 456 is just below the cutoff (≥ 460) for classification as a “mentally impaired” profile. Instead, KB’s profile is classified a “learning disabled” profile, and then is subsequently categorized as a “self-contained classroom” type at the last decision point for his profile (rule 5). Because KB’s profile “just missed” classification as a “mentally impaired” profile, however, the final classification of his profile using the hierarchical rules is suspect.

Using the profile-matching model, we calculated for KB’s profile the intraclass correlations that indicate similarities to the mean profiles of Figure 1. Not surprisingly, KB’s profile was not similar to the mean profiles of children in regular classrooms, whether receiving school social services ($r_i = -.24$) or not ($r_i = -.45$). But neither did KB’s profile resemble the mean profiles of emotionally impaired children ($r_i = .08$). Also, KB’s profile was only moderately similar to the mean profiles of learning disabled children (self-contained classroom, $r_i = .33$; “mainstreamed,” $r_i = .12$). Instead, KB’s profile was much more similar to the mean profiles of children who are mentally impaired (educable, $r_i = .65$; trainable, $r_i = .68$).

Based, in part, on the above PIC results, KB was subsequently seen for a more complete assessment. His WISC-R Full Scale IQ score was only 64, and his grade-equivalent scores on the PIAT were all at a Grade 2 level or lower. Also, his responses...
to projective stimuli were very concrete and suggested lack of age-appropriate social reasoning ability. Overall, these test results indicated that KB was not "learning disabled" per se. Instead, his general cognitive and scholastic skills were all uniformly low.

The next question in KB's case concerned the appropriateness of his current special education placement. KB's placement in a self-contained classroom for the "emotionally impaired" was not necessarily inappropriate, despite the low similarity of his PIC profile to the mean profile of the "emotionally impaired" group in Figure 1. That is, if KB's classroom peers were comparably limited or the instructional level was appropriately low, then his current classroom placement may have been suitable. This was not the case, however, as the academic program in KB's classroom was much above a Grade 2 level. Thus, some of KB's inattention and disruptive behavior in the classroom may have been secondary to his frustration about doing school work. Intervention efforts for KB involved, in part, arrangement of special education services better suited to his general cognitive limitations.

References


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