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Judi Harris

College of William and Mary

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What Do Freehand and Computer-Facilitated Drawings Tell Teachers About the Children Who Drew Them?

Judith B. Harris
University of Texas at Austin

Abstract
A qualitative analysis of data was used to determine the scope and interjudge agreement of personality information communicated to computer-using classroom teachers through three types of children's drawings (freehand, graphics tablet, and Logo). Each of 10 Logo-literate 9- or 10-year-old students was asked to draw pictures in the three different media. Each student, a parent, and the student's current classroom teacher were interviewed to develop 10 vignette-style personality profiles. The information contained therein was then compared to what 13 Logo-using classroom teachers intuited about the children's genders, ages, learning styles, and behavior patterns by looking at the drawings with no prior knowledge of the artists. Viewing teachers were not able to consistently detect artist gender or age by looking at pictures drawn with any of the three media, but 69% of the other statements made by the teachers agreed with information contained in the personality profiles. (Keywords: children's drawings, interjudge agreement, teacher perceptions.)

A commonly held belief among educators is that children symbolically express essential aspects of their personalities in their artistic work. This article describes a qualitative research study that explored the question, "What cross-referenceable personality information can teachers accurately infer for young artists by examining the children's creations?"

CHILDREN'S DRAWINGS AS PSYCHOLOGICAL ASSESSMENT TOOLS

Children's drawings were first presented as potential psychodiagnostic tools when Corrado Ricci, an art critic with interests in psychology, published the first known work that contained reproductions of children's art in 1887. A number of other scholarly studies of children's sketches followed (Klepsch & Logie, 1982). These lead to Goodenough's (1926) seminal work, which presented the first systematized method for estimating artists' intelligence from drawings of people. This technique was standardized and embellished upon by Harris (1963)
and Harris and Roberts (1972). The resulting Goodenough-Harris instrument is called the Draw-A-Man Test, because the task presented to the child is simply to "draw a man." It is the earliest example of a class of open-ended drawing investigations called human figure drawings (HFDs) and has since been incorporated into several IQ tests, such as the Stanford-Binet. By far the most research with children's drawings completed to date has made use of the HFD or one of its variants. Klepsch and Logie (1982) suggest a helpful structure for reviewing clinical HFD applications. They assert that children's drawings have either "projective" or "nonprojective" uses in psychological assessment. "Projection" is a clinical term used in this context to suggest that an artist unconsciously imbues the picture drawn with self-perceptions, regardless of the intended picture's subject. There are four types of projective measurements:

- Personality.
- Perceptions of self in relation to others.
- Collectively held values.
- Specific attitudes.

Nonprojective uses include those that "measure a child's developmental or intellectual maturity" (Klepsch & Logie, 1982, p. 13).

Sixty years of research into projective and nonprojective psychoassessment uses for children's drawings suggest that it is indeed possible for artist characteristics such as intellectual acuity, developmental maturity, personality, group values, and attitudes to be reflected through HFDs (cf., Anastasi & Foley, 1936; Bromberg & Hutchison, 1974; Buck, 1948; Burton, 1972; Daoud, 1976; Dennis, 1966; DiLeo, 1970; Drake, 1985; Frankenburg & Dodds, 1975; Gardiner, 1969, 1974; Hulse, 1951; Ilg & Ames, 1978; Jolles, 1971; Klepsch, 1979, 1980; Koppitz, 1968, 1984; Kuhlman, 1979; Laosa, Swartz, & Diaz-Guerrero, 1974; Machover, 1949; Phillips, 1980; Prout & Phillips, 1974; Rabin & Limuaco, 1959; Shearn & Russell, 1970; Smart & Smart, 1975; Urban, 1963; Welch, Flannigan & Rave, 1971).

For the purposes of this study, a complementary set of questions is posed. Who can recognize and correctly identify individual artists' traits from their artwork? Must a judge be trained to collect and interpret HFDs in order to make accurate projective and nonprojective assessments? Do such judgment vary according to the different media, whether computer mediated or not, used to create the pictures?

**HFDS AND THE TRAINING OF JUDGES**

A large body of literature is directed toward establishing the validity of HFD variants, some of which makes use of untrained, or "naive," judges (Arkell, 1976; Burton & Sjoberg, 1964; Cressen, 1975; Fisher & Fisher, 1950; Goodnow, Wilkins, & Dawes, 1986; Hiler & Nesvig, 1965; Howitt, 1984; Levinson, 1983; Lott, 1979; McIntosh, 1981; Plaut & Crandell, 1955; Renchner, 1985; Schmidt & McGowan, 1950; Wanderer, 1969; Ziv & Shechori, 1970). Several studies
include teachers in this category. In summarizing the research on trained and untrained judges’ interpretive abilities, Swensen (1968) concluded that “formal training is not particularly related to success in interpreting the Draw-A-Person Test” (p. 39). Hiler and Nesvig suggest that “well-developed intuitive ability, rather than formal clinical training, is of primary importance in the interpretation of figure drawings” (p. 526).

For the purposes of this study, it was important to extend Hiler and Nesvig’s (1965) hypothesis by proposing another interpretation of these findings. Perhaps human beings possess intuitive abilities that can be used to detect correctly and declare valid information about artists solely by looking at their work. Moreover, perhaps K–12 teachers subconsciously use information gathered in this manner as one of many ways to get to know their students. To consider this possibility, “intuition” should be defined. This is easier said than done. Noddings and Shore (1984), after carefully examining the history of the notion in relation to education from ancient times to the present, chose to characterize intuitive modes by involvement of external and internal senses, by a relaxation of subjectness into receptivity, by a quest for understanding or insight, and by a continuing tension between subjective certainty and objective uncertainty (p. 89).

Noddings and Shore go on to say that an individual’s will must direct intuitive activity, straining against reason, and the senses must assist the effort by consciously turning inward. This exertion of will, according to these authors, must be motivated by a desire for experiential understanding and enjoyment through embracing the apparently irrational. To whatever extent so-called “untrained” (or intuitive) judges are able to reach, maintain, and deepen these states as they view children’s drawings may also be the extent to which they can gather verifiable information about the artists.

**STUDY TYPE**

How, then, might we verify information intuitively received about artists by observers of their works? To determine appropriate methods to use to form answers to this query, the following research questions were formed to organize this study.

- What is the scope of verifiable information communicated through children’s computer-facilitated and freehand drawings?
- How, if at all, does the scope of content-valid information communicated through children’s drawings differ when different tools are used by the artists?

Research results that address these questions will be presented in this article. More detailed findings are available in Harris (1990).

Yin (1984) suggested that all research that attempts to answer questions can be classified as “who,” “what,” “where,” “why,” or “how” queries. “Who,”
"what," and "where" questions are often refined to "how many" and "how much" questions, which are best approached with quantitative survey methods, especially when predictive results are desired. "What" questions can be approached with any research strategy. "How" and "why" questions, asked about contemporary situations over which the researcher has little or no control, are best explored with case studies. Yin is careful to note that the most frequently cited drawback of case studies, that they are not generalizable to larger populations, reflects a misunderstanding of the intent of case study research. According to Yin, case study results, like experiments, are generalizable to theoretical propositions and not to populations or universes. In this sense, the case study, like the experiment, does not represent a "sample," and the investigator's goal is to expand and generalize theories (analytic generalization) and not to enumerate frequencies (statistical generalization) (p. 21).

Additionally, Stake (1978) recommends case studies as the preferred method for social inquiry because "they may be epistemologically in harmony with the reader's experience and thus to that person a natural basis for generalization" (p. 5). Stake posits that case study results are therefore more directly relevant to the practitioner in fields such as education and social work. Yin (1984) defines the case study as an empirical inquiry that investigates a contemporary phenomenon within its real-life context, when the boundaries between phenomenon and context are not clearly evident, and in which multiple sources of evidence are used (p. 23).

Yin (1984) also suggests that multiple case study designs be "consider[ed] as one would consider multiple experiments—that is, to follow a replication logic," rather than for the purpose of obtaining larger respondent samples (p. 48). Accordingly, multiple sources of information should be collected for each case, then interpreted and summarized as if each were a separate study before any cross-case analysis is begun. These ideas helped to form the sequence of specific methods used to explore answers to the two research questions addressed in this study.

METHOD

Because the research questions I decided to explore in this study imply the need for an open-ended exploration of all possible types of information that could be detected about a child artist from his or her work, it is logical to suggest multi-source, open-ended techniques to gather data about the artist. And, because teachers’ impressions of young artists’ personality characteristics were solicited as the teachers viewed children’s works, other human perceptions of each child artist were
requested for cross-referencing the intuitively received ideas stated by the teachers. These were available from the children in the form of self-report interviews and from significant others in the children's lives—namely, their parents and teachers—who were interviewed in open-ended formats about the child artist's personality characteristics. Coded interviews from all informants (children, parents, and teachers) and intuitive impressions from teachers about each artist's works, therefore, comprised the data for each case in this research study.

At first, the two types of data about the artists (interviews and intuitive impressions) were compared within each case. Then, cross-case analysis was used to provide a comparison among picture observers and intuited artist traits to see if any additional patterns could be detected (e.g., whether gender was easier to discern than age, and whether certain observers intuited information more accurately than others).

PARTICIPANT SELECTION

This study employed a purposive informant sample of gifted fifth-grade boys who were U.S. citizens with at least one parent who had a postbaccalaureate degree. Miles and Huberman (1984) support the use of a purposive sample in qualitative studies such as this one because qualitative researchers usually work with smaller samples of people in fewer global settings than do survey researchers. Also, qualitative samples tend to be more purposive than random, partly because the initial definition of the universe is more limited ... and partly because social processes have a logic and coherence that [a] random sampling of events or treatments usually reduces to uninterpretable sawdust (p. 36).

Patton (1980) suggests that researchers select cases to study that promise the most cogent information about the topic of investigation. He recommends that these be "critical cases ... [those that] make a point quite dramatically or are, for some reason, particularly important" (p. 102). Patton goes on to say that although studying one or a few critical cases does not technically permit broad generalizations to all possible cases, logical generalizations can often be made from the weight of the evidence produced in studying a single, critical case (p. 103).

Ten children agreed to be informants for this study. All were 9- or 10-year-old males in fifth grade at a public elementary school in a southeastern state when they were interviewed. All had been identified for their school districts' gifted and talented programs and had qualified for a local university's summer enrichment program for gifted and talented students. This high degree of demographic similarity was sought so that perceived differences among students might be maximally personality specific. Each student was asked to choose one parent and one teacher to
be interviewed about their perceptions of the student. All names were changed to pseudonyms to protect informants’ rights to confidentiality.

**Data Generation and Analysis**

The loosely structured interviews, each of which was approximately 1 hr in length, were audiotaped and transcribed verbatim. The content of these transcripts was then analyzed by theme. Ethnograph software was used to organize coded data. All informants were asked to describe the students’ most and least favorite school subject areas, problem-solving methods, social interaction patterns, personal “life philosophies,” and activity preferences. Study participants provided information in response to all questions, with the exception of several children who were not able to describe their metacognitive problem-solving processes. Member checking was done by surface mail asking informants to correct any interpretive discrepancies made by the researcher on lists of statements written about the students. Of the 1,397 statements that were written and sent to informants, all were read and returned, and 51 were corrected with respect to content (6 statements) and wording (47 statements). Overall, a small fraction of the statements were corrected by informants, approximately 4%.

Constant comparative coding revealed 15 mutually exclusive theme categories across interview transcriptions. Coding reliability and validity were ensured by frequent meetings with two peer debriefers (Lincoln & Guba, 1985) and the maintenance and review of the researcher’s methodological log. One peer debriefer also reviewed all information generated for a randomly selected case to make sure that summary statements were firmly grounded in generated data.

Immediately prior to being interviewed, each student informant drew three pictures, one in each of three different media. The content and style of the pictures were completely determined by the student; the only instructions that they were given by the researcher regarded the media to use for each drawing. Students had crayons, magic markers, and colored pencils to use for the “freehand” picture; a touch-sensitive graphics tablet (Touch Window, 1985) and computer painting software (Animation Station, 1984) for the “graphics tablet” picture; and their choice of IBM Logo (Logo Computer Systems, Inc., LCSI, 1983), Apple Logo II (LCSI, 1984), or LogoWriter (LCSI, 1986) software for the “Logo” picture. All computer-assisted pictures were drawn on Apple IIe computers, with the exception of one Logo picture created on an IBM PC.

Students gave the researcher permission to keep the pictures they created and show them to teachers who had not met the children. Two groups of teachers viewed the pictures and responded to them. One group (5 teachers) were graduate students taking a summer Logo course in New York, and the others (9 teachers) were graduate Logo students completing coursework during the same summer session in Oregon. All had previously worked with Logo with elementary-aged children in instructional settings. The two graduate course instructors received 35mm slide reproductions of the children’s pictures, arranged in a standard order in a slide carousel, and sufficient copies of the study-specific paper-based viewer response form to provide one form for each of the students in their
classes. The instructors were then asked to follow the viewing instructions printed on the first page of the response form. Pictures formed with similar media were grouped together in the slide carousel, but the artist order in each group was different. Viewers were told only that children drew the 30 pictures; they did not know that 10 artists produced all of the pictures, nor did they know anything about each child’s age, gender, computer experience, or learning style. Two types of intuited information were requested of the viewing teachers. The first was specific answers to specific questions about the children (such as age and gender); the second was viewer-supplied comments about the students’ learning styles, school subject preferences, behavior patterns, and any other information that occurred to the viewing teacher. All viewing teachers but one completed the response forms in full. The content of all responses to open-ended questions supplied by viewers was analyzed, revealing eight mutually exclusive coding categories. Answers to both specific and open-ended questions on the viewer response form were cross-referenced with interview data to determine agreement or lack thereof.

Levels of agreement between viewing teacher comments and interview respondent data were classified as “agree,” “disagree,” “agree by implication,” “disagree by implication,” or “not mentioned.” If the content of a particular viewer statement about an artist was mentioned in two or more interviews with people who knew the artist, the statement was assumed to agree with interview data. If the obverse content of a particular viewer conjecture was mentioned in two or more interviews, it was assumed to disagree with interview data. If the content was implied, but not stated in interview data from two or more people who knew the artist, it was assumed to agree by implication. Similarly, if the content of a viewer comment was countered indirectly in two or more interviews, then it was assumed to disagree by implication. Finally, if the content of a viewer conjecture about an artist was not mentioned directly or indirectly in any interview with informants who knew the artist, it was listed as “not mentioned.” This process was checked for accuracy by one of the study’s peer debriefers, who selected a case at random, and traced the claims made in the results summary back to the data generated for the study.

RESULTS AND DISCUSSION

In this section, three types of information about the artists that were collected with the viewer response form are considered across informants and media types: perceived age, perceived gender, and nonprompted perceptions of the artists.

Viewer Assessment of Artist Age and Gender

The 13 viewing teachers (referred to by sequentially assigned letter) perceived artist age and gender largely incorrectly in all drawing media. As can be seen in Table 1, they were able to correctly perceive artist age (+/- 1 year) from Logo drawings slightly better (50% correctly perceived) than they were able to determine age from graphics-tablet drawings (42% correct) and freehand draw-
Table 1
Numbers of Correct Viewing Teachers’ Perceptions of Artist Age and Gender, Differentiated by Media and Summed Across Viewers

<table>
<thead>
<tr>
<th>Media Used by Artist</th>
<th>n</th>
<th>Artist Attribute</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Age</td>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Freehand</td>
<td>130</td>
<td>54 (42%)</td>
<td>68 (52%)</td>
<td></td>
</tr>
<tr>
<td>Graphics Tablet</td>
<td>130</td>
<td>54 (42%)</td>
<td>48 (37%)</td>
<td></td>
</tr>
<tr>
<td>Logo</td>
<td>130</td>
<td>65 (50%)</td>
<td>59 (45%)</td>
<td></td>
</tr>
</tbody>
</table>

Number of viewing teachers = 13; teacher K did not complete response forms. Each teacher viewed 10 of each type of picture; therefore, 130 responses each for age and gender were collected.

Age was perceived correctly 43% of the time and gender was perceived correctly 45% of the time. Seven teachers assessed age correctly more often than gender, and six teachers assessed gender correctly more often than age.

Viewing teachers displayed a fair amount of individual difference in correct perception of artist age and gender (see Table 2). Percentages of correct age estimation (+/- 1 year) ranged from 23% to 63%, with an average of 44%. Percentages of correct gender perception ranged from 20% to 63%, with an average of 45%.

Table 2
Numbers of Correct Viewing Teachers’ Perceptions of Artist Age and Gender, Differentiated by Informant

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Artist Attribute</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Age</td>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>10 (33%)</td>
<td>14 (47%)</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>11 (37%)</td>
<td>16 (53%)</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>11 (37%)</td>
<td>13 (43%)</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>16 (53%)</td>
<td>11 (37%)</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>13 (43%)</td>
<td>14 (47%)</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>12 (40%)</td>
<td>13 (43%)</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>19 (63%)</td>
<td>13 (43%)</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>16 (53%)</td>
<td>14 (47%)</td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>15 (50%)</td>
<td>19 (63%)</td>
<td></td>
</tr>
<tr>
<td>J</td>
<td>8 (27%)</td>
<td>18 (60%)</td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>did not complete forms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>16 (53%)</td>
<td>10 (33%)</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>16 (53%)</td>
<td>14 (47%)</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>7 (23%)</td>
<td>6 (20%)</td>
<td></td>
</tr>
</tbody>
</table>

a Total number of responses = 30. b Total number of responses = 30.
There seemed to be no direct relationship between viewing teachers’ instructional or computer experience and their abilities to correctly assess artist age and gender. Teacher N identified the fewest artist ages and genders correctly. Teacher G perceived artist age most accurately in the group, and Teacher I identified artist gender correctly most often. Teachers G, I, and L had the most years experience combined in all categories: (a) in teaching, (b) using computers, (c) using computers with children, (d) using Logo, and (e) using Logo with children. But Teacher L’s accuracy rate was much lower than that of the other two most experienced viewing teachers. Teacher N, who identified the fewest artist ages and genders correctly, did not have the least number of combined years of experience in these same areas (see Table 3). Teachers with near-average age perception percentages (Teachers E and F) and near-average gender discrimination percentages (Teachers A, C, E, F, G, H, and M) had varied amounts of experience in the five areas cited.

Table 3
Viewing Teacher Professional Experience

<table>
<thead>
<tr>
<th>Years</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching</td>
<td>15</td>
<td>5</td>
<td>6</td>
<td>11</td>
<td>4</td>
<td>5</td>
<td>17</td>
<td>18</td>
<td>27</td>
<td>25</td>
<td>15</td>
<td>32</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Using Computers</td>
<td>10</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>8</td>
<td>15</td>
<td>8</td>
<td>10</td>
<td>6</td>
<td>10</td>
<td>14</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>With Children</td>
<td>8</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>10</td>
<td>8</td>
<td>10</td>
<td>4</td>
<td>8</td>
<td>9</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Using Logo</td>
<td>6</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>8</td>
<td>5</td>
<td>6</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Using Logo With Children</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>8</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Total*</td>
<td>43</td>
<td>15</td>
<td>13</td>
<td>20</td>
<td>16</td>
<td>23</td>
<td>58</td>
<td>44</td>
<td>58</td>
<td>41</td>
<td>41</td>
<td>58</td>
<td>12</td>
<td>17</td>
</tr>
</tbody>
</table>

* This number is provided only for among-teacher comparative purposes; it has no true mathematical value.

Nonprompted Artist Assessment by Reviewing Teachers

A total of 595 viewer-supplied comments were written about the artists of the 30 pictures. Viewers were given virtually unlimited space in which to write their open-ended perceptions. There was little difference in the percentages of open-ended comments supplied for the works of different individual artists (see Table 4). Jon Marshall’s work received 8% of viewer comments on the lower end of the continuum, and Drew Campbell’s pictures received 13% of the viewers’ voluntary comments on the opposite end. Although the numbers of comments supplied for different artists were not that different from each other, percentages of viewer-supplied comments that could be substantiated with interview data were quite different for different artists (see Table 5). The range of percentages for comments that agreed with interview data was 50%–76%, 16%–30% for comments that disagreed with interview data, and 2%–16% of the comments that were offered by viewers that did not appear in interview data.
Table 4
Numbers of Viewer-Supplied Statements Recorded for Individual Artists

<table>
<thead>
<tr>
<th>Artist Pseudonym</th>
<th>Number of Comments(^a)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drew Campbell</td>
<td>78</td>
<td>13</td>
</tr>
<tr>
<td>Mark Fairbanks</td>
<td>60</td>
<td>10</td>
</tr>
<tr>
<td>Lance Koch</td>
<td>59</td>
<td>10</td>
</tr>
<tr>
<td>Jon Marshall</td>
<td>49</td>
<td>8</td>
</tr>
<tr>
<td>James Myerson</td>
<td>54</td>
<td>9</td>
</tr>
<tr>
<td>Sid Richards</td>
<td>62</td>
<td>10</td>
</tr>
<tr>
<td>Bruce Waterman</td>
<td>56</td>
<td>9</td>
</tr>
<tr>
<td>Rick Watt</td>
<td>56</td>
<td>9</td>
</tr>
<tr>
<td>Herb Williams</td>
<td>67</td>
<td>11</td>
</tr>
<tr>
<td>Harvey Wilson</td>
<td>53</td>
<td>9</td>
</tr>
</tbody>
</table>

\(^a\) Total number of viewer-supplied comments = 595.

Table 5
Numbers of Comments Supplied About Artists Separated by Accordance With Interview Data

<table>
<thead>
<tr>
<th>Relationship to Interview Data</th>
<th>Artist</th>
<th>n(^a)</th>
<th>Agreement</th>
<th>Disagreement</th>
<th>Not Mentioned</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Drew</td>
<td>78</td>
<td>54 (69%)</td>
<td>13 (17%)</td>
<td>11 (14%)</td>
</tr>
<tr>
<td></td>
<td>Mark</td>
<td>60</td>
<td>43 (72%)</td>
<td>12 (20%)</td>
<td>5 (8%)</td>
</tr>
<tr>
<td></td>
<td>Lance</td>
<td>59</td>
<td>40 (68%)</td>
<td>12 (20%)</td>
<td>7 (12%)</td>
</tr>
<tr>
<td></td>
<td>Jon</td>
<td>49</td>
<td>31 (63%)</td>
<td>10 (21%)</td>
<td>8 (16%)</td>
</tr>
<tr>
<td></td>
<td>James</td>
<td>55</td>
<td>41 (75%)</td>
<td>10 (18%)</td>
<td>4 (7%)</td>
</tr>
<tr>
<td></td>
<td>Sid</td>
<td>62</td>
<td>47 (76%)</td>
<td>10 (16%)</td>
<td>5 (8%)</td>
</tr>
<tr>
<td></td>
<td>Bruce</td>
<td>56</td>
<td>33 (59%)</td>
<td>16 (28%)</td>
<td>7 (13%)</td>
</tr>
<tr>
<td></td>
<td>Rick</td>
<td>56</td>
<td>38 (68%)</td>
<td>13 (23%)</td>
<td>5 (9%)</td>
</tr>
<tr>
<td></td>
<td>Herb</td>
<td>67</td>
<td>46 (69%)</td>
<td>16 (24%)</td>
<td>5 (7%)</td>
</tr>
<tr>
<td></td>
<td>Harvey</td>
<td>53</td>
<td>36 (68%)</td>
<td>16 (30%)</td>
<td>1 (2%)</td>
</tr>
</tbody>
</table>

\(^a\) Total number of the comments offered about each student.

James Myerson's and Sid Richards' pictures inspired the highest percentages of comments that agreed with interview data (75% and 76%, respectively). Sid's pictures also suggested the lowest percentage of comments that disagreed with interview data (16%). Bruce Waterman's drawings inspired the lowest percentage of interview-substantiated viewer-supplied comments (59%), and Harvey Wilson's pictures suggested the highest percentage of comments that disagreed with interview data (30%). Overall, James' and Sid's pictures were the most reflective of interview data to the viewing teachers who participated in this study, and Bruce's drawings were the least reflective.
Individual teachers’ percentages of interview-substantiated open-ended comments ranged from 52% (Teacher C) to 87% (Teacher F), as shown in Table 6. These perceptual performance figures are not paralleled by years of experience (see Table 3) or correct perceptions of age and gender (see Table 2). Teacher E is the only teacher to perceive age, gender, and viewer-supplied artist attributes similarly; her scores were close to the group’s average in each instance.

Table 6
Numbers of Comments Supplied by Viewers Separated by Accordance With Interview Data

<table>
<thead>
<tr>
<th>Teacher</th>
<th>n⁴</th>
<th>Agreement</th>
<th>Disagreement</th>
<th>Not Mentioned</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>112</td>
<td>85 (76%)</td>
<td>24 (21%)</td>
<td>3 (3%)</td>
</tr>
<tr>
<td>B</td>
<td>25</td>
<td>15 (60%)</td>
<td>6 (24%)</td>
<td>4 (16%)</td>
</tr>
<tr>
<td>C</td>
<td>23</td>
<td>12 (52%)</td>
<td>6 (26%)</td>
<td>5 (22%)</td>
</tr>
<tr>
<td>D</td>
<td>7</td>
<td>5 (71%)</td>
<td>2 (29%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>E</td>
<td>11</td>
<td>7 (64%)</td>
<td>1 (9%)</td>
<td>3 (27%)</td>
</tr>
<tr>
<td>F</td>
<td>15</td>
<td>13 (87%)</td>
<td>2 (13%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>G</td>
<td>124</td>
<td>93 (75%)</td>
<td>22 (18%)</td>
<td>9 (7%)</td>
</tr>
<tr>
<td>H</td>
<td>87</td>
<td>62 (71%)</td>
<td>20 (23%)</td>
<td>5 (6%)</td>
</tr>
<tr>
<td>I</td>
<td>67</td>
<td>41 (61%)</td>
<td>20 (30%)</td>
<td>6 (9%)</td>
</tr>
<tr>
<td>J</td>
<td>18</td>
<td>11 (61%)</td>
<td>5 (28%)</td>
<td>2 (11%)</td>
</tr>
<tr>
<td>K</td>
<td></td>
<td>did not complete forms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>48</td>
<td>34 (71%)</td>
<td>12 (25%)</td>
<td>2 (4%)</td>
</tr>
<tr>
<td>M</td>
<td>22</td>
<td>13 (59%)</td>
<td>0 (0%)</td>
<td>9 (41%)</td>
</tr>
<tr>
<td>N</td>
<td>24</td>
<td>13 (54%)</td>
<td>2 (8%)</td>
<td>9 (38%)</td>
</tr>
</tbody>
</table>

⁴ Total number of comments offered by each viewing teacher.

Perceptions According to Drawing Media

Of the 595 total nonprompted comments about the artists that were offered by the viewing teachers, 235 (39%) were inspired by viewing freehand drawings, 207 (35%) were offered in response to viewing pictures created with a touch-sensitive graphics tablet, and 153 (26%) were supplied when looking at pictures created with Logo. Although freehand media seemed to catalyze more nonprompted comments than graphics-tablet creations, and these pictures, in turn, inspired more viewer comments than Logo pictures, percentages of interview-substantiated artist perceptions were roughly equivalent (freehand: 68%; graphics tablet: 70%; Logo: 69%; see Table 7). This is particularly interesting, considering that the viewers informally commented that they felt that they “knew” the artists better when looking at their freehand drawings, as compared with the drawings that were created with the assistance of either handheld (graphics tablet) or keyboard-accessible (Logo) tools.
Table 7
Numbers of Statements by Viewing Teachers Compared by Content With Interview Data

<table>
<thead>
<tr>
<th>Media Used by Artist</th>
<th>( n^a )</th>
<th>Agreed</th>
<th>Disagreed</th>
<th>Not Mentioned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freehand</td>
<td>235</td>
<td>159 (68%)</td>
<td>47 (20%)</td>
<td>29 (12%)</td>
</tr>
<tr>
<td>Graphics Tablet</td>
<td>207</td>
<td>145 (70%)</td>
<td>42 (20%)</td>
<td>20 (10%)</td>
</tr>
<tr>
<td>Logo</td>
<td>153</td>
<td>106 (69%)</td>
<td>39 (25%)</td>
<td>8 (5%)</td>
</tr>
</tbody>
</table>

\( ^a \) Total numbers of statements supplied by viewers for all pictures drawn with this medium.

Overall, 69% of viewers' comments about artists agreed with interview data, 21% disagreed with interview data, and 10% were comments that were not mentioned in interviews by any of the three participants giving information about a particular artist. When compared with the percentages for correct perception of artist age (43%) and gender (45%), an interesting difference can be observed. It appears that more individualized (and probably less likely to be guessed) intuited information about the artists was verifiable to a greater extent than less individualized artist information (such as age and gender) among the 13 viewing teachers who participated in the study.

This research was a study of individuals; 10 individual artists and the perceptions of 13 individual teachers. It explored whether certain aspects of the 10 fifth-graders' individualities were communicated to Logo-using teachers through free-form artistic works created in three different media. Although no statistical generalizations about teacher or student populations can be made from a multicase exploratory study such as this one, patterns across informant groups and between individual informants can be noted. These should be considered trustworthy for this particular group of individuals because of the methodological rigor demonstrated in data collection and analysis, as described in the previous sections.

### Results Among Students

In naturalistic terms, this group of 10 boys and their parents and teachers was formed by the imposition of external selections processes; they cannot be described as a group in any ethnographic sense, and, therefore, any observations of similarities or differences among group members are probably not the results of group-specific enculturation processes. Still, the issue of whether and to what extent individually distinctive character traits that emerged from interview data were communicated to viewing teachers should be addressed in an effort to determine the relative specificity of the intuitively received information.

Certainly no teacher or group of teachers in this study described any of the artists with the rich detail achieved by combining the students' self-reports with parental and classroom teacher interview data. Yet, the freehand and computer-
facilitated artwork of 7 of the 10 child informants generated unique viewer comments or patterns of viewer comments. For example, Drew was described as “impatient with mistakes” and “happy and serious.” Mark, it was suspected, “combines and builds on knowledge,” and was described as “talkative” and “security oriented.” Lance’s language arts proficiency, emphasizing fine arts applications, was intuited by several viewing teachers; he was also one of only two children in this group who was described as “generally a compliant kid.” James had 19 comments made in response to his drawings that mentioned neatness, concern with detail, precision, and related-work-habit attributes. Sid was collectively portrayed as “bold,” “adventurous,” “restless,” “creative,” and a “divergent thinker.” Herb was suspected to have a “strong personality,” and to be a “quiet” and “intense individual with definite goals.” Harvey’s interests in science and animal study were mentioned by several viewers; he was also described as “impulsive,” “in a hurry,” and “want[ing] to ‘get it right.’” Although “getting it right” was mentioned for several of the child informants during interviews (e.g., Drew and James), Harvey was the only artist whose artwork communicated attention to appearing “right.” This paralleled the frequency with which this concern was voiced by his father and teacher.

Although these attributes do not fully portray each individual artist’s uniqueness, they are characteristics that begin to differentiate the artists from each other. More importantly, these distinguishing personality features were indeed communicated through drawings to viewing teachers who had no other personal information available about the artists, along with other attributes (such as mathematics or science interest) that were more commonly perceived in this particular group of individuals. Also, there were clearly observable individual differences between children such as Sid and James, who had the highest percentages of interview-substantiated viewer comments, and a child such as Bruce, who had the lowest percentage of such comments. It is apparent that some of the children in this study were more or less “intuitively readable” through their artwork than others were. It is difficult to suggest why that may be so, because the topics of and the techniques used for creation of their pictures do not appear to differ by personally expressive potential.

Results Across Students

It is interesting to note that 8 of the 10 students listed science as one of their preferred subjects in school, and 7 of the 10 mentioned mathematics as a favorite. These preferences were noted by many of the viewing teachers when they were considering pictures that the boys created in all three media. It would seem, therefore, that mathematics or science interest was not intuited primarily as a function of use of a mathematically oriented expressive medium such as Logo. Because child informants were chosen partially on the basis of their competency and comfort in Logo use, it may be true that mathematics and science interest is correlated with interest and competence in Logo programming. In view of the purposes of this research, the existence of this apparent relationship does not impact the pattern of correctly intuited subject preferences on the part of
the viewing teachers, because mathematics and science interest was also detected through freehand and graphics-tablet drawings.

It is also interesting to note that most viewer comments were made with regard to student work habits, and the least were made concerning students' physical features or capabilities. Any comments that were offered about emotional attributes or interpersonal behavior patterns were "positively" stated, or worded as apparent evidence of well-adjusted psychological orientations, even when several of the students had had some emotional and interpersonal concerns voiced about them by the adults interviewed (e.g., Harvey, Herb, and Lance). This absence is especially interesting when viewed in light of the voluminous psychological literature briefly reviewed earlier in this document that primarily addressed the emotional content of children's pictures. It is conceivable either that emotional and physical characteristics were more difficult to discern from these children's drawings than intellectual and work habit attributes or that the teachers in this study chose or were taught to pay closer attention to students' intellectual characteristics and work habits than to other attributes.

**Results Among Viewing Teachers**

As noted previously, there were large individual performance differences among viewing teachers in this study that could not be related to years of teaching experience, years of computer use, years of computer use with children, or type of picture media viewed. Perhaps the best way to attempt to ascertain correlated differences in experience, philosophy, or personality among more or less intuitive teachers is to locate and interview the educators who performed on the ends of the perceptual continuum, requesting their reflections on their own intuitive processes.

It should also be mentioned that although there were individual differences among viewing teachers concerning the total number of comments offered in response to the artwork, the teachers with the highest percentage of interview-substantiated comments were not those who also made the most conjectures. It might be suggested, therefore, that more intuitively received information in this scenario is not necessarily more perceptive; that is, quantity does not necessarily imply accuracy.

**Results Across Viewing Teachers**

It seems that this group of viewing teachers was not able to determine artist gender by looking at the content or style of the drawings in any of the three media. Indeed, the average percentage of correct artist gender perception (45%) was even lower than a theoretically random choice between the two options (50%) without viewing the pictures at all. As was reported earlier, there was also no apparent difference among media in gender discrimination. This is in direct contrast to Lott's (1979) finding that adults could correctly determine the gender of male kindergarten students with 60% accuracy by looking at their freehand pictures of jack-o-lanterns. Several lines of reasoning can be posed...
as possible explanations for the discrepancy, all of which could be explored as null hypotheses for postpositivistic studies with larger artist samples. Perhaps the genders of younger child artists are easier to determine than the genders of older child artists. Or it might be easier to determine the gender of child artists when the subject of the drawing is held constant across artists. It is possible that geographic differences exist in gender identification and expression in children's artwork. It might also be possible that in the 10 years that elapsed between Lott's study and this research, gender-stereotyped socialization processes have become less common.

Overall, it may have been easier for viewing teachers in this study to perceive age correctly than it was to assess gender accurately. Although the average percentage (43%) of correct age perception within one year of artist age is slightly lower than the average correct gender perception (45%), gender determination was a decision between two options, while age could be conceived of as a choice among 8 options, assuming that viewers defined "child" as a school-aged person 5–12 years old. Not only was age more easily intuited than gender, it also was the only artist attribute that showed any notable difference among media types. Teachers were slightly better able to perceive artist age from looking at Logo picture (50%) than they were from graphics-tablet (42%) or freehand (38%) drawings. It is possible that using Logo graphics commands may impose a more limited, developmentally tied range of expressions than using freehand or graphics-tablet tools.

It is important, finally, to compare the general types of interview-substantiated information. On the average, viewing teachers in this study perceived artist age to within one year 43% of the time and artist gender 45% of the time. An observable difference can be observed when comparing that to an average percentage of interview-substantiated open-ended comments of 69%. This may, in part, be because of the specificity of the information requested in the two different question formats, but it may also indicate that personality attributes (specifically, school subject interests and work habits) were more easily discerned from viewing the children's artwork than quantifiable descriptors such as age and gender.

CONCLUSION

It is obvious from the comparison of interview-fueled cases written about the artists and picture viewer response data that the triple interview process (child, parent, and teacher) is an effective way to get to know an individual student. But there is no point in recommending this information-gathering and data-reduction process to classroom teachers who wish to know their students in these ways, because it is obviously neither time efficient nor cost effective for them to individually interview all of the students they teach, their parents, and their previous teachers. Although the range of verifiable artist-specific data that was collected from teachers viewing students' artwork was much narrower than the rich compilation of perspectives garnered from focused conversations with the artists themselves and two of the important adults in their lives, a good percent-
age of the open-ended information offered by viewing teachers was accurate according to comparisons with interview data. This may imply that encouraging teachers to collect and triangulate data from many sources, including those that yield so-called “soft data” about their students by observing graphic artwork (or, for that matter, creative writing and mathematical problem-solving processes) is a worthwhile endeavor. It may help teachers to make such perceptions more conscious and, perhaps, enable them to get to know their students in a more holistic way.

Do teachers fail to access potentially helpful intuitive sources of information about the children in their classes? More research is needed to determine whether the types of cross-referenceable data that teachers intuit from looking at children’s drawings are indeed of prescriptive assistance, and if so, whether teachers can be helped to improve upon the accuracy of their already-astute intuitive perceptions.

Contributor

Judith Harris is an assistant professor of instructional technology in the Department of Curriculum and Instruction at the University of Texas at Austin. Her current teaching and research interests include (a) instructional applications of and professional development with Internet-based telecomputing for educators; (b) the analysis of online conversations among adults and children; (c) relationships among educators’ beliefs, practices, and use of technological tools; and (d) emerging trends in the design of contexts and roles for computer-mediated teaching and learning. (Address: Dr. Judith B. Harris, Department of Curriculum & Instruction, 406 Sanchez Building, College of Education, University of Texas at Austin, Austin, TX 78712-1294; jbharris@tenet.edu.)

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*Journal of Research on Computing in Education* 367


