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Cultural differences in Chinese American and European American children's drawing skills over time☆

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ABSTRACT

Parents and early childhood teachers in Chinese societies and the United States have had dissimilar views about appropriate art instruction for young children. The Chinese view is that creativity will emerge after children have been taught essential drawing skills. The American view has been that children's drawing skills emerge naturally and that directive teaching will stifle children's creativity. Forty second-generation Chinese American and 40 European American young children participated in this longitudinal study at ages 5, 7, and 9 to explore possible cultural differences in and antecedents of their drawing skills and creativity. Chinese American children's person drawings were more mature and creative and their parents reported more formal ways of fostering creativity as compared to their European American counterparts. Correlations showed that children who had more opportunities to draw and who received more guidance in drawing were more advanced in their drawing. For Chinese Americans, fathers' personal art attitudes and children's Time 1 drawing skills predicted 53% of the variance in children's drawing scores four years later.

Parents and early childhood teachers in Chinese societies and the United States seem to have different views about appropriate art instruction for young children. In China, the cultivation of basic skills is primary, and it is believed that creativity will emerge after children have been taught essential skills (Gardner, 1989). The dominant view in the United States has been that creative expression is best developed through a nondirective, progressive educational approach. It is believed that directive teaching in early childhood will diminish a child's natural creativity and that skills are more appropriately developed at a later time (Gardner, 1989). This study was designed to examine whether parents from a culture which favors more explicit early instruction in basic drawing skills have children whose drawing is lower in creativity.

The attitudes we hold regarding children and young children's art have been shaped by our cultural beliefs. These cultural beliefs, in turn, affect the kinds of experiences we offer to our children at home and at school. Culture affects many aspects of children's drawing (Alland, 1983; Cox, 1993; Golomb, 2002; Wilson, 1985). The developmental rate, the graphic elements, the topics of the drawings, the need to develop representational skills, the nature of adult art in a particular culture, and the value of developing artistic skills relative to other skills are all influenced by culture. Patterns of cultural influence are evident in the drawings of even very young children (Alland, 1983). Golomb (2002) states, ". . .models provided by the culture, the teaching strategies used, and the expectations of teachers and parents can have a notable impact on the art children produce" (p. 42).

1. Cultural comparison of parental attitudes, beliefs, and practices

Parental attitudes, which are influenced by cultural values, have been demonstrated to be related to children's performance in various domains (e.g., Eccles, 1993; Goodnow & Collins, 1990; Hess & Holloway, 1984). Parents can influence children's beliefs and achievement motivation through the messages they communicate

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regarding their own competence and preferences (Eccles, 1993). In addition, children may observe parents' own efforts in a particular domain and imitate the parent's technique. Parents who value graphic arts highly and who are more competent in art very likely have children who become more skilled. This may be particularly true of Chinese children, because their parents have uniform high expectations for their children's achievement (Chao & Tseng, 2002). In a collective society like China, children achieve to bring glory to their families (Ebrey, 1991). Profoundly influenced by Confucian teachings for 2500 years, Chinese people have been guided by the principle of filial piety—respect of and responsibility toward parents (Chan, 1963). Ebrey (1991), quoting a late Ming Dynasty document (16th–17th century) on family harmony, reports parents in a family "should utilize their authority to dictate matters, to maintain order, and to inspire respect, so that members of a family will all be obedient" (p. 318). Parents' attitudes and expectations are communicated very clearly to their children, and children do not perceive that they have the choice to disregard parents' ideas. In contrast, European American parents in the U.S. embrace independence and individualism. Children have more choices and are encouraged to be unique.

Several researchers have demonstrated that immigrant Chinese American parents are more directive and controlling in their parenting style than are European American parents (Chao, 1994; Huntsinger & Jose, 1995; Lin & Fu, 1990). Chinese parents have also been found to endorse personality characteristics (which would aid children in learning how to draw) of persistence, neatness, concentration, and precision more strongly than European American parents (Jose, Huntsinger, Huntsinger, & Liaw, 2000). Most researchers of parental attitudes have examined the influence of mothers', but not fathers' attitudes. The scant extant research shows Chinese fathers have been described as gentle, respected, dignified, and interested in education (Fukaya, 1995); as blending strictness and kindness; and as more involved than fathers from other East Asian countries (Shwalb, Nakazawa, Yamamoto, & Hvun, 2004). Paternal warmth has been shown to predict child achievement (Chen, Liu, & Li, 2000.) Because the traditional role of the Chinese father as an authority figure is to ensure that their children achieve (Chen et al., 2000), the attitudes of immigrant Chinese American fathers might have more influence on their children's drawing skill development.

2. Chinese versus American views about appropriate methods of art instruction

Winner (1989) noted that graphic arts are regarded very highly in China; children begin formal instruction in drawing and painting beginning in kindergarten (which includes children from 3 to 6 years of age). The primary focus of early art instruction is on skill-building and technique (Thompson, 2005). Winner (1989), Gardner (1989), and Cox (1992) have noted the differences in the quality of drawing skills that exist between Chinese and American children. Chinese children display extraordinary ability to master the prescribed ways of drawing and painting in their small, neat pictures. The superior drawing performance of Chinese children has been attributed to the explicit instruction in calligraphy, drawing, and painting in Chinese schools and the early encouragement of compliance in children by their families (Winner, 1989). In China's long artistic tradition—over 4000 years, children have been taught the precise steps that are required to draw butterflies, flowers, fish, and birds, for example. The teacher draws the figure step by step, and children are expected to copy the teacher's model (Golomb, 2002; O'Keeffe, 2001). When children are taught Chinese painting, they follow prescribed brush strokes, using specific brushes. The same tools are used for calligraphy, which was developed to serve as a means of communication and as a form of artistic expression (A Look at Chinese Painting, 2009). Calligraphy requires specialized training and careful practice. Each Chinese character represents a word or an idea. To learn to write, children need to concentrate very hard on the unique details of each character. Every Chinese character is constructed within an invisible square, and Chinese children practice writing on graph paper. In the last two decades, the Ministry of Education in the People's Republic of China has created a national art curriculum with standards, textbooks, and teaching materials for children from kindergarten (ages 3–6 years) to secondary school (Art education in China, 2001; Golomb, 2002).

In the United States, the emphasis has been on creativity, imagination, and self-expression rather than on correct ways of drawing. Early childhood professionals in the United States have long endorsed a stage theory of artistic development (Brewer, 2004; Kellogg, 1969; Lindstrom, 1960), believing that children naturally progress through predictable stages of drawing, beginning with scribbling. According to Thompson (2005), the emphasis on the biologically determined unfolding process has probably been "motivated by the desire to preserve children's art in the most unadulterated state possible" (p. 224). In fact, American early childhood teachers for decades have been admonished not to show the child how to draw (e.g., Brewer, 2004; Edwards, 1997; Lasky & Mukerji, 1980; Read, Gardner, & Mahler, 1993). Read et al. (1993) recommended, "We do not give the child directions or set any kind of pattern. It is important that the child is free to express himself without the interference from adults" (p. 329). A decade before, Lasky and Mukerji (1980) prescribed, "Do not draw pictures for a child, because your drawing is likely to be superior to the child's. Do not comply when the child asks you to draw; instead, encourage the child to do it. . .Never have children copy someone else's drawing" (p. 15). More recent early childhood education textbooks (Copple & Bredekamp, 2009; Dodge, Colker, & Heroman, 2002; Gordon & Brown, 2008) advise teachers to avoid adult-made models. Gordon and Brown (2008) state, "Avoid models, making things for children to copy. It insults children and can make them feel inadequate in the face of something you can do so much better" (p. 568). This view of artistic growth has its roots in the Romantic philosophy of Jean Jacques Rousseau who believed that "the child was endowed with an inborn creativity and an internal artistic time clock, which if allowed to unwind at its own speed and in its own natural manner, could maintain the creativity of child art until adulthood" (Wilson, 1985, p. 90). Early childhood professionals in the United States have accepted this position and have tended to resist other views (Thompson, 2005).

If drawing is influenced by culture, then it can be argued that "graphic schemas" are transmitted through social means (Braswell, 2001; Callaghan, 1999). Drawing is a symbol system which precedes the development of writing. Just as children who are learning language need language models and social interaction with a speaking partner (Vygotsky, 1978), children who are learning to draw probably benefit from guided participation in drawing tasks with a more experienced person, usually a parent or an older sibling (Braswell, 2001). Young children's drawing is facilitated by social experience (Callaghan, 1999) and direct instruction (Kindler, 1995). Golomb (1992) and Callaghan (1999) have found that young children will successfully represent a simple object when directed to do so, even though their free drawing is typically non-representational. Children as young as three years old improve their drawings when they receive feedback that their drawing does not look like the object they intended to draw (Callaghan, 1999).

If young children are taught to draw, are their drawings more mature than those of young children who are not explicitly taught to draw? To answer this question, we investigated human figure drawings by Chinese American children of immigrant parents as well as European American children. We chose human figure draw-

ings because the human figure is one of the most frequently chosen topics when young children draw spontaneously (Cox, 1993). We wanted to explore both the Chinese view—that teaching basic skills facilitates later creativity—and the American view—that creativity is stifled by direct teaching and modeling. Therefore, we needed to look at both drawing skill and drawing creativity.

3. Issues, considerations, and research regarding creativity

Are European American children more creative in their drawings than Chinese American children, given the emphasis on creativity and self-expression in the United States? Do the immigrant Chinese parents convey to their children the traditional Chinese emphasis on formal teaching of correct technique (Ho, 1994), and does this have a deleterious or salubrious effect on children's facility and creativity? Ho (1994) writes that there have been few cross-cultural investigations into creativity. The existing scant research conforms to the expectation that the Chinese tend to be weaker in creativity and divergent thinking (Ng, 2001). In *The Learning Gap* (1992), Stevenson and Stigler wrote that Chinese people believe their children are not as creative as American children. Stevenson and Stigler (1992) endorsed the Chinese view of creativity development by stating "creativity in a domain depends on the mastery of basic skills; it is not inhibited by their mastery" (p. 92). Their empirical data, however, did not include any art or creativity measures. Ho (1994) points to the need for more research regarding the effects of Chinese parenting on the development of creativity in young children.

Probably one reason for the dearth of cross-cultural research is that creativity is culturally defined. One culture may encourage creativity in specific domains (i.e., art or music), while ignoring creativity in other domains (i.e., science or business). The cultural prescriptions regarding what types of creativity are valued are transmitted to children through parents and family and later on, through the schools. Adult creativity is usually defined in terms of originality and usefulness of a product, idea, or performance (Runco, 2005). In art and literature, originality is considered to be the sufficient criterion for creativity (Amabile, 1998); whereas, in most other fields, both originality and usefulness (or appropriateness) are necessary conditions for determining creativity (Csikszentmihalyi, 1996; Runco, 2005).

In the United States, art educators, developmental psychologists, and early childhood teachers commonly formulate recommendations to help parents develop creative children. Sternberg (2001) advises parents (1) to encourage the child to take risks, to question, and to persevere; and (2) to model and reward creativity. Gupta (2007) states parents "need to provide opportunities as well as an environment where the child's latent talent can find expression and blossom" and "Let the child choose the medium for expressing his creativity. . .All you need to do is introduce the child to these different media and provide the necessary accompaniments like colors, brushes, instruments, etc." (p. 1). This advice is echoed in a recent early childhood education textbook (Gordon & Brown, 2008). An art educator, Gelineau (2004), writes that creativity is believed to be fostered by providing children with knowledge, skills, and appropriate surroundings. Specifically, parents and teachers can help children sharpen their sensory observations, use their imaginations, and look at common things in uncommon ways, as well as providing an atmosphere that values children's ideas and efforts.

4. Purposes and predictions

Our research compares Chinese American and European American children's drawings at three time points over a period of four years. We believed that cultural differences would be evidenced. If Chinese American children are influenced to a greater extent by the culture of their parents, then we would expect their drawings to be more advanced than those of European American children. If they are influenced to a greater extent by the art experiences in their United States early childhood programs and primary grade classrooms, then we would expect their drawing skills to be more like those of European American children.

The ratings of drawing creativity in this study are based on the existence of novel or unusual elements in children's drawings of a person. In addition to global ratings of creativity at all three time points, we used several more formal measures of creativity at Time 3 to explore creativity more fully. This longitudinal study, with data collections at three time points two years apart, investigated whether cultural differences in drawing skills and/or creativity exist between young Chinese American and European American children. We also examined whether initial group differences, if found, would persist over the primary school years.

Several researchers (Case & Okamoto, 1996; Cox, 1992; Winner, 1989) have shown that Chinese children's drawings are more advanced than those of children in the West. With this in mind, we predicted that (1) Chinese American children of immigrant parents, as compared to their European American counterparts, would demonstrate greater maturity in their drawings of a person, better fine motor skills, and more time practicing fine motor skills; and (2) The growth rates for Chinese American and European American children's drawing skill were expected to be similar; thus, Chinese American children would maintain their advantage in drawing skill over the four-year time span. Because there has been scant cross-cultural research on young children's drawing creativity, it was difficult to form an hypothesis regarding creativity. Because Americans emphasize creativity to a greater degree (Stevenson & Stigler, 1992), we predicted that (3) European American children would demonstrate greater artistic drawing creativity.

Based on the existing literature regarding the influence of differing cultural views and parental attitudes and practices (e.g., Eccles, 1993; Gardner, 1989; Thompson, 2005; Winner, 1989) we predicted that (4) Chinese American parents would have more positive art attitudes, and (5) Chinese American and European American parents would not report identical methods to foster creativity in their children. Further, we expected (6) parental attitudes and practices to predict children's drawing skills.

5. Method

5.1. Participants

At Time 1, our sample comprised 40 second-generation Chinese American (CA) children (20 boys, 20 girls) ($M = 5.67$ years, S.D. = .34) and 40 European American (EA) children (20 boys, 20 girls) ($M = 5.60$ years, S.D. = .32) from well-educated, middle class, two-parent, suburban families. Families were recruited from preschools, kindergartens, and weekend Chinese schools in the suburbs of a large mid-western city. Each of the ethnic groups was composed of 10 preschool girls, 10 preschool boys, 10 kindergarten girls, and 10 kindergarten boys.

Important characteristics of the sample are shown in Table 1. All Chinese American children had immigrant parents; their mothers and fathers had been in the U.S, on average, for 11 years and 12.3 years, respectively. Their countries of origin included Taiwan (31 families), mainland China (4 families), Hong Kong (4 families), and the Philippines (1 family). Thirty-nine of the families spoke a Chinese dialect (Mandarin, Cantonese, or Taiwanese) in their homes. Forty percent were Buddhist, 40% were Christian, and 20% were nonreligious. Two families had Chinese nannies and eight families had grandmothers living in their homes.

Table 1
Sample demographics at Time 1.

Characteristic	Chinese American		European American	
	Mean	S.D.	Mean	S.D.
Age of child	5.67	.34	5.60	.32
Number of children in family	2.21	.55	2.41	.71
Mother's age	37.38	2.88	36.88	4.40
Father's age	39.77	3.09	39.62	4.84
Mother's educational attainment	16.73	1.94	17.18	1.32
Father's educational attainment	18.23	2.21	17.68	1.81
Hollingshead four-factor status scores	59.33	6.81	60.78	4.63
Months in preschool program	22.15	13.67	23.75	13.05
	Frequency		Frequency	
Number who attended day care full time	10		6	
Families reporting incomes over $60,000	28		34	
Firstborn child	11		18	
Middle child	7		7	
Lastborn child	19		12	
Only child	3		3	

All parents in the European American sample were born in the United States except for two fathers, one of whom was born in Canada and one in Austria. English was spoken in their homes; 90% described themselves as Christian; and none had grandparents living with them.

Children in both groups attended similar schools and were exposed to programs which offered non-directive early childhood art experiences. However, 94% (Time 2) and 71% (Time 3) of the Chinese American children in the present sample attended weekend Chinese school on Saturdays or Sundays where they received two hours of instruction in Chinese calligraphy and in reading and speaking Mandarin Chinese. Children were expected to do Chinese homework in preparation for the weekend classes.

At Time 1, all children had attended preschool programs for similar amounts of time (see Table 1). Four CA children and 3 EA children had attended Montessori programs. The rest attended high-quality traditional early childhood programs whose predominant enrollment was European American children in their respective suburban communities. At Time 2, 1 CA child (Baptist) and 5 EA (Catholic) children attended parochial schools; at Time 3, 5 EA children attended Catholic schools. The rest of the participants attended suburban public schools with majority enrollment being European American.

At Times 2 and 3, respectively, we retained 95% and 91% of the original sample (see Table 2 for sample characteristics at Time 3).

5.2. Measures

5.2.1. Children's measures at all three time points

5.2.1.1. Drawing skill. The Draw-A-Person Test, developed by Goodenough (1926) and revised by Harris (1963), focuses on 71 details of the drawn human figure. For example, one point is given for the presence of each of the following: head, arms, legs, trunk, length of trunk greater than breadth, etc. Test–retest reliability has been reported as reasonably high (*r*s = .90–.94) (Cox, 1993). Interrater reliability correlations among scorers ranged from .80 to .96 (Cox, 1993). Each child was tested individually in a quiet place by a female who was very experienced at working with children. After being given a pencil and a piece of 8(1/2)" × 11" white paper, children were told, "I'd like you to draw a picture of a person. Make the very best picture that you can." The score was used as an index of children's drawing skill in this study, not as a measure of intellectual and conceptual maturity. This measure was given at Times 1, 2, and 3.

5.2.1.2. Drawing creativity. The children's drawings of a person were globally rated on creativity by two experienced early childhood teachers at Time 1, by two elementary school art teachers at Time 2, and two college art education instructors at Time 3. Creativity was broadly defined as the inclusion of novel or unusual elements in the drawing. Drawings were randomly arranged and independently presented to the raters, who were blind to the gender, age, and ethnicity of the children. A 5-point Likert scale was used, where 1 = low creativity, 3 = average creativity, and 5 = high creativity. Interrater reliability at each of the three time points was high to moderate: Time 1 $r = .87$; Time 2 $r = .83$; Time 3 $r = .57$. Because the Time 3 reliability was lower, we also looked at it using the "hits and misses" method. A "hit" is scored when the two ratings are within 1 point of each other. The "hit" rate for the Time 3 creativity raters was 84%

To assess interrater reliability across the three time points, the raters from Time 1, Time 2, and Time 3 were asked to independently rate 15 randomly selected drawings for creativity using the same 5-pt Likert scale. Interrater reliabilities among all six raters

Table 2
Sample demographics at Time 3.

	Chinese American			European American		
	N	Mean	S.D.	*N*	Mean	S.D.
Age of child		9.75	.34		9.70	.32
Boys in sample	17			18		
Girls in sample	18			20		
Number of children in family		2.21	.55		2.41	.71
Mother's age		41.38	2.88		40.88	4.40
Father's age		43.77	3.09		43.62	4.84
Mother's educational attainment		16.73	1.94		17.18	1.32
Father's educational attainment		18.23	2.21		17.68	1.81
Hollingshead (1975) status score		59.83	6.81		60.77	4.63

Note. There are no significant differences on any of the sample characteristics.

ranged from .80 to 1.00, with a mean of .90. This result gives support to the idea that creativity can be globally rated, specifically, that there is a consensus regarding what is considered creative in children's drawings of a human figure by people who are familiar with children's drawings in the United States.

5.2.2. Children's measures at Time 1 only

5.2.2.1. Visual discrimination. At Time 1, the 18-item visual speed test (1st grade) from the Michigan Cognitive Battery (Stevenson, Lee, Chen, Stigler, Hsu, & Kitamura, 1990) was used to assess the accuracy of children's ability to visually match one of four alternative pictures to the target picture. Scores can range from 0 to 18. This measure was used previously by Stevenson and colleagues in China, Japan, and Taiwan. The time each child took to complete the test was also recorded.

5.2.2.2. Fine motor coordination. At Time 1, children wrote their names and they wrote numerals as part of a mathematics test. Written names and numerals were each rated by two experienced early childhood educators (blind to the identity and ethnicity of the children) on a scale of 1 (least mature) to 5 (most mature). Interrater reliability between raters for both names and numerals was high (r = .88). Criteria used by the raters included proper formation of numerals/letters, uniformity of spacing, alignment in a plane, size of numerals/letters, and line quality. Ratings for names and numerals were averaged together for the fine motor coordination variable. The *visual discrimination* and *fine motor coordination* variables were moderately correlated (r = .54); therefore, they were standardized and combined into the variable *Time 1 visual-motor proficiency*.

5.2.2.3. Amount of time spent on fine-motor tasks. At Time 1, parents were interviewed in their homes and asked to describe their child's typical weekday in the spring from the time the child got up in the morning until the time the child went to bed at night. The amount of time the parents reported their child engaged in focused practice on a fine-motor task (minutes per day spent on parent-assigned homework, drawing, and music practice) is used in this paper. Time diaries have been used by researchers (e.g., Huston, Wright, Murphy, & Oppenheimer, 1993) to quantify children's use of time.

5.2.3. Children's measures at Time 2 only

5.2.3.1. Visual-motor control. At Time 2, the visual-motor control subtest from the Bruininks Oseretsky Test of Motor Proficiency (Bruininks, 1978) was administered to the children. Only the seven pencil and paper items were given. Item #1, which required children to use scissors to accurately cut around an outline of a circle, was not used, because our focus was more specifically on children's use of drawing and writing tools. Total scores for the seven-item measure can range from 0 to 20.

5.2.3.2. Spatial relations test. At Time 2, the spatial relations test (first grade) from the Michigan Cognitive Battery (Stevenson et al., 1990) was administered individually to the children. Children are guided through two practice problems and are given 12 problems to complete independently. Each problem consists of a target shape which is part of a square. The child is asked to choose (from four alternatives) the shape which will complete the square. Two scores are derived from this measure: (1) the number of problems solved correctly, and (2) the time (in minutes) required for task completion. Children were not aware that they were being timed.

5.2.4. Children's measures at Time 3 only

5.2.4.1. Figural creativity. At Time 3, children were given the Picture Completion activity from the Torrance Tests of Creative Thinking—Figural TTCT (Torrance, 1990). The activity asks children to finish 10 incomplete figures by adding lines to make interesting objects or pictures that no one else will think of. They are also asked to make an interesting title for each completed drawing. The drawings are scored on fluency, originality, elaboration, abstractness of titles, and resistance to premature closure.

5.2.5. Parent measures at Time 1 only

5.2.5.1. Importance of art. At Time 1, parents were asked, "How important is it for your child to develop competence in (mathematics, science, language arts, social studies, foreign language, computers, music, art, sports)?" Responses were given on a 5-point Likert scale where 1 = unimportant and 5 = very important. The variable used in this paper is the parent rating of the importance of art competence.

5.2.5.2. Mothers' and fathers' personal attitudes toward art. At Time 1, three questions which assessed mothers' and fathers' personal attitudes toward art were answered on 5-point Likert scales: (1) "Indicate how easy or difficult it was for you to achieve good grades in art." (1 = very difficult, 5 = very easy); (2) "How would you rate your competence in art?" (1 = low competence, 5 = high competence); and (3) "How much did you like art in school?" (1 = not at all, 5 = very strong like). Mothers' responses to the three questions were moderately to strongly correlated (rs = .70–.79 for EA and rs = .41–.64 for CA) and were combined into the variable *mothers' art attitudes*. Fathers' responses were similarly correlated (rs = .50–.67 for EA and rs = .54–.79 for CA) and combined into *fathers' art attitudes*. Because fathers' and mothers' art attitudes were not correlated, fathers' and mothers' art attitudes are used in separate regressions reported later.

5.2.6. Parent measures at both Times 2 and 3

5.2.6.1. Children's activity attendance. In the parent questionnaires at Times 2 and 3, parents were asked to "Check the non-school activities your child has participated in this year." The four variables used in this paper were *participation in art classes at Time 2 and at Time 3* and *participation in Chinese school at Time 2 and at Time 3.* The responses were coded using 0 = *did not participate* and 1 = *did participate*.

5.2.7. Parent measures at Time 3

5.2.7.1. Parents' ways of fostering creativity. In the Time 3 interview of both parents in their home, parents were asked, "In what ways do you try to foster creativity in your child?" A list was made of all the unique responses to the open-ended question. A developmental psychology professor and the first author independently assigned the 189 items to one of five categories derived from the literature on facilitating creativity in children: (1) providing materials; (2) encouragement and reinforcement; (3) creating the atmosphere; (4) parental teaching and modeling; and (5) enrolling the child in formal classes. Providing materials included buying books, buying supplies, and saving "junk" for children to use. Encouragement and reinforcement included praise for child's efforts, acknowledging the child's work, encouraging imaginative play, expressing interest, and displaying the child's art work. Creating the atmosphere included giving the child opportunities, freedom, time, and space to be creative. Parental teaching and modeling included observing the parents' example, parental teaching of skills, alerting the child to observations in nature, and taking the child to art exhibits and museums. Enrolling in formal classes includes any arts classes outside of regular school. Interrater reliability of 87.7% was achieved. The two raters easily reached consensus on the remaining items.

Table 3
Cultural differences in Draw-a-Person, time use, visual-motor proficiency, art attitudes, and creativity.

Child variable	Chinese American Mean (S.D.)	European American Mean (S.D.)	*F*
Draw-A-Person (Time 1)	22.85 (8.73)	16.68 (5.55)	14.25*
Draw-A-Person (Time 2)	33.39 (7.18)	26.48 (6.75)	18.72*
Draw-A-Person (Time 3)	36.14 (4.19)	31.39 (5.40)	17.41*
Time on focused practice (min./day) (Time 1)	55.56	5.92	47.75*
Visual discrimination (Time 1)	16.42	15.45	5.85*
Fine motor coordination rating (Time 1)	3.64	2.34	32.72*
Visual-motor control test (Time 2)	18.02	16.17	12.57*
TTCT figural creativity (Time 3)			
Fluency	9.43	9.53	NS
Originality	6.60	5.68	4.30*
Abstractness of titles	7.65	5.34	3.39+
Elaboration	4.97	4.76	NS
Resistance to premature closure	16.80	16.37	NS

Time 1: $N = 40$ CA, 40 EA. Time 2: $N = 36$ CA, 40 EA. Time 3: $N = 38$ EA, 35 CA.
+ $p < .10$.
* $p < .05$.

5.3. Procedure

Data collection took place at three time points two years apart. At Time 1 (T1), half the children were in preschool and half were in kindergarten; at Time 2, children were in grades 1 and 2; and at Time 3 children were in grades 3 and 4. The visual-motor coordination measures (T1 & T2), spatial relations measure (T2), and the picture completion activity from the Torrance Tests of Creative Thinking (T3) were individually administered to each child in a quiet room in the preschool, kindergarten, or elementary school they attended on weekdays as part of a larger research project. Questionnaires were given to the children's teachers (who were all European American) to mail back to the researchers. No data were collected at weekend Chinese schools. At all three time points, questionnaires (in English for EA parents and in both Chinese and English for CA parents) were mailed to the mothers and fathers to individually complete at home. Questionnaires had been translated into Chinese by a Chinese American research associate and verified by a Chinese American professor of English. (Only 2 Chinese American parents completed the questionnaire in Chinese at each time point.) Following the in-school assessment of the children at each time point, appointments were made with parents to visit their homes for the purpose of parent (mothers and fathers) interviews. A Chinese American research associate interviewed 13 couples in Chinese (1 in Cantonese and 12 in Mandarin) at Time 1, while only four couples requested an interview in Chinese at Time 3. Prior to the parent interview (or at the same time as the interview, if a second researcher was present), children completed the Draw-A-Person Test (Harris, 1963) and the children's questionnaire at a quiet table in their home. Completed parent questionnaires were collected at the time of the parent interview. Each family was compensated $5.00 at Time 1, $25.00 at Time 2, and $40.00 at Time 3 for their participation. A thank you note with the compensation enclosed was mailed to the families after all data were collected.

6. Results

Hypothesis 1. Did Chinese American children, as compared to their European American counterparts, demonstrate greater maturity in their drawings of a person, better fine motor skills, and more time practicing fine motor skills?

Between group differences were analyzed using 2 (ethnicity) x 2 (gender of child) analyses of variance. Although no predictions were made concerning gender of child, these differences are reported when they occurred.

6.1. Drawing skill

At all three time points, Chinese American children scored higher on the Harris-Goodenough Draw-A-Person Test (see Table 3 and Figs. 1 and 2). All four of the Chinese American children who dropped out of the study were from the younger age group so what began at Time 1 as a balanced sample (ethnic group, gender, and age) was no longer balanced at Times 2 and 3. To determine whether the drawing superiority at Times 2 and 3 was due to differential attrition (a larger proportion of Chinese American children in the older age group), we used the hot deck imputation method (Little & Rubin, 1987). For each of the missing participants at Time 2, we selected a participant of the same gender, age, and ethnic group who had a Time 1 Draw-A-Person score similar (within one point) to that of the missing child. We substituted the Time 2 and Time 3 scores obtained by the similar participants into our data and reran the analysis. We followed the same procedure for the two European American children and one Chinese American child who dropped out after Time 2.

Results of the ANOVAs were very similar to those reported above. Using the imputed values, we found that at Time 2 Chinese American children ($M = 33.15$; S.D. = 7.70) outscored European American children ($M = 26.48$; S.D. = 6.75) on the Draw-A-Person Test, $F(1, 78) = 17.01$, $p < .0001$. Using the imputed values at Time 3, Chinese American children ($M = 36.20$, S.D. = 4.19) obtained higher scores on the Draw-A-Person Test than did European American children ($M = 31.43$, S.D. = 5.49), $F(1, 78) = 19.10$, $p < .0001$.

At Time 1 and Time 2, girls ($Ms = 21.55, 31.44$) scored higher than boys ($M = 17.97, 28.17$) on the Draw-A-Person test, $Fs(1, 72) = 5.96, 4.02$, $ps < .05$, respectively. At Time 3, the gender difference had disappeared.

6.2. Visual-motor performance

At Time 1, Chinese American children scored higher in visual discrimination than did their European American counterparts. At Times 1 and 2, Chinese American children demonstrated significantly better visual-motor control (see Table 3).

6.3. Time on focused practice

Chinese American children had spent much more time doing parent-assigned homework, drawing, and music practice at Time 1 (see Table 3).

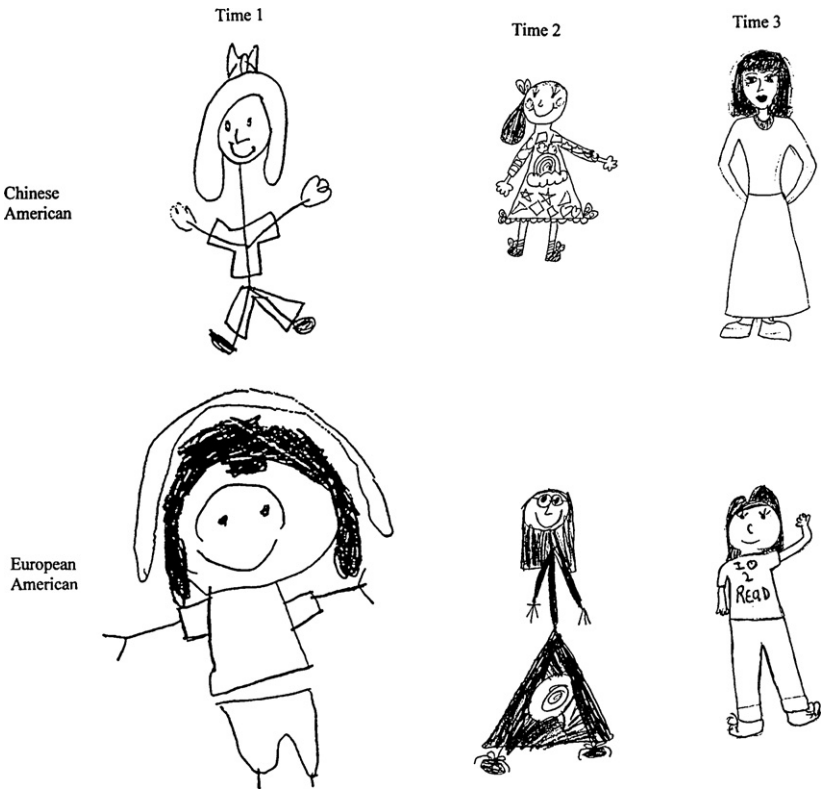

Fig. 1. Drawings representing the Draw-A-Person mean scores at Times 1, 2, and 3.

6.4. Spatial relations performance

At Time 2, Chinese American (M =11.58, S.D. = .472) and European American (M = 11.35, S.D. = .495) children had similar scores on the spatial relations test, $F(1, 74) = .981$, $p = .325$. However, Chinese American children (M = 1.62 min) solved the problems significantly faster than did European American children (M = 1.94 min), $F(1, 74) = 8.22$, $p < .01$.

Hypothesis 2. Did Chinese American children and European American children differ in their growth rates over the four-year time span?

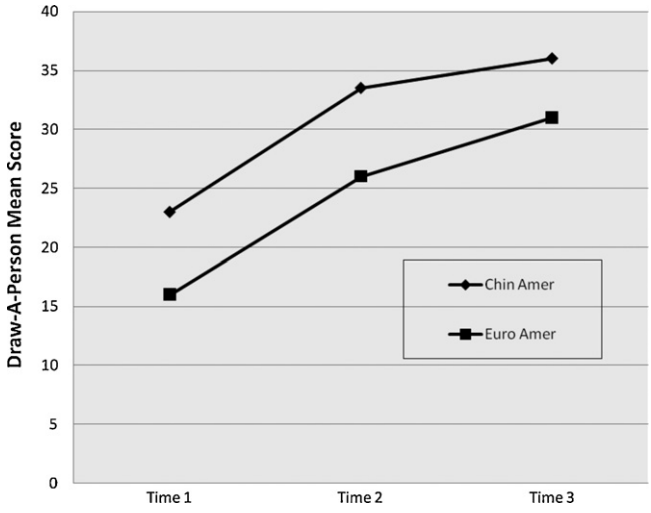

Fig. 2. Cultural differences in Draw-A-Person scores over time.

6.5. HLM analyses

To examine the longitudinal development of drawing skills as assessed by the Goodenough/Harris test, we computed a linear growth curve model in HLM (Raudenbush, Bryk, Cheong, & Congdon, 2000). In the unconditional model, the initial status of drawing skills at Time 1 was estimated (γ_{00}), as well as the growth rate over time (see Table 4). On average, children obtained a score of 20.77 in drawings at Time 1, and the average growth between adjacent time points was 7.03.

The conditional model revealed group differences in drawing skills in initial status and growth rate. At Time 1, Chinese American children scored 6.58 points higher than European American children, the older cohort scored 5.61 points higher than the younger cohort, and girls scored 3.86 points higher than boys. All the group differences were significant at the $p < .01$ level. In terms of growth rates, the older cohort's gain over time was 2.95 points slower than the younger cohort's gain (see Fig. 3). However, we did not find ethnicity and gender differences in growth rates. The growth rates of the two ethnic groups were similar; thus, the Chinese American children maintained their advantage over the European American children during this time period.

Hypothesis 3. Did European American children, as compared to their Chinese American counterparts, create drawings showing higher levels of creativity?

6.5.1. Drawing creativity

In addition, Chinese American children's person drawings were rated at all three time points as more creative than European American children's drawings (see Fig. 4). Examples of drawings reflecting the highest creativity ratings (given a rating of 5) at all three time points are displayed in Fig. 5. The creativity ratings gap between groups gradually narrowed from Time 1 to Time 3; however, the gap at Time 3 remained statistically significant. At Time 3,

Table 4
Parameters from the unconditional and conditional models from HLM analyses.

Parameters	Unconditional model	*p*	Conditional model	*p*	
σ^2	28.33		27.40		
γ_{00}	20.77	<.001	23.18	<.001	
γ_{01} Ethnic group[a]			−6.58	<.001	CA > EA
γ_{02} Grade level[b]			5.61	<.001	Older > Younger
γ_{03} Gender[c]			−3.86	<.01	Girl > Boy
γ_{10} Growth	7.03	<.001	7.58	<.001	
γ_{11} Ethnic group[a]			.70	n.s.	
γ_{12} Grade level[b]			−2.95	<.001	Older < Younger
γ_{13} Gender[c]			1.15	n.s.	
u_0	39.43	<.001	19.31	<.001	
u_1	1.94	n.s.	0.71	n.s.	

[a] Chinese American is coded as 0; European American is coded as 1.
[b] Younger is coded as 0; older is coded as 1.
[c] Girl is coded as 0; boy is coded as 1.

Chinese American children also scored higher than European American children in originality on the picture completion task from the Torrance Tests of Creative Thinking-Figural TTCT (see Table 3). Chinese American and European American children's scores on fluency, elaboration, and resistance to premature closure were similar. We found a difference approaching significance on abstractness of titles, with Chinese American children scoring higher.

Hypothesis 4. Did Chinese American parents, as compared to their European American counterparts, express more positive attitudes toward art?

6.5.2. Parent beliefs about the importance of art

At Time 1, Chinese American fathers ($M = 3.45$, S.D. = .714) and mothers ($M = 3.63$, S.D. = .740) said it was more important than did European American fathers ($M = 3.13$, S.D. = .853) and mothers ($M = 3.18$, S.D. = .903) for their child to develop competence in art, $F(1, 78) = 3.41$, $p = .068$ and $F(1, 78) = 5.94$, $p < .05$, respectively.

6.5.3. Mothers' and fathers' personal art attitudes

No differences were found between Chinese American fathers and European American fathers on the liking of art and the easiness of art variables, but Chinese American fathers ($M = 2.78$, S.D. = 1.07) rated themselves higher on art competence than did European American fathers ($M = 2.25$, S.D. = 1.03), $F(1, 78) = 4.97$, $p < .05$. The self-ratings of Chinese American and European American mothers on liking of art and art competence were similar, but European American mothers ($M = 3.70$, S.D. = 1.11) reported art as being easier for them than did Chinese American mothers ($M = 3.23$, S.D. = .92), $F(1, 78) = 4.51$, $p < .05$. Mothers' and fathers' personal art attitudes were not correlated within dyads; therefore we entered them separately in the regressions performed below.

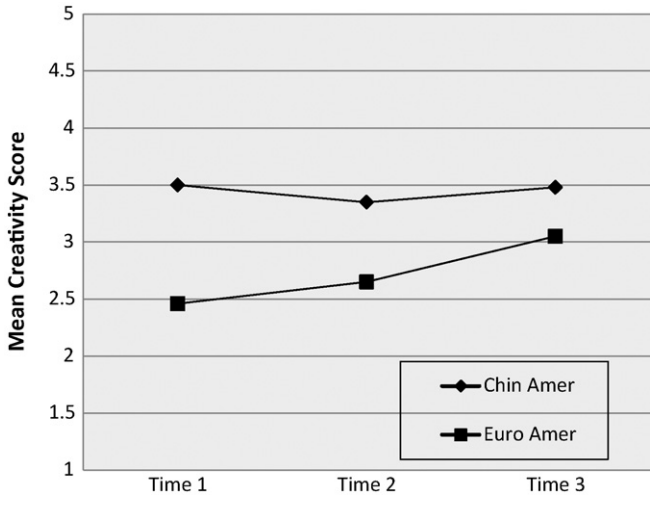

Fig. 3. Cultural differences in drawing creativity ratings over time.

Hypothesis 5. Did Chinese American parents use methods different from those of European American parents to foster their children's creativity?

6.5.4. Parents' ways of fostering creativity

At Time 3, parents in the two cultural groups reported fostering creativity in somewhat different ways (see Table 5). Chi-square analyses revealed that European American parents were more likely to say they provided their child with a variety of materials, while Chinese American parents were more likely to mention enrolling their children in formal classes. Parents of both groups reported using encouragement and reinforcement equally. Percentage differences in the other two categories did not reach statistical significance.

Hypothesis 6. Did parental attitudes and practices directly influence their children's drawing skills?

6.6. Correlational analyses among children's measures

Pearson correlations were obtained to examine the relationships between each drawing-related component skill and practice and the Time 1, 2, and 3 Draw-A-Person scores (see Table 6). Children who had more fine-motor skill practice, and children who performed better on visual-motor and spatial relations measures exhibited more advanced drawing skills.

Next, we determined the relationships between participation in art classes and Chinese school and *Draw-A-Person scores* and *creativity ratings* (see Table 7). Children who attended art classes and

Table 5
Cultural differences in parents' ways of fostering creativity.

Parent provides	Chinese American Freq. & Percent	European American Freq. & Percent	χ^2
Materials	21 (60%)	30 (79%)	3.11[+]
Encouragement/reinforcement	16 (46%)	18 (47%)	0.02
Atmosphere	18 (51%)	26 (68%)	2.20
Parental teaching & modeling	17 (46%)	12 (29%)	2.20
Formal classes	17 (49%)	9 (24%)	4.92[*]

Note. Chinese American $N = 35$; European American $N = 38$.
[+] $p < .10$.
[*] $p < .05$

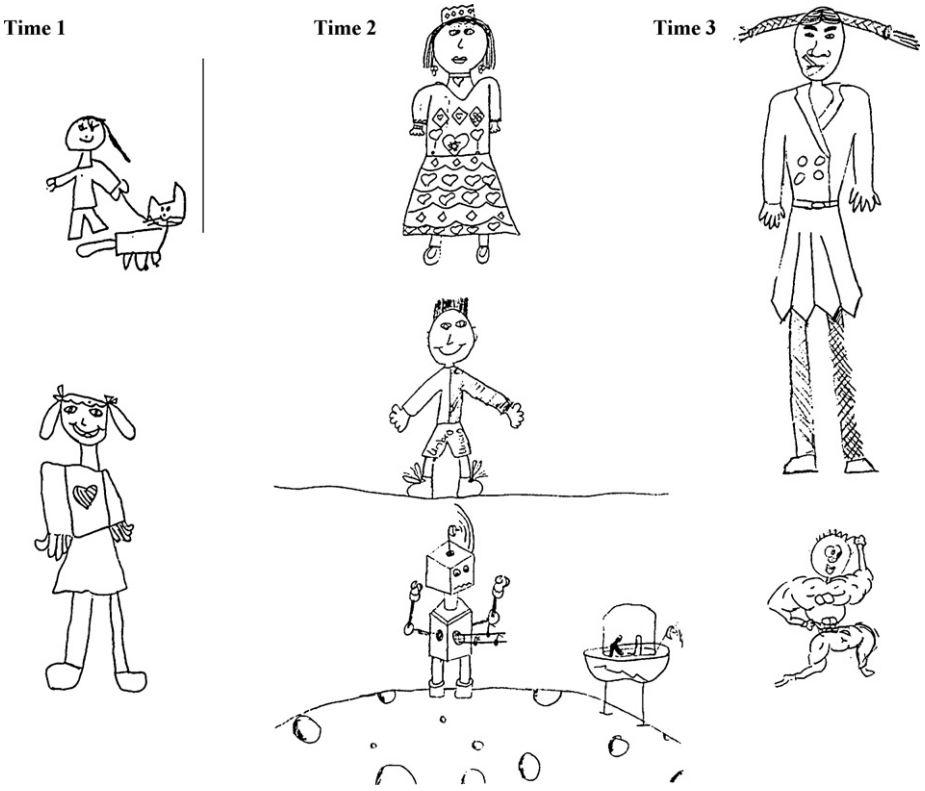

Fig. 4. Drawings representing the highest creativity ratings at Times 1, 2, and 3.

Table 6
Correlations of practice, visual-motor scores, and spatial relation scores with Draw-a-Person scores.

	Draw-A-Person scores		
	Time 1	Time 2	Time 3
T1 Time on focused practice	.39*	.32*	.27*
T1 Visual-motor proficiency	.64*	.40*	.39*
T2 Visual-motor control	.49*	.45*	n.s.
Time 2 spatial relations score	.31*	.28*	n.s.

Note. T1, $N = 80$. T2, $N = 76$. T3, $N = 73$.
* $p < .05$.

Chinese school exhibited more advanced drawing skills and higher creativity ratings.

6.7. Regression analyses

To determine the contribution of mothers' and fathers' personal art attitudes and children's T1 and T2 drawing skills to the children's T3 drawing skills, we performed a series of regressions. We examined the two ethnic groups separately. First we regressed fathers' personal art attitudes, children's Time 1 drawing, and children's Time 2 drawing as a block of predictors on the dependent variable of children's Time 3 Drawing. Two variables, Chinese American fathers' personal art attitudes and children's Time 1 drawing skills, predicted nearly 53 percent of the variance in Chinese American children's Time 3 drawings (see Table 8). For European Americans, children's Time 2 drawing skills predicted 23 percent of the variance in their Time 3 drawings. European American fathers' art attitudes did not contribute.

We then performed similar regressions substituting mothers' personal art attitudes for fathers' art attitudes. For Chinese Americans, children's Time 1 drawing predicted 23 percent of the variance in children's Time 3 drawing. For European Americans, children's Time 2 drawing predicted 22 percent of the variance in children's Time 3 drawing. Mothers' art attitudes were not sig-

Table 7
Correlations of art class participation and Chinese school attendance with Draw-A-Person scores and creativity ratings.

	Draw-A-Person scores		Creativity ratings	
	Time 2	Time 3	Time 2	Time 3
T2 art class participation	.36*	.26*	.36*	.27*
T2 attendance at Chinese school	.48*	.48*	.34*	.23*
T3 attendance at Chinese school		.35*	n.s.	n.s.

Note. T1, $N = 80$. T2, $N = 76$. T3, $N = 73$.
* $p < .05$.

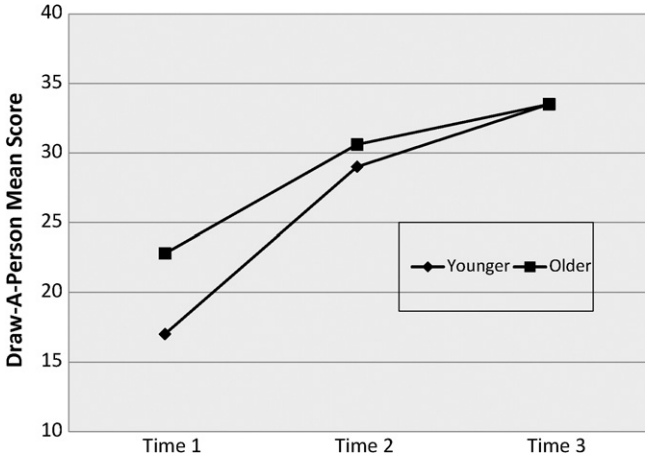

Fig. 5. A comparison of Draw-A-Person growth curves for older and younger cohorts.

Table 8
Predictors of children's Time 3 drawing skills.

Child outcome	Predictor	Total R^2	β
Chinese American			
Time 3 Drawing Skill	Fathers' Art Attitudes	.529	.561*
	Time 1 Drawing Skill		.542*
	Time 2 Drawing Skill		−.012
Time 3 Drawing Skill	Mothers' Art Attitudes	.231	−.016
	Time 1 Drawing Skill		.445*
	Time 2 Drawing Skill		.103
European American			
Time 3 Drawing Skill	Fathers' Art Attitudes	.259	−.229
	Time 1 Drawing Skill		−.069
	Time 2 Drawing Skill		.487*
Time 3 Drawing Skill	Mothers' Art Attitudes	.219	−.110
	Time 1 Drawing Skill		−.018
	Time 2 Drawing Skill		.490*

* $p < .05$.

nificant predictors of children's drawing skill at Time 3 in either group.

7. Discussion

The general pattern of results largely confirmed our predictions regarding cultural differences in drawing skills. Chinese American children produced more advanced drawings of a person than did their European American counterparts at three time points over a period of four years. At Times 1 and 2, Chinese American children also scored higher on the requisite skills of visual discrimination and visual-motor proficiency, and solved spatial relations problems significantly faster.

However, our prediction that European American children would be higher in creativity was not supported. Rather, Chinese American children received higher creativity ratings on their drawings of a person at all three time points. In addition, they scored higher on originality in picture completion at Time 3.

Chinese American parents, as compared to their European American counterparts, rated development of competence in art as more important for their children and reported that their children spent much more time in focused practice on fine-motor tasks (including drawing) at Time 1. Overall, correlations showed that children who spent more time on fine motor tasks had better visual-motor coordination and more mature drawing skills. Consistent with previous research, young children who had more opportunities to draw and who had some guidance in drawing were more advanced in their drawing (e.g., Case & Okamoto, 1996; Cox, 1993; Martlew & Connolly, 1996).

Our data showed that Chinese American fathers' attitudes toward art (including self-rated competence) had a strong positive influence on their children's drawing development four years later. Winner (1989) has noted that the graphic arts are very highly regarded in China. In this vein, Chinese American immigrant parents, as compared to European Americans, placed greater importance on the development of art competence in their children. Fathers from a traditionally collectivistic, interdependent culture communicate their attitudes more intensely to their young children (Greenfield, 1994). In line with the Confucian ideal of filial piety, their children accept (or absorb) the fathers' attitudes. Another Confucian ideal, the cultivation of humility, probably influenced Chinese American fathers to be modest about their considerable artistic skills. Although higher than the European American fathers, Chinese American fathers' mean self-ratings were below the scale midpoint. Spontaneous parental comments and researcher observations during the in-home parent interviews revealed that several Chinese American fathers painted seriously as a hobby. This modeling of art making also serves to strengthen the influence of the father.

Chinese American children's drawing skills developed earlier and these early skills (at preschool and kindergarten) predicted their drawing skills at third and fourth grades. European American children's drawing skills at a later age, i.e., at first and second grades, predicted their drawing skills in third and fourth grades. It should be noted that the mean drawing scores of European American third and fourth graders had not reached the mean drawing scores of Chinese American first and second graders.

In efforts to foster creativity in their children, Chinese American parents reported greater use of formal classes, whereas European American parents more frequently reported provision of materials. Among Chinese Americans, parents who reported teaching and modeling art had children with more advanced drawing skills at Time 3. This result can be interpreted as support for Gardner's (1989) report of the different cultural views of art creativity development, namely, Chinese American parents favored more explicit instruction of art skills, whereas European American parents allowed the children to experiment and learn to do art on their own. The fact that Chinese American children in this study did not appear to have their creativity stifled by their more structured approach to drawing development runs against the deep-seated American view that creativity flourishes in a context without constraints.

The position on children's drawing development taken by many early childhood educators in the United States is not consistent with their positions in other areas of development. For example, when children are learning language, parents and caregivers are encouraged to provide appropriate language models. We know that children who have responsive language models acquire language more quickly. When children master the basics, they have the tools to use language creatively. Why should drawing be different?

While we favor cultural explanations for the more advanced drawing skills of the Chinese American children, we need to recognize that all behavior is an interaction of biological and environmental factors. Is the earlier emergence of fine motor control a result of greater practice on the part of children and systematic instruction by parents? The phenomenon of more uniform higher performance on fine motor skills by Chinese American children in this study and others (Luo, Jose, Huntsinger, & Pigott, 2007) causes one to wonder whether biological maturation plays a role in the development of young children's fine motor control and whether maturation rate varies by ethnicity. Because fine motor development is regulated to some degree by maturation, it is possible that fine motor control comes earlier to children of Chinese descent partially because of biological unfoldings. It could be that Asian children undergo earlier maturation of fingers, near-vision capabilities, and brain areas that control visual-motor coordination. To what degree the neural pathways involved in fine motor coordination and visual-motor control are influenced by training and practice is an open question. It is also possible that the calmer temperament of Chinese infants (Camras et al., 1998; Freedman & Freedman, 1969; Kagan et al., 1994) makes it easier for a Chinese American child to concentrate on focused practice at an earlier age.

While we cannot rule out a possible small contribution of biological factors, this study identifies cultural beliefs and parent practices that appear to enhance children's artistic development. Chinese American parents believe it is more important for their children to develop competence in art. Chinese American fathers rated themselves as having greater art competence. Given the tendency toward modesty among Chinese people and the tendency toward positive bias of parents in the United States (Stevenson et al., 1990), the actual difference in art competence might be even greater. Cultural beliefs influence what practices parents deem appropriate for their children. Partly because of the greater importance attached

to art competence, Chinese American parents guide their children to spend much more time practicing visual-motor skills at home in the early childhood years. In addition, Chinese American children received formal instruction in Chinese calligraphy and art. Therefore, it is very likely that these children developed greater skill in drawing through (1) exposure to parental attitudes and modeling, (2) introduction to a pictorial written language, (3) receipt of explicit instruction in art and calligraphy, and (4) expenditure of more time practicing visual-motor skills in the early childhood years.

We feel this study has many strengths. First, we used multiple measures of fine motor control. Second, the study is longitudinal and cross-cultural. Very few studies have examined children's drawing development over time. Third, we have used multiple sources of information: children and parents. A particular strength is that we reported data from both fathers and mothers. Fourth, we have considered the drawings of children in the context of their cultures within the United States. Fifth, we have examined the possible clash between the beliefs and practices of immigrant Chinese parents and the teachers of their young children in the United States.

This study also has several weaknesses. Our sample is small and the results may not generalize to children whose parents have lower incomes and/or education levels, different family configurations, or different cultural backgrounds. Future research should develop scales that would be more reliable across cultures and gender of parent. We also realize that creativity is a complex, multifaceted phenomenon. Our purpose was not to examine creativity broadly. Instead, we wanted to explore the development of creativity specifically in the drawing domain and to assess whether the idea (still pervasive among early childhood professionals in the United States) that showing a young child how to draw lowers his/her drawing creativity. Our raters of creativity were all European American, primarily because it is more difficult to find experienced early childhood educators who are Chinese immigrants in our area. However, in future studies, it would be wise to examine whether there is cross-cultural agreement regarding creativity.

Future researchers might consider short or long-term interventions in which one group of preschool children is given greater individual or small group guidance in basic drawing, while another group is provided drawing materials with no guidance in actual drawing. This type of study could help clarify whether other children in the United States could benefit from more explicit drawing instruction and practice during the early childhood years.

Golomb (2002) states "without specific training, the majority of children never attain the ability to draw in perspective" (p. 132). Only the very gifted and talented learn this by themselves. In the U.S. there has been an emphasis on natural talent or innate ability (Golomb, 2002; Stevenson et al., 1990), while in Chinese societies, the emphasis is on hard work and practice. Chinese peoples have traditionally believed that everyone can master drawing and writing when instructed properly. Their view provides a greater opportunity for all children to reach levels of competence. Even though young Chinese children are shown how to draw, the finished products are unique (O'Keeffe, 2001). Once they are successful at copying the basic shapes, they are free to add interesting details of their own. In the U.S., if a young child has an idea of what s/he wants to make, but lacks the skills to do it, s/he will likely become frustrated and give up if a teacher does not offer some help. If early childhood teachers do not give young children the skills and knowledge they need, they deprive the children of the opportunities to advance further in their understanding or proficiency. While, generally speaking, a child-initiated framework is still recommended in preschool classrooms, a teacher can also take the lead in imparting specific knowledge and skills to children. Thompson (2005) asserts that with the accumulating evidence showing the positive influence of adult guidance in and scaffolding of young children's artistic learning, early childhood professionals are beginning to realize that some direct instruction may be advantageous as part of a curriculum that is primarily grounded in independent exploration.

It must be noted that with increasing globalization, the Chinese and US approaches to early childhood education are not as different as they once were. According to Zhu and Zhang (2008), China's early childhood education programs are a mix of traditional Chinese, Communist, and Western ideas. However, Chen-Haftek and Xu (2008) contend that there is a wide gap between policy and practice. The official policy of the government is based on global views of education, but according to the authors, the policy cannot work without an understanding of local cultural beliefs. In the U.S., Asian-influenced early childhood mathematics interventions used by researchers (Starkey & Klein, 2007) have been demonstrated to be very effective, but public preschool programs have not widely adopted the successful mathematics curricula. Private Kumon learning centers ($N = 1400$) have sprung up throughout the US, and some parents choose to enroll their children in the Japanese-style mathematics and reading enrichment ("Kumon Method," 2010). The Kumon centers use a curriculum that emphasizes a child's advancing in small, manageable increments with lots of practice on each successive step.

Early childhood educators in the United States may want to consider adding more intentional teaching to promote the development of representational skills in young children. The Vygotskian perspective would suggest that children benefit from adult guidance in learning to draw, just as they do in learning to talk. Golomb (1992) reports that children who draw only scribbles when drawing spontaneously can draw representational figures when asked to do so. It may be that no one has ever asked most young children to produce higher-level drawings. In addition, the findings in this study challenge the idea that structuring a young child's time and giving more adult guidance in the process of drawing diminishes creativity. It may be that giving young children more guidance enables them to develop the skills involved in the creative arts. It may be, as Golomb (2002) concludes, that "contemporary Western culture has emphasized spontaneity, expression, and inventiveness in child art at the expense of professional instruction" (p. 132). Early childhood teachers should to strive for a better balance.

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