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Socialization of Young Children’s Math Development: Chinese, Chinese-American, and European-American Parents

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Background

- Chinese and Chinese-American children generally earn higher math scores than U.S. European-American children (e.g., Stevenson et al., 1990; Siegler & Mu, 2008).
- Although our knowledge of the role that parents play in their children’s math learning is increasing, there is still a critical need for additional research (Blevins-Knabe, 2016), particularly for different cultural groups. We know very little about similarities/differences in how Chinese and non-U.S. born Chinese-American parents socialize their children’s math, and how this compares to U.S. born European-American parents.
- At least some of the data are 20 years old (e.g., Huntsinger et al. 1997); thus, cultural arguments may not be relevant today.
- Comparisons between Chinese parents in China and the U.S. are of interest because of similarities in cultural heritage stressing the importance of parents’ roles in education and differences in immigration status.
- Comparisons between Chinese, non-U.S. born Chinese-Americans, and European-Americans are of interest because of children’s differential history of success in math.

Current Study

- What are the math socialization practices of Chinese, non-U.S. born Chinese-American, U.S. European-American parents of pre-kindergarteners through first graders?
- We compare and contrast how these three groups of parents define math, their views about how children learn math, and their view of their role in their children’s learning.

Method

- Participants**
- 120 parents (97% mothers, 3% fathers) of children in prekindergarten through first grade
 - Most of the non-U.S. born Chinese-American parents moved to the U.S. after completing part or all of elementary school in China. Sixty-seven percent of them also completed some schooling in the U.S., primarily their graduate degrees.

	Chinese (N = 40)	Chinese American (N = 39)	European American (N = 41)
Parent Highest Education (% with BA/BS or higher)	92.5%	97.4%	82.9%
Parent Years in the U.S.	N/A	9.37(5.29)	N/A
Parent Age	35.59 (4.51)	39.04 (3.99)	34.91 (5.29)
Child Age	5.78 (1.18)	5.47 (0.92)	5.60 (1.01)
Number of Children at Home	1.20 (0.41)	1.69 (0.66)	2.24 (0.77)

Procedure: Mothers completed oral interviews in their preferred language, either Chinese (Mandarin/Taiwanese) or English. Chinese interviews were transcribed in Chinese, translated into English, and then back-translated to check for accuracy.

Parent’s Beliefs About Children’s Math Activities Questionnaire: Questions addressed parents’ conceptions about math, their perceived role in their children’s math education, and their views about how children learn math.

- Sample Questions:**
- “What is math?”
 - “What is the best way to help your child to learn math?”
 - “What type of math activities do you like best for your child?” What do you like best about [each activity mentioned]?”
 - “Do you pick out math toys/books/activities for your child?” If “yes.” “When you pick out a math toy/book/activity for your child, what kinds of things do you look for?”

- Qualitative Coding**
- Written transcripts were reviewed to identify themes emerging from parents’ responses.
 - Transcripts were coded holistically, because themes may have appeared across more than one question response.

Parents’ Definitions of Mathematics

	Chinese <i>n</i> = 40	Chinese American <i>n</i> = 39	European American <i>n</i> = 41	χ^2 (<i>df</i> , <i>n</i>), <i>p</i>
Math Content	25 (63%)	33 (85%)	34 (83%)	6.76 (2,120), <i>p</i> = .034
• Numbers and Operations	21 (53%)	34 (87%)	33 (80%)	13.77 (2,120), <i>p</i> = .001
• Number Transformations	10 (25%)	23 (59%)	17 (41%)	9.38 (2,120), <i>p</i> = .009
Math Processes	26 (65%)	17 (44%)	16 (39%)	6.19 (2,120), <i>p</i> = .045
• Logic (Reasoning/Proof)	21 (53%)	9 (23%)	2 (5%)	26.71 (2,120), <i>p</i> < .001
Math is Part of Daily Life	14 (35%)	6 (15%)	9 (22%)	4.31 (2,120), <i>p</i> = .116
Math is different in China/U.S.	9 (23%)	26 (67%)	0 (0%)	- -

Parents’ Views of Their Roles in Math Education

	Chinese <i>n</i> = 40	Chinese American <i>n</i> = 39	European American <i>n</i> = 41	χ^2 (<i>df</i> , <i>n</i>), <i>p</i>
Role in Math Learning				
• Facilitator	16 (40%)	4 (10%)	6 (15%)	12.11 (2,120), <i>p</i> = .002
• Active/Direct Instruction	28 (70%)	29 (74%)	33 (80%)	1.20 (2,120), <i>p</i> = .549
Systematic Instruction	9 (23%)	19 (49%)	3 (7%)	18.23 (2,120), <i>p</i> < .001
• Gives supplemental math assignments or homework	2 (5%)	13 (33%)	2 (5%)	17.46 (2,120), <i>p</i> < .001
• Practice or repetition	1 (3%)	11 (28%)	2 (5%)	15.45 (2,120), <i>p</i> < .001
• Activities aimed to get child above grade level	2 (5%)	7 (18%)	2 (5%)	5.35 (2,120), <i>p</i> = .069
• Changes as child acquires skills	2 (5%)	7 (18%)	0 (0%)	- -
Providing Artifacts	40 (100%)	38 (97%)	41 (100%)	- -
• Poker/Playing Cards	17 (43%)	6 (15%)	1 (2%)	21.08 (2,120), <i>p</i> < .001
• Blocks/Manipulatives	27 (68%)	18 (46%)	18 (44%)	5.45 (2,120), <i>p</i> = .065
• Storybooks	6 (15%)	8 (21%)	22 (54%)	16.89 (2,120), <i>p</i> < .001
• Workbooks	26 (65%)	17 (44%)	23 (56%)	3.69 (2,120), <i>p</i> = .158
• Chess	12 (30%)	6 (15%)	3 (7%)	7.39 (2,120), <i>p</i> = .025
• Puzzles	17 (43%)	11 (28%)	15 (37%)	1.77 (2,120), <i>p</i> = .413
• Flashcards	2 (5%)	7 (18%)	11 (27%)	7.01 (2,120), <i>p</i> = .030
• Money Games	3 (8%)	5 (13%)	9 (22%)	3.56 (2,120), <i>p</i> = .168

Facilitator (Chinese)

We make him do his homework by himself. When he has problems we guide him to read the questions, for instance, if he had problems doing a test paper, we would guide him to read and let him lead to the conclusion by himself..The family should create environments and chances for children to improve math.

Systematic Instruction (Chinese-American)

I will give him a lot of math exercises to do and make him do it repeatedly. According to my experience, there should be a phase in which you should do a large amount of math exercises repeatedly and rapidly.

Active/Direct Instruction (European-American)

I like writing out little math problems and I give her the problems and we check them. I like doing it because she does really well with them and she loves it. I like playing Uno with her...I like cooking with her.

Numbers and Operations (European-American)

[Math is] the manipulation of numbers and concepts related to numbers...quantities...addition, subtraction, multiplication, division, basic math.

Logic (Chinese)

I think [math] is a style of thinking, like logical thinking. Anyway, is certainly not as simple as 1 + 1 = 2.

Daily Living (Chinese-American)

We use math every day...like buying food, you look at time, you count how many things are there. I feel we use it every day, whatever things you do will all use math.

Cultural Comparison (Chinese-American)

The way that Americans teach their children math is different from the way we teach children math

Parents’ Views of How Children Learn Math

	Chinese <i>n</i> = 40	Chinese American <i>n</i> = 39	European American <i>n</i> = 41	χ^2 (<i>df</i> , <i>n</i>), <i>p</i>
Approaches to Math Learning				
• Engaging Child’s Interest	33 (83%)	31 (79%)	27 (66%)	3.48 (2,120), <i>p</i> = .175
• Skills	19 (48%)	23 (59%)	21 (51%)	1.08 (2,120), <i>p</i> = .582
• Daily Living/Applications	31 (78%)	27 (69%)	31 (76%)	0.77 (2,120), <i>p</i> = .680
Logic is Critical for Math Development	15 (38%)	6 (15%)	1 (2%)	16.96 (2,120), <i>p</i> < .001

Engaging Child’s Interest (Chinese-American)

Motivate his interest and let him feel studying math is not a painful thing. It is really fun and is useful after learning it.

Skills (European-American)

We do like the workbooks. We do, uh, adding and subtracting.

Logic is Critical (Chinese)

I think these [puzzles and mazes] are the best games. I think mathematical games which can reflect something about thinking...and something about logic are best.

Daily Living (Chinese)

The best way is playing games about math...you can ask him how many grapes left when he eats grape. We can do that whenever we want. You can’t tell your children “now, let’s sit down and ready to learn math.” Children would hate that.

Discussion

- These findings highlight the need not only to consider race/ethnicity/culture, but also educational contexts when interpreting parents’ socialization practices.
- All groups discussed the importance of assisting their children with math activities at home and that children learn best when engaging their children’s interest. However:
 - Chinese parents more often defined math as the development of logical or analytical thinking.
 - Logic was an important element of math development.
 - They stressed providing learning opportunities to develop logical thinking.
 - Chinese-American and European-American parents focused more on math content and operations.
 - Although all groups discussed using daily living activities to foster math skills, Chinese parents discussed how using concrete tools are crucial for understanding abstract math concepts.
 - Chinese-American parents discussed providing systematic instruction tailored to math skill development, including giving supplemental assignments. This reflected their concerns about weaknesses they saw in U.S. schools.
 - There were both similarities and differences in children’s activities across groups. About half the parents in each group mentioned using workbooks and blocks/manipulatives. However, Chinese-American parents noted they sent to China for better quality workbooks.
 - Chinese parents also mentioned using poker/playing cards, puzzles, and chess.
 - European-American parents also mentioned using storybooks.
- Chinese parents’ views of math reflect recent societal changes in children’s math curriculum in school which now emphasizes problem solving and logical thinking (Wang, 2018).

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