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The relationship between family dining practices, parenting style and family functioning and child learning

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Abstract

Background: This study examined the association between family dining practices, parenting style and family functioning with child learning among Chinese families with preschool children.

Methods: Participants included 663 parent-child dyads recruited from Hong Kong preschools. Child learning was measured through individual assessment of children on preschool concepts, parent and teacher report of child learning. Parents completed questionnaires on parenting style, family functioning, frequency of parents/grandparents dining with target children, mealtime television viewing and feeding practice.

Results: Child attainment of preschool concepts was associated with child sex and frequency of father eating with child. Parent report of child learning was associated with child sex, parenting style, family functioning and family feeding practice. Teacher report of child learning was associated with child sex.

Conclusion: Child learning could potentially be influenced by family practice including family dining practices, parenting style and family functioning.

Keywords: child learning; family dining practices; parenting.

Introduction

Parental responsiveness is associated with children's learning interest and language skills [1]. Family functioning and parenting style are commonly used constructs on parental responsiveness.

Research [2, 3] indicated that positive family functioning (e.g. family cohesion, maternal sensitivity) and learning stimulation (e.g. maternal vocabulary) were associated with positive child outcomes in physical, psychosocial and cognitive areas. Parenting style is defined as a constellation of attitudes or a pattern of parental authority towards the child which are conveyed to the child [4, 5]. Parenting styles are most often conceptualized along two dimensions, demandingness and responsiveness [5]. Authoritative parenting is high in both demandingness and responsiveness. Authoritarian parenting is high in demandingness but low in responsiveness. Permissive parenting is high in responsiveness but low in demandingness. Indifferent parenting is low in demandingness and responsiveness [5]. Research on western populations has consistently shown that authoritative parenting was associated with positive child learning outcomes [4, 6]. However, among Chinese or Asian families, though authoritative parenting was associated with positive outcomes in social behavior and academic performance [7], authoritarian parenting was also positively associated with academic performance [8]. Most existing studies are on Asian-American and primary/secondary school students [7–10], but research on parenting style and outcomes in preschool children is limited. In Chinese culture, parents tend to adopt a more permissive style for preschool children but are more demanding with older children [11].

Apart from family functioning and parenting styles, family meal (parents eating together with children) frequency was found to be positively associated with language and numeracy outcomes in preschool children [12]. However, a recent longitudinal study found no association between family meal frequency and academic outcomes for school-aged children [13]. Furthermore, family meal frequency was operationalized differently among different studies.

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It is not clear whether it is family functioning or parenting styles behind family meal arrangements or family meal per se which is linked to children's learning. It is unclear whether it is family meal frequency per se, or family dining practices (frequency and characteristic of family members dining together, dining environment, feeding practices) that should be considered. Research indicated that meal-time television viewing was negatively associated with child learning [14, 15]. Feeding practices were found to be associated with child cognitive outcomes [16] but this study did not control for parenting/family variables. Authoritative parenting style was associated with adolescent fruit/vegetable consumption [17]. However, there is no study testing the impact of family functioning, parenting style and family dining practices on child learning outcomes.

Furthermore, most of the above studies are based on western literature. In Chinese families, food represents the goodwill of the food-provider, and is to be respectfully consumed. In a study of Hong Kong obese children, there was a tendency for children to eat more when dining with relatives as parents found it impolite for the child to reject food offered by family seniors [18]. The relevance of overseas findings on family dining practices and child outcome in Chinese societies warrants further investigation. Moreover, there is little research on family dining practices and child outcomes among preschool children.

The present study aimed to examine the impact of family dining practices and parenting style/family functioning on learning among Chinese preschool children in Hong Kong. Instead of focusing just on family members eating together, mealtime television viewing and feeding practices were also investigated. Three possible patterns of association were examined in terms of three competing hypotheses:

1. Family dining practices are confounded with parenting style and family functioning [19]; the latter two, rather than family dining practices, predict child learning outcomes.
2. Family dining practices have unique contributions to child learning outcomes, in addition to family functioning and parenting style.
3. Family dining practices are mediating factors between parenting style/family functioning and child learning outcomes.

Materials and methods

Participants

The inclusion criteria were (i) children and their parents should be Cantonese-speaking and (ii) children should be attending preschools

as the preschool attendance rate for children aged 3 to 5 years old was 91.3%, which would ensure a fairly representative sample of this age group. Cantonese was the most common dialect used at home in Hong Kong [20]. Children with global developmental delay, physical, severe hearing or visual impairment or autism spectrum disorder were excluded. The study was approved by the Ethics Committee of The Hong Kong Polytechnic University.

Participants were recruited from 24 preschools in Hong Kong. Through contacts with five organizations providing preschool education, these organizations nominated 18 preschools to participate. Moreover, 400 other preschools throughout Hong Kong were invited to participate by phone, of which six preschools participated.

The number of participating parent-child dyads in each participating preschool ranged from nine to 141. Out of 2492 consent forms distributed, 923 parents consented to participate. However, 11 participants either changed school or were outside Hong Kong at the time of data collection, resulting in 912 data sets collected. The questionnaires were found incomplete for 249 dyads; hence the final data set for analysis included 663 parent-child dyads (72.697%).

The majority of participants were mothers. The mean age of target children was 4.492 years and there were equal proportions of boys and girls. Demographic characteristics of the participants are shown in Table 1.

Measures

Measures of child learning: Cognition Scale of The Hong Kong Comprehensive Assessment Scale for Preschool Children (HKCAS-P-CS) – this scale was developed for Hong Kong Chinese children aged 3 to 6 years old. It correlated with the Wechsler Preschool and Primary Scale of Intelligence-Revised. It could distinguish between children of different age groups, and children with developmental disability from children with typical development [21]. There were 40 items on basic preschool concepts such as colors and shapes and the Scale was individually administered to children. Picture stimuli were presented to children and they had to provide verbal responses or point to the correct answers among the options (pictures) presented. Age standardized scores could be calculated (mean=10, SD=3). The Cronbach's alpha was 0.896.

Behavior Academic Competence Scale (BACS) [22] – this consisted of 15 items on children's learning behavior (e.g. setting high goals, taking initiatives), with a teacher version (BACS-T) and a parent version (BACS-P) validated for use with Hong Kong preschool children. Both versions correlated with HKCAS-P-CS and both versions could discriminate children with typical development from children with developmental disability. Teachers and parents each rated their students/children on each statement on a 4-point scale with higher scores indicating more competent learning behavior. The Cronbach's alphas for parent and teacher versions were 0.865 and 0.947, respectively.

Measures of parenting style, family functioning and family dining practices: Parenting Style and Dimension Questionnaire – Short Form (PSDQ-SF) – this consisted of 32 items on a 5-point Likert scale measuring three parenting styles (authoritative, authoritarian and permissive). A total score could be calculated for each style, with higher scores indicating more frequent adoption of that particular parenting style (e.g. emphasizes the reasons for rules, explodes in

Table 1: Demographic characteristics of participants and mean and standard deviation scores of scales (n=663).

	Number	Percentage
Sex of target child – boy	332	50.075%
Sex of target child – girl	331	49.925%
Relationship of participant to target child – mother	537	80.995%
Relationship of participant to target child – father	124	18.703%
Relationship of participant to target child – grandparents	2	0.302%
Target child living with both parents	590	88.989%
Target child living with mother only	33	4.977%
Target child living with father only	13	1.961%
Target child not living with parents	25	3.771%
Mother's education – junior secondary or below	170	25.641%
Mother's education – senior secondary or above	489	73.756%
Father's education – junior secondary or below	171	25.792%
Father's education – senior secondary or above	480	72.398%
Mother employed	344	51.885%
Father employed	617	93.062%
Family income ^a – HK\$19,999 or below	290	43.741%
Family income ^a – HK\$20,000 or above	373	56.259%
	Mean	Standard deviation
Age of target child, years	4.492	0.684
Age of mother, years	34.660	5.118
Age of father, years	38.650	6.573
Mother's length of residence in Hong Kong, years	21.342	15.243
Father's length of residence in Hong Kong, years	31.899	14.149
Number of children	1.730	0.683
HKCAS-P Cognition Scale	9.994	3.048
Parent report of child learning	47.424	6.227
Teacher report of child learning	45.907	8.695
Authoritative parenting style	58.620	7.638
Authoritarian parenting style	26.804	5.766
Permissive parenting style	13.026	2.907
C-FAI communication	16.459	6.217
C-FAI mutuality	21.808	9.081
C-FAI conflict	11.085	4.200
C-FAI parental concern	3.952	1.636
C-FAI parental control	6.364	2.371
Family feeding practice	58.585	7.118
Frequency of fathers dining with child	4.619	2.609
Frequency of mothers dining with child	5.846	2.079
Frequency of grandparents dining with child	4.680	5.060
Frequency of mealtime television viewing	4.027	2.765

^aMedian household income=HK\$20,700.

anger towards child, spoils child) [23]. A Chinese version was validated for Hong Kong parents where authoritative parenting style was negatively correlated with parenting stress and child behavior problems while authoritarian and permissive parenting styles were positively correlated with parenting stress and child behavior problems. Exploratory factor analysis supported the original 3-factor solution [24]. The Cronbach's alphas for authoritative, authoritarian and permissive styles were 0.900, 0.819 and 0.616, respectively.

Chinese family assessment instrument (C-FAI) – this consisted of 60 items assessing family functioning among Chinese adolescents, with five sub-scales: communication, mutuality, conflict, parental concern, and parental control. The Cronbach's alphas were 0.897,

0.963, 0.726, 0.720 and 0.689, respectively. Its validity was confirmed by confirmatory factor analysis [25]. It could be adapted for parent completion without changing the wording as the instructions asked the respondent to rate their perception of their families (e.g. mutual consideration, good family relationship). Parents rated each statement along a 5-point scale. In all cases, lower scores represented more harmonious family functioning.

Hong Kong parent feeding questionnaire (HKPFQ) – this consisted of 35 items on parent knowledge, attitude and practices on child feeding (e.g. regular meals and balanced diet) and it correlated negatively with parental stress. Parents rated each item on a 3-point scale. A high score indicated more desirable feeding practices.

This scale was used with parents of children aged between 24 and 48 months in a recent Hong Kong survey [26]. The Cronbach's alpha was 0.803.

Family meal time – this was measured by parent report of family members present at family dinner time over the last 7 days. The number of days within the report period (7 days) that father and mother ate with the target child was summed up to form two variables representing the frequency of father and mother eating with the target child, respectively. Frequency of grandparents eating with the target child was created by summing up all the meals that grandparents (paternal and maternal) ate with the target child during the 7-day report period.

Frequency of mealtime television viewing – this was measured by parent report of the frequency of mealtime television viewing during dinner over the last 7 days. The total number of nights the television was on was calculated by summing up the report for each dinner.

Measures of family background: Parents were requested to supply information on their age, length of residence in Hong Kong, marital status, family type, education level, employment, household income and social welfare status.

Procedures

Upon parent consent, a research assistant delivered the questionnaires to the preschools which then distributed the questionnaires to parents and teachers. Participating parents (one parent in each family for each parent-child dyad) and teachers completed the questionnaires at a time/place of their own convenience and returned the completed questionnaires to the preschools in sealed envelopes supplied by the research team. A research assistant (psychology graduate) and a postgraduate psychology student individually assessed the children in preschools on their attainment of preschool concepts, within 2 months after parent completion of questionnaires.

Data analysis

In 37.557% ($n=249$) of the parent-child dyads, grandparents never joined the grandchildren at meal time. This variable was recoded into a dichotomous variable (1: at least one grandparent present at one dinner; 0: otherwise). Family income was recoded into a dichotomous variable (at or above versus below median household income).

Data analysis was performed using STATA Data Analysis and Statistical Software, 2011 (College Station, TX, USA). To examine the three competing hypotheses, mixed method regressions were conducted with school as random factor, and the dependent variables were (i) child learning as measured by HKCAS-P-CS; (ii) parent BACS-P, and (iii) teacher BACS-T. To test hypotheses 1 and 2, stepwise regression was used for each dependent variable. In each case, demographic variables (child sex and family income), parenting style and family functioning variables were included in the initial regression and variables with non-significant association with the dependent variable were removed from the model one at a time. The family dining practice variables (frequency of father/mother/grandparent eating with child, frequency of mealtime television viewing, family feeding practice) were then entered together with the remaining demographic and parenting style/family functioning

variables (using the criteria of $p \leq 0.150$). This approach would guide the examination of significant predictors to child learning (Hypotheses 1 and 2) and to provide information on the selection of variables according to the Baron and Kenny criteria [27] to test for mediation. To formally test hypothesis 3 on mediation, Sobel test was performed where mediation was indicated according to the Baron and Kenny criteria [27].

Results

The sample

There were differences between participants with complete and incomplete data. Among participants with incomplete data, there was a higher proportion of boys, $\chi^2(1)=6.364$, $p=0.012$, families with income below the median household income, $\chi^2(1)=25.584$, $p<0.001$, mothers with 9 years' education or less, $\chi^2(1)=15.106$, $p<0.001$, fathers with 9 years' education or less, $\chi^2(1)=14.031$, $p<0.001$, and mothers not in the workforce $\chi^2(1)=15.601$, $p<0.001$. Among those with incomplete data, the fathers had lived in Hong Kong for a shorter time, $t(744)=2.146$, $p=0.032$; the mothers had lived in Hong Kong for a shorter time, $t(761)=4.366$, $p<0.001$, and they reported higher scores on C-FAI communication, $t(857)=2.483$, $p=0.013$, C-FAI mutuality, $t(854)=2.392$, $p=0.017$, C-FAI conflict, $t(859)=3.625$, $p<0.001$, C-FAI parental concern sub-scales $t(864)=2.303$, $p=0.022$, permissive parenting, $t(863)=2.771$, $p=0.006$, lower scores on authoritative parenting, $t(846)=1.996$, $p=0.046$, and lower frequency of mother eating with child, $t(865)=2.059$, $p=0.040$. Their children achieved lower HKCAS-P-CS scores, $t(852)=2.402$, $p=0.017$.

Correlations among variables

Descriptive statistics of the measures are shown in Table 1. The correlations among all variables are shown in Table 2. The regression of HKCAS-P-CS, BACS-P and BACS-T scores on family dining practices variables is shown in Table 3. The regression of HKCAS-P-CS, BACS-P, BACS-T and family dining practices scores on family functioning (C-FAI) variables and parenting style (PSDQ-SF) variables is shown in Table 4. School was treated as a random factor in all the above regression models.

Child preschool concepts

When hypotheses 1 and 2 were tested, family income, child sex, three parenting style and five family

Table 2: Correlation among variables.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. HKCAS-P Cognition Scale																	
2. Parent report of child learning	0.072, p=0.068																
3. Teacher report of child learning	0.263, p<0.001	0.294, p<0.001															
4. Frequency of fathers eating with child	0.104, p=0.008	0.002, p=0.966	-0.055, p=0.175														
5. Frequency of mothers eating with child	0.018, p=0.646	0.043, p=0.269	0.304, p<0.001														
6. Frequency of mealtime television viewing	-0.145, p<0.001	-0.076, p=0.049	-0.038, p=0.327	-0.089, p=0.022													
7. Family feeding practice	0.160, p<0.001	0.245, p<0.001	0.118, p=0.003	0.025, p=0.515	0.000, p=0.993	-0.358, p<0.001											
8. Frequency of grandparents eating with child	0.088, p=0.026	-0.037, p=0.338	0.026, p=0.522	-0.053, p=0.170	-0.084, p=0.300	0.048, p=0.215	-0.022, p=0.564										
9. C-FAI communication	-0.008, p=0.838	-0.329, p<0.001	-0.060, p=0.136	-0.115, p=0.003	-0.058, p=0.136	0.156, p<0.001	-0.222, p=0.707	0.015, p=0.707									
10. C-FAI mutuality	0.038, p=0.329	-0.273, p<0.001	-0.024, p=0.554	-0.068, p=0.082	-0.033, p=0.391	0.133, p=0.001	-0.208, p=0.001	0.818, p=0.611	0.818, p=0.001								
11. C-FAI conflict	-0.021, p=0.592	-0.224, p<0.001	-0.050, p=0.213	-0.046, p=0.240	-0.063, p=0.103	0.139, p<0.001	-0.206, p<0.001	-0.030, p=0.446	0.593, p<0.001	0.721, p<0.001							
12. C-FAI parental concern	0.028, p=0.471	-0.180, p<0.001	-0.034, p=0.404	-0.005, p=0.898	0.031, p=0.430	0.098, p=0.011	-0.166, p<0.001	-0.015, p=0.695	0.567, p<0.001	0.510, p<0.001	0.407, p<0.001						
13. C-FAI parental control	-0.056, p=0.151	-0.232, p<0.001	-0.090, p=0.025	0.033, p=0.402	0.038, p=0.328	0.077, p=0.048	-0.211, p<0.001	-0.022, p=0.577	0.254, p<0.001	0.274, p<0.001	0.363, p<0.001	0.193, p<0.001					
14. Authoritative parenting style	0.096, p=0.014	0.367, p<0.001	0.078, p=0.053	-0.034, p=0.377	0.039, p=0.321	-0.159, p<0.001	0.299, p<0.001	0.006, p=0.872	-0.433, p<0.001	-0.323, p<0.001	-0.284, p<0.001	-0.348, p<0.001	-0.272, p<0.001				
15. Authoritarian parenting style	-0.090, p=0.021	-0.195, p<0.001	-0.081, p=0.044	0.044, p=0.257	0.017, p=0.660	0.149, p<0.001	-0.332, p<0.001	0.043, p=0.271	0.220, p<0.001	0.257, p<0.001	0.313, p<0.001	0.167, p<0.001	0.487, p<0.001	-0.326, p<0.001			
16. Permissive parenting style	-0.110, p=0.005	-0.210, p<0.001	-0.105, p=0.009	-0.017, p=0.246	-0.045, p=0.246	0.247, p<0.001	-0.417, p<0.001	0.035, p=0.372	0.225, p<0.001	0.216, p<0.001	0.212, p<0.001	0.121, p<0.002	0.223, p<0.001	-0.241, p<0.001	0.397, p<0.001		
17. Child sex	0.104, p=0.008	0.095, p=0.015	0.124, p=0.002	0.077, p=0.047	0.025, p=0.528	-0.008, p=0.845	-0.016, p=0.689	0.027, p=0.490	-0.051, p=0.187	-0.048, p=0.216	-0.069, p=0.076	-0.041, p=0.296	-0.063, p=0.106	0.018, p=0.649	-0.017, p=0.660		
18. Family income	0.168, p<0.001	0.101, p=0.010	0.037, p=0.358	0.016, p=0.680	-0.057, p=0.146	-0.174, p<0.001	0.198, p<0.001	0.151, p<0.001	-0.203, p<0.001	-0.169, p<0.001	-0.224, p<0.001	-0.123, p<0.002	-0.080, p<0.039	0.233, p<0.001	-0.105, p<0.001	-0.156, p<0.001	0.053, p=0.170

Table 3: Regression (unstandardized coefficients and 95% confidence intervals) of child learning on family dining practices.

	HKCAS-P Cognition Scale	Parent report of child learning	Teacher report of child learning
Frequency of fathers eating with child	0.097 (0.011, 0.184), p=0.028	-0.013 (-0.198, 0.172), p=0.890	-0.109 (-0.375, 0.157), p=0.421
Frequency of mothers eating with child	0.020 (-0.091, 0.132), p=0.719	0.112 (-0.123, 0.346), p=0.352	-0.188 (-0.529, 0.152), p=0.279
Frequency of grandparents eating with child	0.026 (-0.017, 0.068), p=0.241	0.054 (-0.038, 0.146), p=0.248	0.062 (-0.071, 0.195), p=0.364
Frequency of mealtime television viewing	-0.083 (-0.167, 0.002), p=0.056	0.027 (-0.153, 0.207), p=0.770	-0.201 (-0.461, 0.060), p=0.132
Family feeding practice	0.043 (0.011, 0.075), p=0.009	0.232 (0.163, 0.301), p<0.001	0.121 (0.021, 0.221), p=0.018
R ²	0.188, p=0.0004	0.002, p<0.001	0.009, p=0.013

functioning variables were removed from the model, one at a time at the alpha level of 0.150, following the backward stepwise approach. The “final set of variables” remaining were child sex, authoritative and permissive parenting. Then family dining practice variables were tested after adjusting for the “final set of variables” described above. Significant predictors for HKCAS-P-CS scores in the final model were child sex and frequency of father eating with child. Hypothesis 3 was not tested as the regression results did not support mediation effect. The details are in Table 5.

Parent report of child learning

The same procedures described in the paragraph above were used when testing hypotheses 1 and 2 on parent report of child learning. The details are in Table 5. The “final set of variables” remaining were child sex, C-FAI communication, C-FAI parental control, authoritative and permissive parenting. The family dining practice variables were then entered. After adjusting for the “final set of variables”, family feeding practice, child sex, C-FAI communication, C-FAI parental control, and authoritative parenting were found to be significant predictors of parent report of child learning. The effect of permissive parenting style on BACS-P scores was no longer significant when family feeding practice was entered into the regression, and family feeding practice was a significant predictor. To test hypothesis 3, the Sobel test was conducted to examine the mediation effect of family feeding practice on permissive parenting style and BACS-P scores. The result was significant, $Z=-5.861$, $p<0.001$. The indirect effect of permissive parenting style on parent report of child learning was -0.225 (95%CI: $-0.609, 0.159$).

Teacher report of child learning

To test hypotheses 1 and 2, stepwise mixed method regressions were performed, with school as random factor, and again, exactly the same procedures described in the two paragraphs above were adopted when fitting the stepwise regression models when testing BACS-T scores as the dependent variable. The details are in Table 5. The “final set of variables” remained included child sex, C-FAI parental control, and permissive parenting. When family dining practice variables were included in the model, child sex became the only significant predictor. Hypothesis 3 was not tested as the regression results did not support mediation effect.

Discussion

The results did not support hypothesis 1 on family dining practices as confounding factors. Family dining practices variables were significant predictors after controlling for family functioning and parenting style variables. For child achievement on preschool concepts, frequency of fathers eating with child was a significant predictor after controlling for family functioning and parenting style variables. Similarly, family feeding practice remained a significant predictor for parent report of child learning after controlling for family functioning and parenting style variables. These results were consistent with the findings on the association between family meal times and child outcomes [12], and findings on the association between attachment with father and positive learning outcomes [28].

Hypothesis 2 on family dining practices having unique contribution to child learning was partially supported. For child achievement on preschool concepts,

Table 4: Regression (unstandardized coefficients and 95% confidence intervals) of family dining practices and child learning on parenting style and family functioning.

	Frequency of father eating with child	Frequency of mother eating with child	Frequency of grandparents eating with child	Frequency of mealtime television viewing	Family feeding practice	HKCAS-P Cognition Scale	Parent report of child learning	Teacher report of child learning
Authoritative parenting style	-0.029 (-0.059, 0.002) p=0.065	0.011 (-0.013, 0.035) p=0.365	-0.018 (-0.076, 0.041) p=0.557	-0.021 (-0.052, 0.010) p=0.180	0.139 (0.066, 0.212) p<0.001	0.028 (-0.006, 0.061) p=0.108	0.205 (0.139, 0.270) p<0.001	0.039 (-0.064, 0.142) p=0.460
Authoritarian parenting style	0.019 (-0.023, 0.062) p=0.373	0.013 (-0.021, 0.047) p=0.470	0.050 (-0.033, 0.133) p=0.238	0.017 (-0.027, 0.060) p=0.451	-0.168 (-0.271, -0.065) p=0.001	-0.008 (-0.054, 0.039) p=0.750	0.007 (-0.085, 0.100) p=0.878	0.003 (-0.142, 0.149) p=0.965
Permissive parenting style	-0.023 (-0.098, 0.052) p=0.551	-0.033 (-0.093, 0.027) p=0.287	0.107 (-0.039, 0.253) p=0.152	0.180 (0.103, 0.257) p<0.001	-0.760 (-0.941, -0.578) p<0.001	-0.064 (-0.147, 0.019) p=0.130	-0.194 (-0.357, -0.031) p=0.020	-0.226 (-0.480, 0.029) p=0.082
C-FAI communication	-0.106 (-0.166, -0.046) p=0.001	-0.041 (-0.089, 0.007) p=0.093	0.108 (-0.009, 0.225) p=0.069	0.023 (-0.038, 0.085) p=0.453	-0.023 (-0.168, 0.122) p=0.758	-0.024 (-0.089, 0.042) p=0.478	-0.202 (-0.332, -0.072) p=0.002	-0.084 (-0.286, 0.118) p=0.417
C-FAI mutuality	0.023 (-0.021, 0.067) p=0.309	0.022 (-0.013, 0.058) p=0.213	-0.085 (-0.171, 0.001) p=0.052	-0.002 (-0.047, 0.043) p=0.935	-0.004 (-0.111, 0.102) p=0.938	0.039 (-0.009, 0.088) p=0.115	-0.006 (-0.102, 0.089) p=0.895	0.102 (-0.051, 0.256) p=0.192
C-FAI conflict	-0.014 (-0.085, 0.056) p=0.686	-0.056 (-0.112, -0.0001) p=0.050	-0.037 (-0.174, 0.100) p=0.593	0.040 (-0.032, 0.111) p=0.279	-0.038 (-0.208, 0.132) p=0.658	-0.043 (-0.120, 0.034) p=0.275	0.012 (-0.141, 0.165) p=0.877	-0.077 (-0.316, 0.161) p=0.526
C-FAI parental concern	0.108 (-0.041, 0.256) p=0.156	0.126 (0.007, 0.245) p=0.038	0.105 (-0.185, 0.394) p=0.478	0.007 (-0.145, 0.159) p=0.929	-0.123 (-0.483, 0.237) p=0.503	0.030 (-0.136, 0.197) p=0.721	0.208 (-0.115, 0.532) p=0.207	-0.107 (-0.607, 0.393) p=0.675
C-FAI parental control	0.036 (-0.063, 0.135) p=0.473	0.061 (-0.018, 0.139) p=0.132	-0.183 (-0.375, 0.010) p=0.063	-0.040 (-0.141, 0.060) p=0.431	-0.042 (-0.281, 0.196) p=0.728	-0.028 (-0.137, 0.080) p=0.608	-0.278 (-0.492, -0.063) p=0.011	-0.206 (-0.540, 0.128) p=0.226
R ²	0.094 p=0.008	0.0003 p=0.078	0.073 p=0.059	0.344 p<0.001	0.316 p<0.001	0.086 p=0.124	0.296 p<0.001	0.024 p=0.173

Table 5: Stepwise mixed method regression results (unstandardized coefficients and 95% confidence intervals) for HKCAS-P Cognition Scale, parent and teacher report of child learning.

	HKCAS-P-CS	Parent report of child learning	Teacher report of child learning
Family income	Removed in step 7, $p=0.178$	Removed in step 4, $p=1.000$	Removed in step 2, $p=0.873$
Child sex	0.599, (0.168, 1.029), $p=0.006$	0.964, (0.108, 1.820), $p=0.027$	2.254, (0.922, 3.586), $p=0.001$
Authoritative parenting style	0.021, (-0.009, 0.050), $p=0.173$	0.183, (0.118, 0.248), $p<0.001$	Removed in step 6, $p=0.362$
Authoritarian parenting style	Removed in step 2, $p=0.984$	Removed in step 5, $p=0.772$	Removed in step 3, $p=0.730$
Permissive parenting style	-0.021, (-0.104, 0.061), $p=0.612$	-0.128, (-0.293, 0.038), $p=0.131$	-0.132, (-0.383, 0.119), $p=0.304$
C-FAI communication	Removed in step 4, $p=0.579$	-0.175, (-0.254, -0.097), $p<0.001$	Removed in step 7, $p=0.204$
C-FAI mutuality	Removed in step 8, $p=0.242$	Removed in step 3, $p=0.990$	Removed in step 8, $p=0.651$
C-FAI conflict	Removed in step 6, $p=0.327$	Removed in step 2, $p=0.847$	Removed in step 5, $p=0.592$
C-FAI parental concern	Removed in step 3, $p=0.688$	Removed in step 6, $p=0.182$	Removed in step 4, $p=0.694$
C-FAI parental control	Removed in step 5, $p=0.533$	-0.225, (-0.418, -0.032), $p=0.022$	-0.150, (-0.439, 0.139), $p=0.310$
Frequency of fathers eating with child	0.090, (0.003, 0.176), $p=0.043$	-0.057, (-0.231, 0.117), $p=0.523$	-0.141, (-0.406, 0.123), $p=0.296$
Frequency of mothers eating with child	0.018, (-0.093, 0.129), $p=0.753$	0.113, (-0.104, 0.331), $p=0.307$	-0.186, (-0.524, 0.152), $p=0.281$
Frequency of grandparents eating with child	0.023, (-0.019, 0.066), $p=0.281$	0.039, (-0.047, 0.125), $p=0.371$	0.050, (-0.082, 0.183), $p=0.455$
Frequency of mealtime television viewing	-0.077, (-0.162, 0.007), $p=0.073$	0.113, (-0.054, 0.281), $p=0.185$	-0.184, (-0.444, 0.075), $p=0.164$
Family feeding practice	0.034, (-0.002, 0.069), $p=0.061$	0.105, (0.034, 0.176), $p=0.004$	0.090, (-0.017, 0.197), $p=0.099$
R ²	0.069, $p<0.001$	0.287, $p<0.001$	0.033, $p<0.001$

frequency of fathers eating with children had unique contribution, after controlling for family functioning and parenting style variables. For parent report of child learning, family feeding practice was a significant predictor. The results were consistent with the findings on the association between parents eating with children and child learning outcomes [12, 14, 15].

Hypothesis 3 on family dining practices as mediators between parenting style and child learning outcomes was partially supported. Family feeding practice mediated the association between permissive parenting style and parent report of child learning (BACS-P). The results were consistent with the findings on the association between parenting style and feeding practice [29].

The results of the present study suggested that predictors for child learning outcomes varied according to the way child learning outcomes were measured. Individual direct assessment of children’s attainment on preschool concepts was related to child sex and family dining practices, but not directly associated with parenting style and family functioning, which was contradictory to previous findings in the literature [5]. Parent report of child learning was associated with family functioning variables, authoritative parenting style, and family feeding practice. The results were consistent with the literature on authoritative parenting and child academic performance [4]. Teacher report of child learning was associated only with child sex. Girls were generally more co-operative and compliant than boys and so they were more likely to be rated positively by teachers and parents [30]. There might be other factors affecting children’s classroom behavior, such as teacher or classmate behavior, which were independent of family factors. The results also suggested that children’s learning was multi-faceted and their attainment and learning behavior in different settings might vary and these might be predicted by different factors. Considering child learning as one single construct might not reflect the multi-faceted nature of child learning.

It is argued that family meal times could provide unique “face-to-face sit-together” opportunities for parents to communicate with their children, monitor their activities, act as role models, and provide family teaching such as table manners, respect and sharing [31]. Dining with parents also provides a unique opportunity for children to engage in a common activity with other adults, to observe and participate in adult interaction and conversation. These might offer opportunities for learning turn taking, perspective taking and exposure to outside experiences through parents conversing about activities outside home. In the Hong Kong context,

fathers might work long hours and might not be able to spend much time with their children. Some fathers might also hold the traditional Chinese view of a stern father who might not interact much with their children on a fun basis. Family dinner might be a strategic opportunity for the father and child to spend time together on a shared activity in some families. Healthy family feeding practice might be interpreted as regulation and balance between healthy diet and the desire for tasty but unhealthy food at the child's wish. This might imply a message of self-control or regulation for better health outcomes and this general message of self-control/regulation is likely to be conducive to learning. However, further studies will need to be conducted to fully understand the dynamics behind these associations.

This study was unique in three regards. First, family dining practices, instead of family meals, were investigated. Second, this study used multi-method measure of child learning, including direct assessment of children with a locally normed instrument, parent and teacher report of child learning. Third, this study examined the contribution of family functioning, parenting style and family dining practices on the learning of Chinese children.

Limitations

First, this study was a cross-sectional study and conclusions on cause-effect relationship could not be drawn. Second, participants with incomplete data were more disadvantaged than those with complete data, in terms of socio-demographic characteristics, child learning, family functioning and parenting style. Third, schools from three of the relatively affluent districts in Hong Kong did not participate. Fourth, teacher factor was only partly controlled using school as a random factor. Fifth, parent input into child learning such as reading with children or tuition classes were not included. These variables might be confounded with family income. However, after controlling for family income, family dining practices, parenting style and family functioning variables were still significant predictors of child learning. Sixth, the parent questionnaires were completed by one parent only, and the data could not capture families where father and mother differed in parenting style or family functioning. Finally, though parents were asked to report their meal time activities in the last 7 days, it was not clear whether it was a typical week or not, and the 7-day period might not be long enough as a reliable measure.

Conclusion

There are different aspects of child learning, such as learning behavior in different settings and attainment of preschool concepts. The factors associated with these different aspects of child learning are different. Teachers and parents would need to recognize these different facets of child learning, and support their learning in ways specific to these facets of learning. Furthermore, there is some initial evidence on family dining practices as mediator between parenting style and child learning. Moreover, fathers eating dinner with their children have unique contribution to child attainment of preschool concepts. To enhance child learning, it is important to consider various aspects of learning and to adopt a comprehensive approach to address factors associated with different aspects of child learning, including family dining practices, parenting style and family functioning.

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