

RGC Ref. No.: UGC/FDS15/H02/14 _____ (please insert ref. above)
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**RESEARCH GRANTS COUNCIL  
COMPETITIVE RESEARCH FUNDING SCHEMES FOR  
THE LOCAL SELF-FINANCING DEGREE SECTOR**

**FACULTY DEVELOPMENT SCHEME (FDS)**

**Completion Report**

*(for completed projects only)*

<p><b><u>Submission Deadlines:</u></b></p> <ol style="list-style-type: none"> <li>1. Auditor's report with unspent balance, if any: within <b><u>six</u></b> months of the approved project completion date.</li> <li>2. Completion report: within <b><u>12</u></b> months of the approved project completion date.</li> </ol>
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**Part A: The Project and Investigator(s)**

**1. Project Title**

Executive Function Skills and Early School Success in Young Chinese Children from  


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Low-income Families  


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**2. Investigator(s) And Academic Department(s) / Unit(s) Involved**

<b>Research Team</b>	<b>Name / Post</b>	<b>Unit / Department / Institution</b>
Principal Investigator	Dr Chan Chi-keung/ Assistant Professor	Department of Counselling and Psychology/ Hong Kong Shue Yan University
Co-Investigator(s)	Dr Cutuli, J. J. / Assistant Professor	Department of Psychology / Rutgers University – Camden, USA
	Dr Zhang, Xiao / Associate Professor	Division of Chinese Language and Literature / Faculty of Education / The University of Hong Kong
	Dr Wong, Pak Ho Bernard / Assistant Professor	Department of Counseling and Psychology / Hong Kong Shue Yan University
Others	n.a.	n.a.

### 3. Project Duration

	<b>Original</b>	<b>Revised</b>	<b>Date of RGC / Institution Approval</b> <i>(must be quoted)</i>
Project Start Date	1 October 2014	n.a.	n.a.
Project Completion Date	30 September 2016	31 March 2017	29 August 2016
Duration ( <i>in month</i> )	24 months	30 months	29 August 2016
Deadline for Submission of Completion Report	30 September 2017	31 March 2018	29 August 2016

## **Part B: The Final Report**

### **5. Project Objectives**

#### 5.1 Objectives as per original application

1. To compare the average performance and growth of executive functioning (EF) and its components (inhibitory control, working memory and cognitive flexibility) between economically disadvantaged young children and their middle-class peers, that is, to test for socioeconomic disparity in EF development.
2. To investigate the dynamic relations between EF and five specific early school adaptive outcomes, namely academic competence, peer acceptance, pro-social behaviour, inattention-impulsivity and aggressive-defiant behaviour for young children from low-income families. This investigation will discern whether EF skill levels serve as indicators of risk and resilience for early school success for economically disadvantaged young children.
3. To examine whether maternal and paternal parenting styles are critical factors that can enable young children living in poverty to develop good EF skills and achieve school success.

#### 5.2 Revised objectives n.a.

Date of approval from the RGC: n.a.

Reasons for the change: n.a.

1. n.a.

2. n.a.

3. n.a.

#### 5.3 Realisation of the objectives

*(Maximum 1 page; please state how and to what extent the project objectives have been achieved; give reasons for under-achievements and outline attempts to overcome problems, if any)*

The data of the main study were analyzed to address the three project objectives and are summarized as follows:

- 1) For objective 1, socioeconomic disparity was found on two of the EF measures (working memory and cognitive flexibility) and the overall EF composite scores in the Fall 2015 data (T1). In Spring 2016 (T2), socioeconomic disparity was found on two of the EF measures (working memory and inhibitory control) and the overall EF composite scores. Children from low-income families had significantly lower levels on EF performance as compared to their middle-class peers. Using residual analysis (comparing the actual growth versus the expected growth), socioeconomic disparity was found in the growth of overall EF composite between children from low-income families and their middle-class peers. *Thus, economically disadvantaged children had lower EF performance and lower growth than their middle class peers.*

- 2) For objective 2, at T1, children's performance on working memory significantly and positively predicted their academic competence. Also, children's performance on inhibitory control significantly and positively predicted their prosocial behaviors. Furthermore, EF composite scores significantly and positively predicted their academic competence and prosocial behaviors whereas EF composite significantly and negatively predicted inattentive behaviors. At T2, children's performance on inhibitory control and EF composite scores significantly and positively predicted their academic competence. For the dynamic relationship, the growth in young children's inhibitory control and EF composite significantly and positively predicted their growth in academic competence. Also, the growth in EF composite scores significantly predicted lower growth in impulsive behaviors. Hence, *higher (lower) levels and growth in EF can serve as resilience (risk) indicators of early school success of young children.*
- 3) For objective 3, the results found that there were significant differences on some maternal and paternal parenting styles/practices between parents from low-income families and middle-class parents. On average, both parents from low-income families had significant lower scores on the authoritative parenting style and practices (warmth, democratic, and reasoning) but higher scores on lack of confidence in parenting. Mother's over-protective parenting style significantly predicted lower EF composite scores at T2 and lower growth in EF composite scores. Father's over-protective parenting style significantly predicted lower EF composite scores at both T1 and T2. Father's authoritative parenting style significantly predicted higher EF composite scores at both time points as well higher growth in EF composite scores. No consistent findings were found for the relations of maternal and paternal parenting with EF sub-measures. Therefore, *some of the maternal (over-protective) and paternal parenting styles (authoritative and over-protective) can be critical factors that can enable or hinder young children to develop good EF skills.*

Overall, all three project objectives of the completed FDS study have been fully addressed, however, some of the proposed sophisticated data analyses (structural equation modeling, linear mixed modeling, latent growth curve modeling) had poor model fit or could not be executed due to small number of data points.

#### 5.4 Summary of objectives addressed to date

<b>Objectives</b> <i>(as per 5.1/5.2 above)</i>	<b>Addressed</b> <i>(please tick)</i>	<b>Percentage Achieved</b> <i>(please estimate)</i>
1. To compare the average performance and growth of executive functioning and its components (inhibitory control, working memory and cognitive flexibility) between economically disadvantaged young children and their middle-class peers, that is, to test for socioeconomic disparity in EF development.	√	100%
2. To investigate the dynamic relations between EF and five specific early school adaptive outcomes, namely academic	√	100%

<p>competence, peer acceptance, pro-social behaviour, inattention-impulsivity and aggressive-defiant behaviour for young children from low-income families. This investigation will discern whether EF skill levels serve as indicators of risk and resilience for early school success for economically disadvantaged young children.</p>		
<p>3. To examine whether maternal and paternal parenting styles are critical factors that can enable young children living in poverty to develop good EF skills and achieve school success.</p>	√	100%

## 6. Research Outcome

### 6.1 Major findings and research outcome

*(Maximum 1 page; please make reference to Part C where necessary)*

The major findings are summarized as follows:

1) Socioeconomic disparity was found on two of the EF measures (working memory and cognitive flexibility) and the overall EF composite in the Fall 2015 data (T1). In Spring 2016 (T2), socioeconomic disparity was found on two of the EF measures (working memory and inhibitory control) and the overall EF composite. Furthermore, using residual analyses (comparing actual versus expected growth), socioeconomic disparity was found in the growth of overall EF composite between Chinese children from low-income families and their middle-class peers.

2) EF composite scores consistently and significantly predicted young children's early academic competence at both T1 and T2. In terms of the dynamic relations of EF with early school adaptive outcomes, the growth in young children's EF composite scores significantly and positively predicted their growth in academic competence. Also, the growth in EF composite scores significantly predicted lower growth on impulsive behaviors. Hence, higher (lower) levels and growth in EF can serve as resilience (risk) indicators of early school success of young children.

3) There were significant differences on some maternal and paternal parenting styles/practices between parents from low-income families and middle-class parents. On average, both parents from low-income families had significant lower scores on the authoritative parenting style and practices (warmth, democratic, and reasoning) but higher scores on lack of confidence in parenting.

4) Using hierarchical step-wise regression analyses, the results found that mother's over-protective parenting style significantly predicted lower EF composite scores at T2 above and beyond socioeconomic status and child's gender. Father's over-protective parenting style significantly predicted lower EF composite scores at both T1 and T2 above and beyond socioeconomic status and child's gender. Father's authoritative parenting style significantly predicted higher EF composite scores at both time points beyond socioeconomic status and child's gender.

5) Mother's over-protective parenting style significantly predicted lower growth in EF composite scores and father's authoritative parenting style predicted higher growth in EF composite scores. Thus, some of the maternal (over-protective) and paternal parenting styles (authoritative and over-protective) can be critical factors that can enable or hinder young Chinese children in Hong Kong to develop good EF skills.

Research outcome:

6) Two poster presentations and one oral presentation were given at one local (Hong Kong Psychological Society Annual Conference 2016) and two recognized international conferences (International School Psychology Association 2016 Conference and American Psychological Association 2016 Annual Convention) for this project.

7) Four teachers' workshops and four parents' workshops were conducted in between July 2016 and March 2017 for the participating schools.

8) The handbook on young children's EF development for parents and teachers was completed and distributed to administrators and teachers at the participating schools.

9) The research team is planning to present the final research findings of the completed study at one more international conference and is preparing at least two manuscripts for considering to be published in peer-reviewed journals.

10) A new FDS project (UGC-FDS15-H01-17) that is a continuation of this project was approved and just began on January 1, 2018. Based on the findings of this completed research project, the three-year new FDS project is going to develop and validate a parent-focused intervention to enhance the executive function skills of young Chinese children from low-income families. Please see more details in section 6.2.

### 6.2 Potential for further development of the research and the proposed course of action

*(Maximum half a page)*

A new FDS project (UGC-FDS15-H01-17) that is a continuation of this completed research project was also funded by RGC and the new project just began on January 1, 2018. Based on the findings of this completed research project, the three-year new FDS project is going to develop and validate a parent-focused intervention to enhance the executive function skills of young Chinese children from low-income families. The objectives of the new FDS project are:

- 1) To design and develop a parent-based EF-focused intervention programme to teach and empower parents from low-income families supportive parenting practices through psychoeducational workshops, take-home practice activities and monthly progress reviews to enhance the EF development of their children.
- 2) To examine the effectiveness of this parent-based EF-focused intervention programme using quantitative data (measures of parents' supportive parenting practices and children's EF) collected from the wait-list control intervention design and observations of parent-child play interaction, and field notes of monthly parent review sessions.
- 3) To investigate the fidelity of the implementation of this parent-focused intervention programme by analysing field notes from monthly individual parent review sessions and semi-structured parent interviews after the intervention.

Furthermore, I have been discussing with two of the co-Is, Dr J. J. Cutuli from Rutgers University and Dr Janette E. Herbers from Villanova University to explore any potential opportunities in developing a cross-cultural comparison study to examine the impacts of maternal and paternal parenting on EF development of young children, especially those from low-income families.

## **7. Layman's Summary**

*(Describe in layman's language the nature, significance and value of the research project, in no more than 200 words)*

Previous studies found that Chinese children have better executive functioning (EF) performance than Western children. Nevertheless, the negative impact of poverty on EF skills of economically disadvantaged Chinese children has not been fully investigated. This research project aims at comparing the levels and growth of EF performance between young Chinese children from low-income families and their middle-class peers. This project also examines whether better growth in EF can predict early school adaptive outcomes. It also investigates the relations of maternal and paternal parenting styles with EF performance.

This research project is valuable because it provides a critical understanding about the healthy development of EF of economically disadvantaged Chinese children which can support their short- and long-term development and success. There are two major significance of this research project: 1) it emphasizes the importance to counter the negative impact of widening income and educational disparities on the development of economically disadvantaged young children in Hong Kong by enhancing their EFs, and 2) the findings of this project provide empirical evidence on the design and development of a parent-focused intervention programme to empower parents of low-income families by training them in supportive parenting practices to enhance their young children's EF skills.

**Part C: Research Output****8. Peer-Reviewed Journal Publication(s) Arising Directly From This Research Project**

*(Please attach a copy of the publication and/or the letter of acceptance if not yet submitted in the previous progress report(s). All listed publications must acknowledge RGC's funding support by quoting the specific grant reference.)*

The Latest Status of Publications				Author(s) (denote the corresponding author with an asterisk*)	Title and Journal / Book (with the volume, pages and other necessary publishing details specified)	Submitted to RGC (indicate the year ending of the relevant progress report)	Attached to this Report (Yes or No)	Acknowledged the Support of RGC (Yes or No)	Accessible from the institutional repository (Yes or No)
Year of Publication	Year of Acceptance (For paper accepted but not yet published)	Under Review	Under Preparation (optional)						
n.a.	n.a.	n.a.	2	*Chi-Keung Chan, J. J. Cutuli, Xiao Zhang, Bernard P. H. Wong, Janette E. Herbers, & Tsz-Ching Lo	Early Childhood Research Quarterly; Early Education and Development	No	No	Yes	n.a.

**9. Recognized International Conference(s) In Which Paper(s) Related To This Research Project Was / Were Delivered**

*(Please attach a copy of each conference abstract)*

Month / Year / Place	Title	Conference Name	Submitted to RGC (indicate the year ending of the relevant progress report)	Attached to this Report (Yes or No)	Acknowledged the Support of RGC (Yes or No)	Accessible from the institutional repository (Yes or No)
June 2016 Hong Kong	Socioeconomic disparity in executive functioning skills of young Chinese children: The mediation effects of parenting styles	The Hong Kong Psychological Society Annual Conference 2016	2016	No	Yes	n.a.



July 2016 Amsterdam, Netherlands	Socioeconomic disparity in executive functioning skills of young Chinese children: The mediation effects of parenting styles	International School Psychology Association (ISPA) 2016	2016	No	Yes	n.a.
August 2016 Denver, U.S.A.	Socioeconomic disparity in parenting and executive functioning skills of young Chinese children	American Psychological Association (APA) 2016 Annual Convention	2016	No	Yes	n.a.

### 10. Whether Research Experience And New Knowledge Has Been Transferred / Has Contributed To Teaching And Learning

*(Please elaborate)*

This worthwhile research experience has contributed to my teaching of Research Methods and Statistics courses as well as my supervision of undergraduate and master students' research projects. I have also transferred my research experience and knowledge to my former and current Research Assistants and Student Assistants.

### 11. Student(s) Trained

*(Please attach a copy of the title page of the thesis) n.a.*

Name	Degree Registered for	Date of Registration	Date of Thesis Submission / Graduation

### 12. Other Impact

*(e.g. award of patents or prizes, collaboration with other research institutions, technology transfer, teaching enhancement, etc.)*

1) The research team collaborated with MacArthur Foundation Research Network on Psychopathology and Development in developing the Chinese version of HBQ (Health and Behavior Questionnaire) 1.0 teacher form. The HBQ-T 1.0 is a questionnaire for assessing the mental, physical, social, and academic well-being of children and adolescents. The team has kept updating this Chinese version. The Chinese HBQ-T 1.0 was developed by Dr. Chan, Chi-Keung (PI), Ms. Ng Wun-Ting, and Ms. Chan, Wing-Sze Wincy. A downloadable copy can be retrieved at: <https://macarthurbhq.files.wordpress.com/2014/05/chinese-hbq-t-1-0-teacher-version-2015-2-6.pdf>

2) The handbook on young children's EF development for parents and teachers was completed. The content of this handbook is based on the recent brain-based research findings on EF development. The handbook also emphasizes on how teachers and parents can cultivate a learning environment at school and at home to support and to sustain the growth of EF in young children. The handbook will be further revised as a training manual for educating parents from low-income families for the upcoming FDS research project (UGC-FDS15-H01-17).

### 13. Public Access Of Completion Report

*(Please specify the information, if any, that cannot be provided for public access and give the reasons.)*

<b>Information that Cannot Be Provided for Public Access</b>	<b>Reasons</b>
n.a.	n.a.

**RESEARCH GRANTS COUNCIL  
COMPETITIVE RESEARCH FUNDING SCHEMES FOR  
THE LOCAL SELF-FINANCING DEGREE SECTOR**

**FACULTY DEVELOPMENT SCHEME (FDS)**

**Completion Report - Attachment**

*(for completed projects only)*

**RGC Ref. No.:** UGC/FDS15/H02/14

**Principal Investigator:** Dr. Chan Chi-keung

**Project Title:** Executive Function Skills and Early School Success in Young  
Chinese Children from Low-income Families

**Statistics on Research Outputs**

	Peer-reviewed Journal Publications	Conference Papers	Scholarly Books, Monographs and Chapters	Patents Awarded	Other Research Outputs (Please specify)
No. of outputs arising directly from this research project [or conference]	0	1 paper presentation and 2 poster presentations	0	0	Chinese version of HBQ (Health and Behavior Questionnaire) 1.0 teacher form  1 handbook on EF for parents and teachers