

RGC Ref. No.: UGC/FDS16/H13/19 (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**

The impact of bilingual exposure on the language development of Cantonese-speaking children with Autism Spectrum Disorder

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

Research Team	Name / Post	Unit / Department / Institution
Principal Investigator	Haoyan Ge/ Assistant Professor	School of Education and Languages, Hong Kong Metropolitan University
Co-Investigator(s)	Virginia Yip/ Professor	Department of Linguistics and Modern Languages, Chinese University of Hong Kong
Co-Investigator(s)	Fang Liu/ Associate Professor	School of Psychology and Clinical Language Sciences, University of Reading

**3. Project Duration**

	Original	Revised	Date of RGC / Institution Approval (must be quoted)
Project Start Date	01/01/2020	01/01/2020	
Project Completion Date	31/12/2021	31/12/2022	28/03/2022
Duration (in month)	24	36	28/03/2022
Deadline for Submission of Completion Report	31/12/2022	31/12/2023	28/03/2022

4.4 Please attach photo(s) of acknowledgement of RGC-funded facilities / equipment.

Equipment: Chronos



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

### **5. Project Objectives**

#### 5.1 Objectives as per original application

1. *To investigate whether Cantonese-speaking autistic children with exposure to English have additional language impairments than their monolingual peers with ASD;*
2. *To examine the general language ability of Cantonese-speaking autistic children with and without exposure to English;*
3. *To identify the level of linguistic deficits of Cantonese-speaking autistic children with and without exposure to English by examining their use of prosody and syntax related to the comprehension and production of contrastive focus;*
4. *To provide evidence-based guidance on early treatment and effective interventions for Cantonese-speaking children with ASD in Hong Kong; and*
5. *To shed light on the relationship between bilingual exposure and language development in children with ASD.*

## 5.2 Revised objectives

Date of approval from the RGC: NA

Reasons for the change: NA

1. NA

2. NA

3. NA

## 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)*

### **Realisation of Objectives 1, 2 & 3:**

This project tested 44 autistic children ( $M = 83.41$  months,  $SD = 14.57$ ; 34 boys, 8 girls) and 60 TD children ( $M = 75.44$  months,  $SD = 6.52$ ; 36 boys, 20 girls) in a series of language tasks and assessments. All children were born in Hong Kong and acquired Cantonese as their first language and English as a second language before age 3. TD children had no family history of diagnosed developmental disorders or impairments. Children's level of receptive vocabulary, autism severity, nonverbal IQ, and socioeconomic status of the children were considered in order to systematically control confounding variables. Parents were asked to fill out a report including the language(s) the parents/caretaker(s) and teachers speak to the child; and the average amount of time the child is exposed to Cantonese and English at home, school and community per week. We considered children bilingual with English exposure amounting to over 12% of the total language input. Two language tasks were conducted separately to investigate the comprehension and production of syntactically marked and prosodically marked focus in autistic and TD children.

**Objective 1** was achieved by comparing the performance between monolingual and bilingual autistic children. The two groups were aligned in the comprehension and production of focus in general. The two autistic groups only differed in the production of object focus, with bilingual autistic children being significantly more accurate than their monolingual autistic children. Our findings indicated that bilingual autistic children did not have additional language impairments than their monolingual autistic peers.

**Objective 2** was realised by examining the general language skills, including the Cantonese receptive vocabulary and self-ratings from the parents, of monolingual and bilingual autistic children. Our results revealed no difference between the two groups.

**Objective 3** was achieved by conducting detailed linguistic analyses of the children's use of prosody and syntax in the comprehension and production of focus. This involved recording and analysing their speech and response during the two language tasks, and comparing their performance with typical developmental benchmarks. Our findings revealed TD-like performance in autistic children in the use of syntax to comprehend and produce focus. However, autistic children experience more difficulties than their TD peers in acquiring prosodically marked focus.

**Realisation of Objectives 4 & 5:**

**Objective 4** was realised by reviewing the current empirical data generated from the project. First, our results suggest that autistic children may not always experience more difficulties than their TD peers in all aspects of language development. Assessing their linguistic knowledge in different domains is crucial to obtain a more comprehensive picture of their language development. Second, our study highlights the importance of understanding language-specific patterns in designing future language assessment tools to detect communication problems in children with ASD. In particular, identifying cross-linguistic differences and considering language backgrounds would be helpful in designing intervention plans for children with ASD. Moreover, the findings can inform parents and educators that they should be encouraged to engage their autistic children in rich bilingual environments. Interventions and training may also consider including bilingual programmes to support families raising bilingual autistic children.

**Objective 5** was achieved by conducting a systematic review of the effects of bilingual exposure on the language development of autistic children in the current project. This study is the first investigation of the effects of bilingualism on the language development of autistic children in Cantonese–English bilingual contexts where Cantonese is the community language. Our findings provide new empirical evidence that bilingual autistic children exposed to two typologically different and genetically divergent languages would not experience additional language difficulties in the production of focus compared to monolingual autistic peers.

## 5.4 Summary of objectives addressed to date

<b>Objectives</b> (as per 5.1/5.2 above)	<b>Addressed</b> (please tick)	<b>Percentage Achieved</b> (please estimate)
1. <i>To investigate whether Cantonese-speaking autistic children with exposure to English have additional language impairments than their monolingual peers with ASD</i>	✓	100%
2. <i>To examine the general language ability of Cantonese-speaking autistic children with and without exposure to English</i>	✓	100%
3. <i>To identify the level of linguistic deficits of Cantonese-speaking autistic children with and without exposure to English by examining their use of prosody and syntax related to the comprehension and production of contrastive focus</i>	✓	100%
4. <i>To provide evidence-based guidance on early treatment and effective interventions for Cantonese-speaking children with ASD in Hong Kong</i>	✓	100%
5. <i>To shed light on the relationship between bilingual exposure and language development in children with ASD.</i>	✓	100%

## 6. Research Outcome

### 6.1 Major findings and research outcome

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

This research project mainly examined the comprehension and production of contrastive focus in 5- to 9-year-old Cantonese-speaking autistic children, compared with TD children matched in nonverbal IQ, working memory, receptive vocabulary and maternal education.

In terms of the comprehension (see **Ge et al., 2022, Attachment 1**), we examined how Cantonese-speaking autistic children interpret prosodically and syntactically marked focus. We have identified their use of prosodic and syntactic means, while comparing them to Cantonese-speaking adults and TD children. On the one hand, the similar patterns between autistic children with and TD children provide supporting evidence for TD-like syntactic abilities in the comprehension of focus by autistic children. On the other hand, the results suggest that autistic children might experience more difficulties in utilising prosodic information to understand focus, relative to their TD peers. Our results also indicate that Cantonese-speaking autistic children have acquired language-specific focus marking strategies by age 8. This study demonstrates how linguistic domains (e.g., prosody and syntax) and language specific strategies can influence comprehension outcomes in autistic children.

Regarding the production (see **Ge et al., 2023, Attachment 2**), our findings revealed that bilingual autistic children aligned with monolingual autistic children in the production of focus in general, although bilingual autistic children outperformed monolingual autistic peers in object focus production. Our results also revealed autistic children's difficulty using prosodic means to produce focus. Our findings shed new light on the effects of bilingualism on the focus production of autistic children, showing that exposure to two languages does not impede bilingual autistic children's first language development. Rather, bilingualism may even enhance the production of focus in autistic children.

Taken together, our comprehension and production data provide empirical evidence to indicate that Cantonese-speaking autistic children may experience more difficulties than their TD peers in acquiring prosodically marked focus in general. Our study is one of the very few that examined the impact of bilingual exposure on specific linguistic structures and the use of different linguistic strategies in experimental settings where confounding factors such as language ability, nonverbal IQ and working memory are adequately controlled, apart from standardized language assessments. Our results highlight the importance of combining both approaches in measuring bilingualism effects on the language development of autistic children. Apart from shedding light on the relationship between bilingualism and language development in autism, the findings of the current study can inform evidence-based practice and provide essential guidance to parents, clinicians, educators and other professionals who make language decisions for autistic children in bilingual communities. Crucially, parents and educators should be encouraged to engage their autistic children in rich bilingual environments. Interventions and training may also consider including bilingual programmes to support families raising bilingual autistic children.

## 6.2 Potential for further development of the research and the proposed course of action (Maximum half a page)

Our research on the impact of bilingual exposure on the language development of Cantonese-speaking children with ASD in Hong Kong has the potential for significant further development. First, the findings from our study could be used as a foundation for similar research in other bilingual or multilingual contexts, involving different combinations of languages. This would allow for a more comprehensive understanding of how ASD interacts with bilingual exposure across various linguistic and cultural contexts. Second, the developmental patterns obtained from this research can be used as a baseline for language deficits across different populations of children with or at risk of neurodevelopmental disorders. Moreover, the research could be expanded to investigate other aspects of development in autistic children, such as narrative skills and cognitive abilities. This would provide a more holistic view of the communication abilities of these children.

In terms of the proposed course of action, the first step would be to secure additional funding for the further development of the research. This could involve applying for research grants or seeking partnerships with other research institutions or organisations interested in the development of autistic children in bilingual communities. Then, the research team would begin planning and implementing the expanded studies, incorporating the lessons learned from this research and the feedback received from the academic community. Throughout this process, the team would continue to collaborate with clinicians, educators, and parents to ensure that the research remains relevant and beneficial to the individuals it aims to support.

## 7. Layman's Summary

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

Autism Spectrum Disorder (ASD) affects social interaction and communication in children. Professionals and parents commonly believe that exposure to two languages imposes an additional burden on autistic children. In spite of this, empirical evidence is lacking. We studied bilingual autistic children from Hong Kong, whose first language was Cantonese and whose second language was English. Using standard language assessments and interactive language games, we tested how autistic children produce contrastive information in real conversations, compared to their typically developing peers. Our research showed that bilingual autistic children performed just as well as typically developing children, and they even outperformed monolingual autistic children. This is the first study to investigate the effects of bilingualism on autistic children's language development in Cantonese–English bilingual settings. Our findings provide new empirical evidence that bilingual autistic children exposed to two typologically different and genetically divergent languages will not experience additional language difficulties. Thus, we encourage parents to create rich bilingual environments for their children. To support families raising bilingual autistic children, clinicians, educators, and other professionals may consider adding bilingual aspects to training programmes.

**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)						
2022				<b>Haoyan Ge*</b> , Fang Liu, Hoi Kwan Yuen, Aishu Chen & Virginia Yip	Comprehension of prosodically and syntactically marked focus in Cantonese-Speaking children with and without Autism Spectrum Disorder, <i>Journal of Autism and Developmental Disorders</i> , 53, 1255–1268. <a href="https://doi.org/10.1007/s10803-022-05770-1">https://doi.org/10.1007/s10803-022-05770-1</a>	No	Yes [Attachment 1]	Yes	Yes
2023				<b>Haoyan Ge*</b> , Albert Lee, Hoi Kwan Yuen, Fang Liu & Virginia Yip	Bilingual exposure might enhance L1 development in Cantonese–English bilingual autistic children: Evidence from the production of focus, <i>Autism</i> . <a href="https://doi.org/10.1177/13623613231207449">https://doi.org/10.1177/13623613231207449</a>	No	Yes [Attachment 2]	Yes	Yes

### 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)
08/2020 Hong Kong	Comprehension of focus in Cantonese: Comparison between children with Autism Spectrum Disorder and typically developing children.	RiBILT Research Seminars, Open University of Hong Kong	Yes	Yes [Attachment 3]	Yes	Yes
11/2020 Macau	Syntax or prosody? Comprehension of focus by Cantonese-speaking children and adults	The 24th International Conference on Yue Dialects	Yes	Yes [Attachment 4]	Yes	Yes
07/2021 Poland	How do Cantonese-English bilingual children with Autism Spectrum Disorder comprehend focus?	The 13th International Symposium of Bilingualism	Yes	Yes [Attachment 5]	Yes	Yes
07/2021 USA	Input effects in bilingual development: The case of syntactic complexity in Cantonese-English bilingual children's English.	The International Association for the Study of Child Language (IASCL) Conference	Yes	Yes [Attachment 6]	Yes	Yes
11/2021 Germany	The elicitation of focus in online testing of Cantonese-speaking children with and without Autism Spectrum Disorder.	Methods of Online Discourse Elicitation Conference	Yes	Yes [Attachment 7]	Yes	Yes
05/2022 Germany	The production of focus by Cantonese-English bilingual children with and without Autism Spectrum Disorder.	Bi/multilingualism and Specific Language Impairment (Developmental Language Disorder) Conference	No	Yes [Attachment 8]	Yes	Yes
05/2022 Hong Kong	The use of prosodic and syntactic cues in the comprehension of focus in Cantonese-speaking children with and without Autism Spectrum Disorder	The 28th Annual Conference of the International Association of Chinese Linguistics	No	Yes [Attachment 9]	Yes	Yes
06/2023 Australia	Bilingual exposure enhances focus production in Cantonese-English bilingual autistic children's L1 Cantonese	The 14th International Symposium of Bilingualism	No	Yes [Attachment 10]	Yes	Yes



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

*(please elaborate)*

Based on the research work on autistic children, the PI added a new section about language development in special populations in a foundation linguistics course designed for students majoring in English language and English Education in the School of Education and Languages. This new lecture broadens students' understanding of language development, highlighting that it is not a uniform process but varies significantly among different populations. It also fosters empathy and understanding among future educators and language professionals towards individuals with special needs. By learning about the unique challenges and abilities of autistic children, students will be better prepared to accommodate and support these individuals in their future careers.

# 11. Student(s) Trained

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

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

# 12. Other Impact

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

**Collaboration with Other Research Institutions:** The research project has led to several collaborations with other researchers in Hong Kong and the UK. The PI built a collaboration with Dr Si Chen at Hong Kong Polytechnic University and was invited to serve as the Co-I of a GRF application on autistic children's language development. As a follow-up study, the PI established an eye-tracking study on autistic children's online prosody processing with Dr Fang Liu (the Co-I of this project) at the University of Reading in the UK. In addition, the PI was also involved as a Co-I in a research project on psychotherapy for the well-being of caregivers of children with ASD, with Dr Wendy Zhang in the School of Nursing at HKMU.

**Teaching Enhancement:** The findings of the research were incorporated into the PI's teaching of undergraduate students majoring in English Language and English Education (also see section 10). The research findings can enhance the teaching strategies used by

educators, particularly those focused on special education or bilingual education.

**Community Engagement:** The research has led to increased engagement with the community, particularly with families raising autistic children. First, the project provided a detailed report for each child, which included language profiles, cognitive skills, and level of autism severity (if applicable). From this report, parents gained a comprehensive understanding of their children's overall development and were therefore able to adjust their child-rearing strategies at home accordingly. Second, the PI gave several public talks on autistic children's language development in Hong Kong, Macau and Mainland China. These talks attracted more than 300 audiences including parents of autistic children, speech therapists, educators and other professionals. Moreover, the PI shared her research findings on bilingual autistic children in Sing Tao Daily (see Attachment 11). This evidence-based research provides essential guidance to parents, clinicians, educators, and other professionals who make decisions concerning child-rearing for autistic children in Hong Kong.

### 13. 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	2	8	0	0	Type	No.
					Media Press	1

### 14. Public Access Of Completion Report

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

Information that Cannot Be Provided for Public Access	Reasons
NA	NA