

THE EDUCATION UNIVERSITY OF HONG KONG
FACULTY OF LIBERAL ARTS AND SOCIAL SCIENCES

Research Output/Impact Prize for the Dean's Research Fund 2017-18

**Brief Introduction of Awardee's
Research Publication/Study and Future Research Development**

Awardee (Dept):	Dr. Tse Choi Yeung Andy, Assistant Professor (HPE)
Publication Title:	Choosing an Appropriate Physical Exercise to Reduce Stereotypic Behavior in Children with Autism Spectrum Disorders: A Non-randomized Crossover Study

A. Briefly introduce your research publication/study for which you have received the prize.

This research study of “Choosing an Appropriate Physical Exercise to Reduce Stereotypic Behavior in Children with Autism Spectrum Disorders: A Non-randomized Crossover Study” has been published by the Journal of Autism and Developmental Disorders in 2018. Due to the considerable evidence has shown that physical exercise could be an effective treatment in reducing stereotypical autism spectrum disorder (ASD) behaviors in children, the present study seeks to examine the underlying mechanism by considering the theoretical operant nature of stereotypy. In the study, 30 children with ASD who exhibited hand-flapping and body-rocking stereotypies were asked to participate in both control (story-time) and experimental (ball-tapping-exercise intervention) conditions. In the study, we aimed to examine this speculation by investigating the impact of a ball-tapping exercise on two stereotypic behaviors: repetitive hand flapping and body rocking in children with ASD. Considering the different topographies of these two behaviors (one focused on hand-and-arm movement and one focused on whole-body movement), we hypothesized that ball tapping would be more effective in reducing hand flapping behavior than in reducing body-rocking behavior. The present study applied a crossover design to test our hypothesis. All participants were exposed to both control and experimental conditions in an A-B sequence with a 1-month wash-out period. Each condition comprised 24 sessions (two sessions per week, 20 min per session). Each session was conducted in the morning between 8:30 a.m. and 9:30 a.m. by a trained research assistant who was assisted by student helpers in a hall/gymnasium of each participating school. The staff-to-participant ratio for both groups was 1:2 to 1:1, depending on attendance. Each

participant was assigned a student helper as a partner and this partnership was fixed throughout the study. The result of the study has shown that hand-flapping stereotypy was significantly reduced but body-rocking stereotypy following the ball-tapping-exercise intervention was not. These results not only confirm the positive impact of exercise intervention on stereotypic behavior as shown in many previous studies, but further suggest that physical exercise should be matched with the topography of stereotypy to produce a desirable behavioral benefit.

B. How you used/will use your prize and perhaps its usefulness to your research development?

I will use the research prize to buy one computer, one portable hard-disk and hire student helpers for my future research. The computer with good graphic designs and portal hard-disk are essential for the coming project. The video editing is very important in this study because it is the major data format for coding the children participants' behaviour. Also, we are using the 'self-modelling technique' to enhance the motor learning process of the participants. For example, we are video-recording the participants the motor learning progress of the basketball tapping skill. And we will edit the video as if they have already mastered the skill. This video-editing requires a good hardware and software to create this 'self-modelling clip'. The portable hard-disk with great volume (2TB or above) is essential or storing the video clips which are to be coded and analysed for the experiment. Moreover, the edited video is expected to occupy a large memory of the volume.

C. Expected research outcomes/outputs/impacts arising from this prize.

The study, for the first time, examines the differential impacts of a physical exercise intervention on different stereotypic behaviors in children with ASD. We hypothesized that a ball-tapping exercise that required similar biomechanics as repetitive-hand-flapping behavior would more effectively reduce said stereotypic behavior compared with repetitive body-rocking behavior. In agreement with this hypothesis, the frequency of hand flapping movements was found to be significantly reduced by the exercise intervention. In contrast, the frequency of body-rocking movement was not revealed to be significantly reduced by the exercise intervention. These findings, although preliminary, are encouraging because they not only confirm the positive impact of physical exercise on stereotypic behavior in children with ASD, but further suggest that exercise should be matched with stereotypic behavior to yield a significant behavioral benefit. Moreover, these results provide some insight into understanding the mechanism by which exercise impacts behavior and provides valuable information for parents, teachers and practitioners to design a more efficient behavioral treatment for children with ASD. Additional research should be conducted in the future to replicate and extend these findings to examine the sustainability of this benefit for children with ASD.