

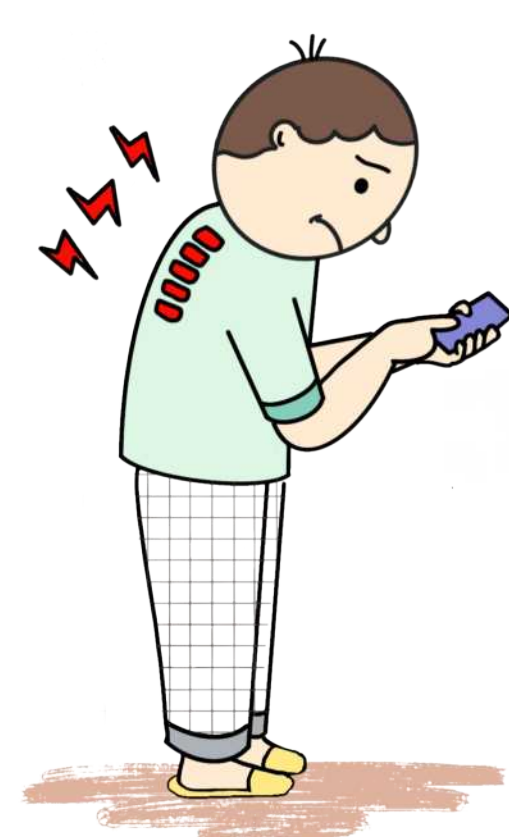
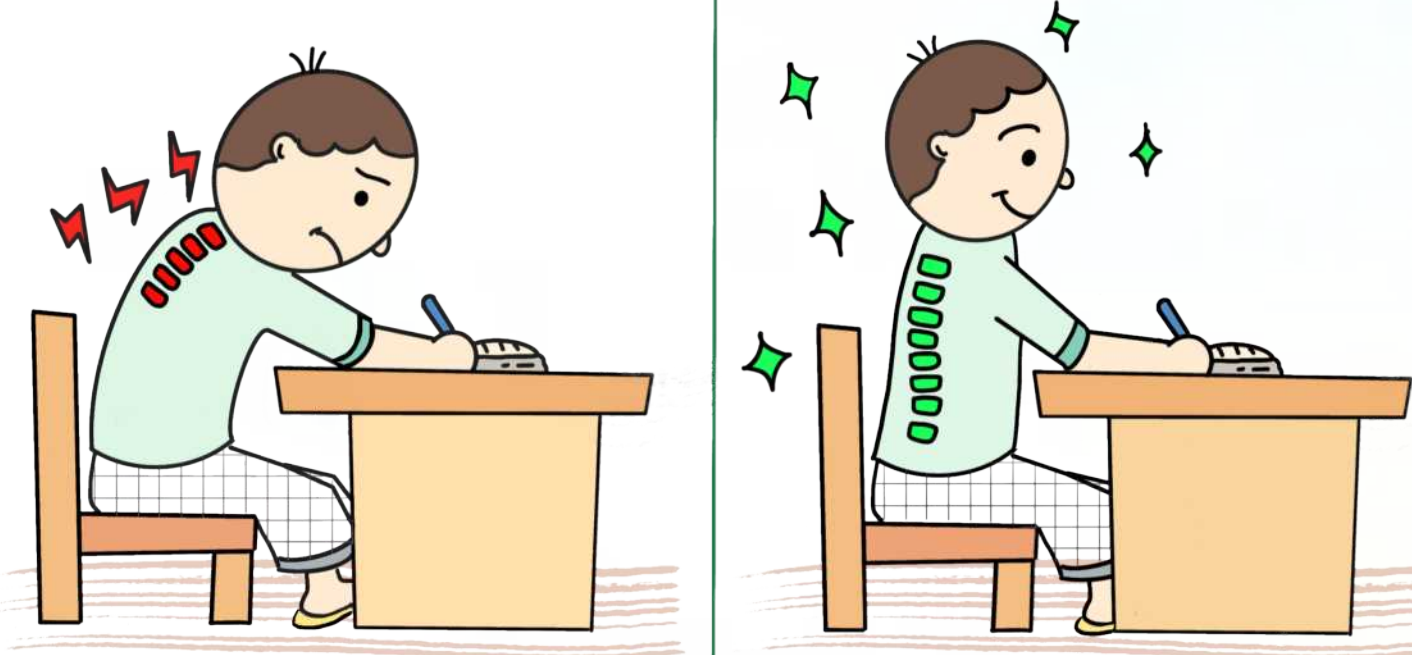
Good posture is a good habit which allows healthy growth of the spine, especially for the adolescents at the stage of puberty and those children living in subdivided units (SDU).

- To improve the awareness of children's posture and Adolescent Idiopathic Scoliosis (AIS) through delivering educational talks
- To extend the benefit of screening program to SDU children
- To increase the accessibility to service via providing convenient treatment and follow-ups.
- To promote the psychological health of the children with AIS by organizing mutual support programs



Why it matters to SDU Children and family's well-being?

Bad **Good**



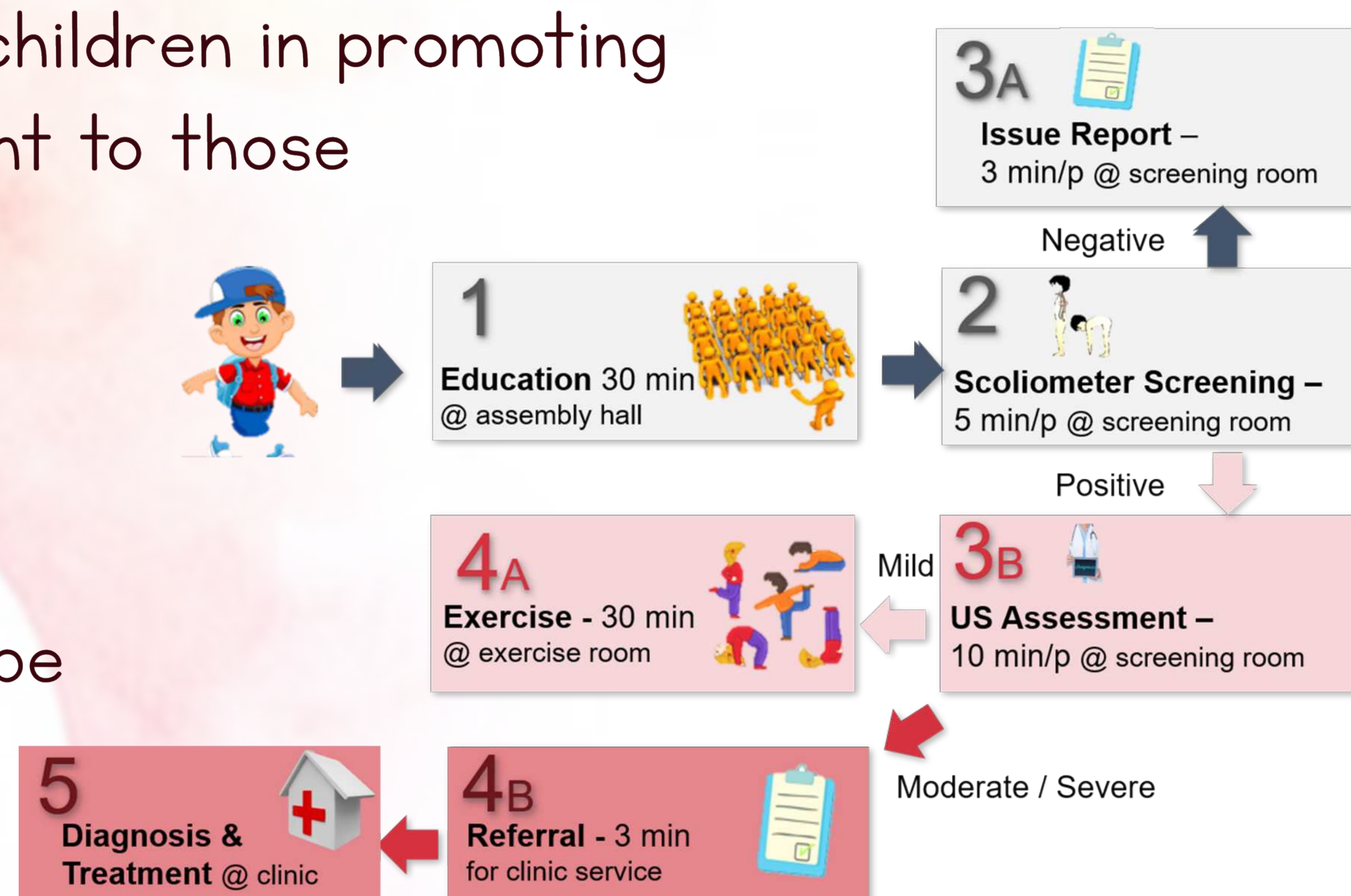
- Poor posture could lead to musculoskeletal disorders such as neck/back pain, decreased joint range of motion, imbalanced standing and impeded walking pattern.
 - Discomfort due to poor posture would distract children from learning and affect their academic performance.
 - Prolonged poor posture could restrict normal motion of spinal segment which would affect the growth of children.
- Good posture is therefore important for the children who are at the stage of growth and development.
- To explore practical ways to transform ergonomic principles into furniture in SDU within limited space and prevent poor posture development.



Jockey Club Children's Spine Care Community Project

賽馬會學童脊柱保健計劃

- The Hong Kong Jockey Club Charities Trust funded "Jockey Club Children's Spine Care Community Project" aims to provide service to the under privileged children in promoting good posture, and to offer spine screening and treatment to those who are diagnosed with scoliosis.
- The under-privileged children suffering from scoliosis can be taken good care of.
- The outcomes of spine health public education, scoliosis screening, clinical service and treatment strategies can be shared with to the key stakeholders in educational, medical, academic and policy-making bodies.



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香港賽馬會慈善信託基金
The Hong Kong Jockey Club Charities Trust
同心 同步 同進 RIDING HIGH TOGETHER



Key Message

During the growth of children, space has taken different roles to facilitate the developmental needs. At the first 2 years of age, space facilitates the sensorimotor development, so babies could learn to crawl, sit, stand and walk through interactions with the environment. From the age of 2, spacious environment nurtures children's creativity, problem solving and social skills through playing. Environment of the SDU limits the sensory and motor experience of children and reduces the space for play and learning. Full utilization of space and use of proper furniture, including proper table and chair, could provide a facilitative environment for children development and learning.

Basic Theories and Concept of child development

Sensorimotor development

- According to Piaget's Cognitive Development Theory, children learn how's their sensory and motor system interact with the environment from 0-2 years old.⁴
- Cognitive development is positively associated with levels of gross motor skills of toddlers.⁶
- According to Dynamic Systems Theory, the motor skills at these ages (i.e. crawling, sitting, standing etc.) develop with the sensory systems (visual, auditory, proprioceptive, vestibular, tactile, olfactory, gustatory) which requires stimuli providing by the environment.
- Sensory stimulation and sensory experience of different sensation systems are crucial for learning in infancy and most of the daily activities does in the first seven years of life.²

Play skills development

- Play development starts at infancy and it is brain building. Infants starts object play by exploration and manipulation. Play skills develop from reaching and shaking rattles at 3 months old to stacking blocks and build block structures at 2 years old.
- Children starts to develop physical activity play involving items after 2 years old. (i.e. kick ball, throw balls etc.)
- Children starts to show empathy during play, having conversation, turns taking with friends and have pretend play by using multiple toys (e.g. dolls and doll house) with complex theme after 3 years old.

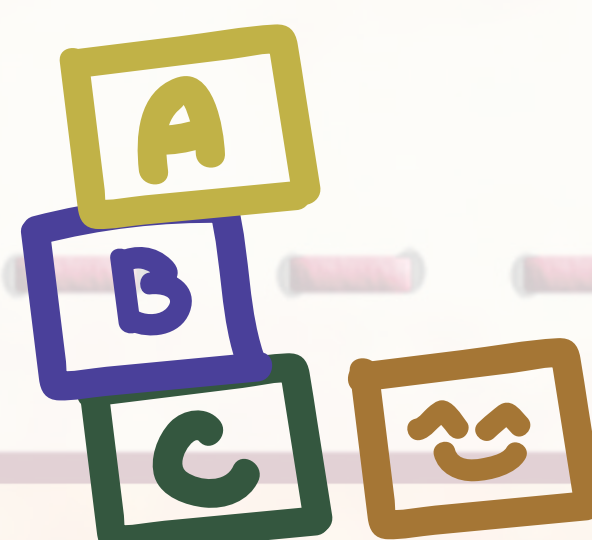
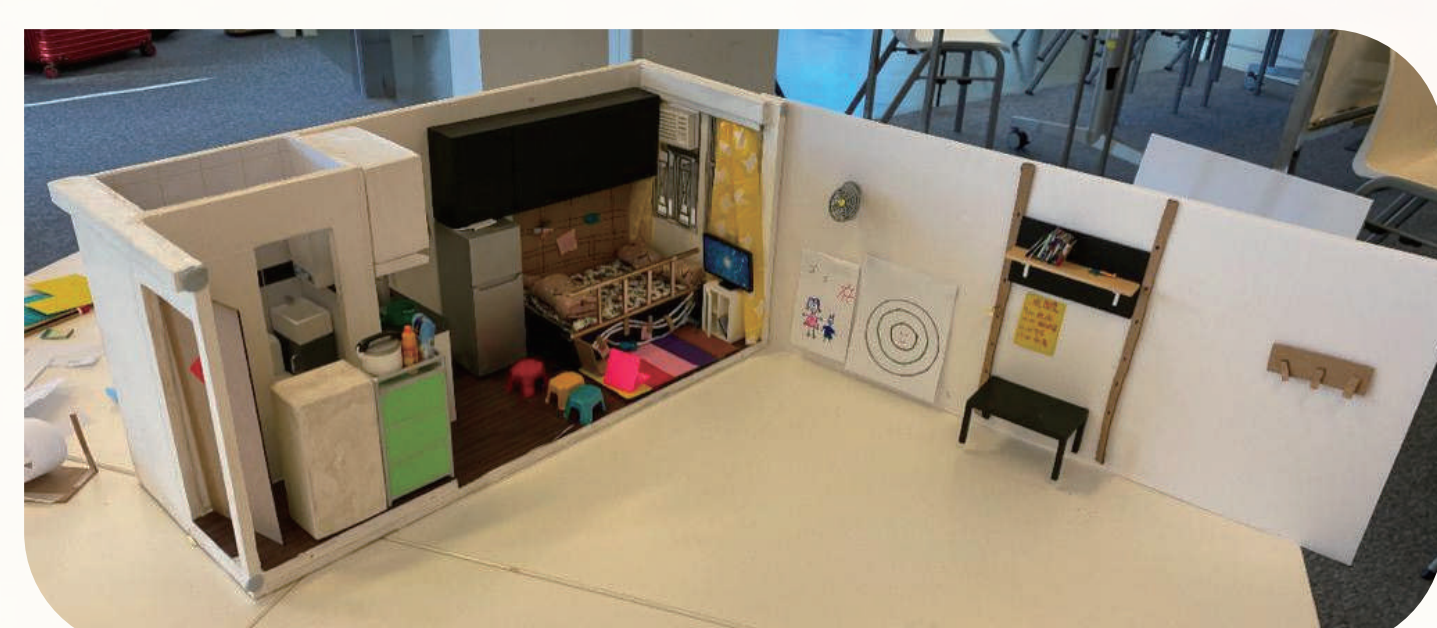


Why it matters to family in Subdivided unit ?

SDU environment provides limited play materials and stimulating zones to enhance children's sensorimotor development and their wellbeing.

The sensory stimulation provided in a home environment is crucial on children's psychomotor development in their first 3 years of age.¹

Provision of age-appropriate play materials is found to have significant impact, yet families living in SDU may not be able to provide manufactured toys for children to play. Tumbling zone, cubbies and open floor space were found to have positive impact on children's physical activity, while high and low tables having negative impact on children's well being.⁵



How Can PolyU Help?

In view of limitations to change the size of SDU, in addition to the modification of hardware, several suggestion on software support are proposed to improve the well being of the tenants including children and adults. It is believed that equipping parents with knowledge do affect the successfulness of changing the tenants' habits, lifestyle and awareness, and leads to improvement in quality of living and facilitation of children's development.

Hardware

Home modification - Home visit could be done, advises on furniture or spatial re-arrangement/ furniture ergonomics could be given.

Participate in furniture design - collaborate with the design team to maximize the functions that could be provided by each furniture to fit the needs of the tenants.

Toys design - collaborate with the design team to design age-appropriate toys which fits the sensory/motor and play skills developmental needs.

Prescription of equipment for writing/reading/other functional tasks which fits the ergonomic needs.

Software

Provide age-appropriate sensory/ motor activities recommendation - For parents to facilitate children development in an environment with limited space and follow up on the execution.

Provide parents' education on safety issues and child developmental needs - Raise their concern on how the environment is affecting their children and what they could do to facilitate their children's growth.

Lifestyle redesign - Identify the barriers/ obstacles of daily/weekly routine in order to better understand how the parents could build meaningful lifestyle components, which helps to promote the health of both the parents and children.

Professional service

Health screening, developmental assessment, postural assessment can be performed to identify children in need. Professional rehabilitation service e.g. physiotherapy and occupational therapy can be provided so as to facilitate development and foster rehabilitation.

Research

Research on impact on living environment and it's modification in relation to children development or other related topics could be done.

1. Avon, B. I., Raza, S. A., & Kirkwood B. R. (2014). A community-based study of early childhood sensory stimulation in home environment associated with growth and psychomotor development in Pakistan. *International Journal of Public Health*, 59, 779-788.

2. Ayres, A. J., & Robbins, J. (2005). Sensory integration and the child: understanding hidden sensory challenges. *Western Psychological Services*.

3. Charlop, M. H., Lang, R., & Rispoli, M. (2018). More than just fun and games: Definition, development, and intervention for children's play and social skills. In *Play and social skills for children with autism spectrum disorder* (pp. 1-16). Springer International Publishing.

4. Jansen, J. (2011). Piaget's cognitive development theory. In S. Goldstein, J.A. Naglieri (Ed.) *Encyclopedia of child behavior and development*. Springer, Boston, MA. https://doi.org/10.1007/978-0-387-79061-9_2164

5. Sands, O. J. (2019). The physical indoor environment in ECEC settings: children's well-being and physical activity. *European Early Childhood Education Research Journal*, 27(4), 506-519.

6. Veldman, L.C. et al. (2018). Associations between gross motor skills and physical activity in Australian toddlers. *Journal of science and medicine in sport*, 21(8), p.817-821.

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PolyU Design

Key Message

There is no single solution to help to improve the living conditions in subdivided units. The most important is to involve multiple stakeholders to design, test and improve solutions before scaling up. Ideally, solutions are better if linked to existing community services to raise awareness and provide training to more efficient intervention.

Social Design

People's behaviour and culture have a considerable impact on solution design failure/success.

- A multi-purpose furniture may fail as people often choose a single function or are not aware of various functions (e.g. a table for study and dining may stay cluttered and not offer both functions)
- Engaging people to design their solution can increase the sense of ownership, reduce chances of abandonment, provide training and raise awareness.
- Solutions are better if integrated into service (e.g. furniture to improve posture can integrate existing social and health services to increase posture awareness)

How Can PolyU Help?

School of Design can help in multiple directions:

- Co-designing solutions with external parties (e.g., through undergraduate and postgraduate subjects' collaborations)
- Experimenting with materials (e.g., upcycled / sustainable) and process (e.g., using V.R., 3D print)
- Conducting usability studies/proof of concept
- Co-writing funding applications for continued development.



Product Model

Locating the children in need	Finding local resources/materials	Finding local workshops	Finding local volunteers/partners
Through government and Institution working with cwd	Materials should be easy to find and inexpensive	Event is held where the workshop is located	Materials should be easy to find and inexpensive

Reference:

Maximo, T.; Foureaux, E.; Wang, X.L.; Fong, K.N.K. Giranda—An Inclusive Floor Seating Positioning System and Social Enterprise. *Int. J. Environ. Res. Public Health* 2020, 17, 7942.

Chu K. 2015. Rents for subdivided units are twice as expensive as those of normal flats, study says. *Hong Kong Free Press*.

Chung, J. W. Y., Wong, T. K. S. (2007) Anthropometric evaluation for primary school furniture design. *Ergonomics*, 50:3, 323-334, DOI: 10.1080/00140130600842328

Census and Statistics Department. 2018. *Hong Kong 2016 Population By-census - Thematic Report : Persons Living in Subdivided Units*. Hong Kong.

Why it matters to family in Subdivided unit

A bespoke solution to a single SDU is often expensive, it can also lead to the landlord increasing the rent value or discourage the tenant from bringing the solution when moving. Prefer solutions that can be replicated, and that tenant can bring when moving.

Donated or top-down solutions often fail to consider the real need or usage behaviour and are often misuse or abandoned. Engage stakeholders into different development stages.

Cost is often an excluding factor. Consider using upcycled or inexpensive material that can still provide dignity.

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School of Nursing



Key Message

Around 60,000 children are living in very tiny spaces like subdivided units (SDU) in Hong Kong.¹ While we laid our lenses on the physical space, we must also pay attention to the mental well-being of the children living in the SDU. The biggest problem here is the emotional pressure and increasing conflicts among families, possibly affecting parent-child relationships. By enhancing the resilience of children living in the SDU, we can help them booster the inner strength and see things out of the box (i.e. the subdivided units)- the opportunities to change and grow stronger.

Previous Findings:

- Because of the poor living conditions in SDU, children might have a sense of inferiority or inadequacy, dragging their self-esteem down. As a result, the drive for improvement among such children would be impaired and the opportunities for them to develop their full potential will be reduced.²⁻⁴
- Poverty has been strongly associated with negative parenting practices that consequently hinder the parent-child relationship.
- In a nutshell, children living in SDU are more likely to lag behind in growth and psychosocial development.

Possible Solutions:

- Resilience is a strong indicator of adolescents at a higher risk of depression. Enhancing adolescents' resilience to psychological distress is vital.⁷
- It may be hard to change the physical environment for children living in SDU. Yet by enhancing their resilience, in particular to build up their confidence and develop skills, we can help children to improve their mental well-being and overcome adversity.⁵⁻⁷
- Evidence shows that in the face of adversity, children with higher resilience were associated with better mental well-being and quality of life.^{8,9}
- Adventure-based Training has been increasingly used by educators, social workers and nurses to promote psychological well-being among school children⁸⁻¹⁰ and childhood cancer survivors.¹¹

ADVENTURE-BASED TRAINING:

- It changes participants' cognitive thinking and behaviour through experience and practice in the outdoor environment.
- It allows participants to challenge themselves, experience, learn and practice what they thought was impossible, greatly increase participants' self-confidence, and let them learn the spirit of "never giving up".
- It enhances their resilience in the face of adversity.
 - Evidence shows that adventure-based training is effective in enhancing resilience and reducing depressive symptoms among children and adolescents.^{9,10}
 - By inviting families (children and parents) to join the adventure-based training, it can not only enhance their resilience in the face of adversity, but also promote their parent-child relationship.

HOW CAN POLYU HELP?

- **Physical and psychological assessments:** The motto of the School of Nursing, PolyU is to excel in Nursing for the well-being of mankind. We can offer appropriate assessments and holistic interventions for SDU community accordingly.
- **Mental health and well-being program:** It is essential for nurses to develop effective programmes to children living in SDU and the SDU community. It helps children building up resilience to face any of life adversities, engaging in healthy lifestyles, and promoting positive mental well-being.
- **Health education promotion to community:** Nurses should take a more assertive role in promoting health education to the community, with an emphasis on helping children to enhance their resilience and self-esteem, and develop their personal and social skills.
- **Adopt multi-disciplinary approach:** Collaborate with education sectors, school social workers and non-governmental organizations to build effective health promotion programmes in the community so that children can better combat mental health problems and become able to lead healthier lives.



References:

- Colombo M. Home Alone, Hong Kong's Children Face Increased Stress During Pandemic [Internet]. US News & World Report. US News & World Report; 2020. Available from: <https://www.usnews.com/news/best-countries/articles/2020-04-09/hong-kong-families-face-increased-stress-at-home-during-coronavirus-pandemic>
- Hanandita W, Tampubolon G. Does poverty reduce mental health? An instrumental variable analysis. Social Science & Medicine [Internet]. 2014;113:59-67. <https://doi.org/10.1016/j.socscimed.2014.05.005>
- Ho KY, Li WHC, Chan SSC. The Effect of Poverty and Income Disparity on the Psychological Well-Being of Hong Kong Children. Public Health Nursing [Internet]. 2014; 32(3):212-21. <https://doi.org/10.1111/phn.12147>
- Yoshikawa H, Aber JL, Beardale WR. The effects of poverty on the mental, emotional, and behavioral health of children and youth: Implications for prevention. American Psychologist [Internet]. 2012; 67(4):272-84. <https://doi.org/10.1037/a0028015>
- Luthar SS, Cicchetti D, Becker B. The construct of resilience: a critical evaluation and guidelines for future work. Child development [Internet]. 2000; 71(3):543-62.
- Davydov DM, Stewart R, Ritchie K, Chaudieu I. Resilience and mental health. Clinical Psychology Review [Internet]. 2010; 30(5):474-95. Available from: <https://pubmed.ncbi.nlm.nih.gov/20395025/>
- Chung J, Lam K, Ho K, Cheung A, Ho L, Gibson F, et al. Relationships among resilience, self-esteem, and depressive symptoms in Chinese adolescents. Journal of Health Psychology [Internet]. 2018; 25(13-14):2346-405. [doi:10.1177/1359105318800159](https://doi.org/10.1177/1359105318800159)
- Sun J, Stewart DE. Promoting student resilience and wellbeing: Asia-Pacific resilient children and communities project. In: international research handbook on values education and student wellbeing. Dordrecht: Springer; 2010. p. 404-26
- Chung, Oi Kwan Joyce, Li, Ho Cheung William Ho, Ka Yan, Katherine KY Lam et al (2020) Adventure-Based Training to Enhance Resilience and Reduce Depressive Symptoms Among Juveniles: A Randomized Controlled Trial. Manuscript submitted for publication
- Li WH, Chung JO, Ho EK. Effectiveness of an adventure-based training programme in promoting the psychological well-being of primary schoolchildren. Journal of Health Psychology. 2012;18(11):1478-92. <https://doi.org/10.1177/1359105312465102>
- Chung OKJ, Li HCW, Chiu SY, Ho KY, Lopez V. Sustainability of an Integrated Adventure-Based Training and Health Education Program to Enhance Quality of Life Among Chinese Childhood Cancer Survivors. Cancer Nursing [Internet]. 2015; 38(5):366-74. [doi:10.1097/NCC.0000000000000211](https://doi.org/10.1097/NCC.0000000000000211)

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RESILIENCE



School of Nursing



Key Message

Children from low-income families reported statistically significantly lower self-esteem and quality of life, but more depressive symptoms than those from high-income families. Multiple regression analysis showed that among the assessed domains, poverty had the greatest impact on children's self-esteem. Positive psychology interventions (PPI) help mitigate the psychological impact of poverty.

Positive Psychology and Intervention

- Positive psychology is the study of factors that contribute to a meaningful life.⁷
- Unlike traditional psychology that focuses on negative emotions, positive psychology emphasizes achieving happiness through fostering positive attitudes toward one's subjective experiences and life events.⁷ By using positive psychology techniques, people can change their ways of thinking and identify some aspects of life that warrant happiness, notwithstanding their impoverished circumstances.⁸
- Instructions for Positive psychology interventions (PPIs) are simple and easy-to-follow, and can be self-administered or implemented by laypeople.⁹ Several studies have examined the effectiveness of PPIs among children the Hong Kong Chinese context. The results showed that PPIs were effective in increasing subjective happiness and reducing anxiety symptoms of children.¹⁰⁻¹¹



Why it matters to children and family's well-being

- **Existing interventions in mitigating psychological impacts of poverty provide little support to build up children's capacity to handle psychological distress:** A review noted that government and NGO adopted various measures to improve children's access to healthcare and social services, yet it overly-emphasized addressing poverty at the country level, neglect to build children's personal attributes. It reduces their capacity to cope with psychological distress resulting from poverty.³
- **Previous studies reported several existing interventions, included musical training,⁴ art enrichment programs,⁵ and adventure-based training⁶, help promoting psychological well-being among children living in poverty, yet with certain limitations.** These interventions aimed to reduce negative emotions, but did not change children's mindsets to perceive their lives positively.⁴⁻⁶ They may experience repeated feelings of depression because poverty is a problem that cannot be resolved in the short-term.
- It is crucial to develop interventions to change children's perceptions of poverty and their lives, with the ultimate goal of promoting their psychological well-being and QoL.

How can PolyU help?

- Positive psychology interventions (PPIs) contain some distinctive advantages which override existing interventions. Unlike traditional psychotherapies, PPIs are brief with only a few sessions.⁹
- Positive psychology interventions (PPIs) can be extended to more children living in low-income families, thus improving their psychological well-being and maximizing their capacity to serve as the future pillar of our society.
- A multi-disciplinary partnership should therefore be established to promote the psychological well-being of children living in low-income families.

Psychological well-being of SDU children

- Notwithstanding much public concern about poverty has concentrated on children's physical development, the impact of poverty and income disparity on their psychological well-being remains relatively underexplored.
- Previous study on the impact of poverty on the psychological well-being of HK Chinese children indicated that children from low-income families reported statistically significantly lower self-esteem and quality of life (QoL), but more depressive symptoms than those from high-income families. Among the assessed domains, poverty had the greatest impact on children's self-esteem.
- This study shed light on the literature gap by comparing the self-esteem, depressive symptoms and QoL of children from low- and high-income families. The results demonstrated that poverty exerted a negative impact on children's psychological well-being. It is anticipated that such problem would become even more serious in the COVID-19 outbreak.

Reference:

1. Ho KY, Li WHC, Chan SSC. The effect of poverty and income disparity on the psychological well-being of Hong Kong children. *Public Health Nurs.* 2015; 32(3): 212-221.
2. Census and Statistics Department. Poverty Situation. 2019. <https://www.censtatd.gov.hk/hkstat/sub/so461.jsp>. Accessed January 22, 2020.
3. Wahlbeck K, Cresswell-Smith J, Haaramo P, Parkkonen J. Interventions to mitigate the effects of poverty and inequality on mental health. *Soc Psychiatry Psychiatr Epidemiol.* 2017; 52(5): 505-514.
4. Cheung ATC, Li WHC, Ho LLK, Ho KY, Lam KKW, Chung OK. Effectiveness of a musical training programme in promoting happiness and quality of life of underprivileged preschool children. *J Clin Nurs.* 2019; 28(23-24): 4412-4423.
5. Li WHC, Chung JOK, Ho EKY. Effectiveness of an adventure-based training programme in promoting the psychological well-being of primary schoolchildren. *J Health Psychol.* 2013;18(11):1478-1492.
6. Brown ED, Sax KL. Arts enrichment and preschool emotions for low-income children at risk. *Early Child Res Q.* 2013; 28(2): 337-346.
7. Seligman MEP, Steen TA, Park N, Peterson C. *Positive Psychology Progress: Empirical Validation of Interventions.* *Am Psychol.* 2005; 60(5): 410-421.
8. Biswas-Diener R, Diener E. The subjective well-being of the homeless and lessons for happiness. *Soc Indic Res.* 2006; 76: 185-205.
9. Wahlbeck K, Cresswell-Smith J, Haaramo P, Parkkonen J. Interventions to mitigate the effects of poverty and inequality on mental health. *Soc Psychiatry Psychiatr Epidemiol.* 2017; 52(5): 505-514.
10. Kwok SYCL, Gu M, Tong KKK. Positive Psychology Intervention to Alleviate Child Depression and Increase Life Satisfaction: A Randomized Clinical Trial. *Research on Social Work Practice.* 2016; 26(4):350-361.
11. Kwok SYCL. Integrating positive psychology and elements of music therapy to alleviate adolescent anxiety. *Research on Social Work Practice.* 2019; 29(6): 663-676.

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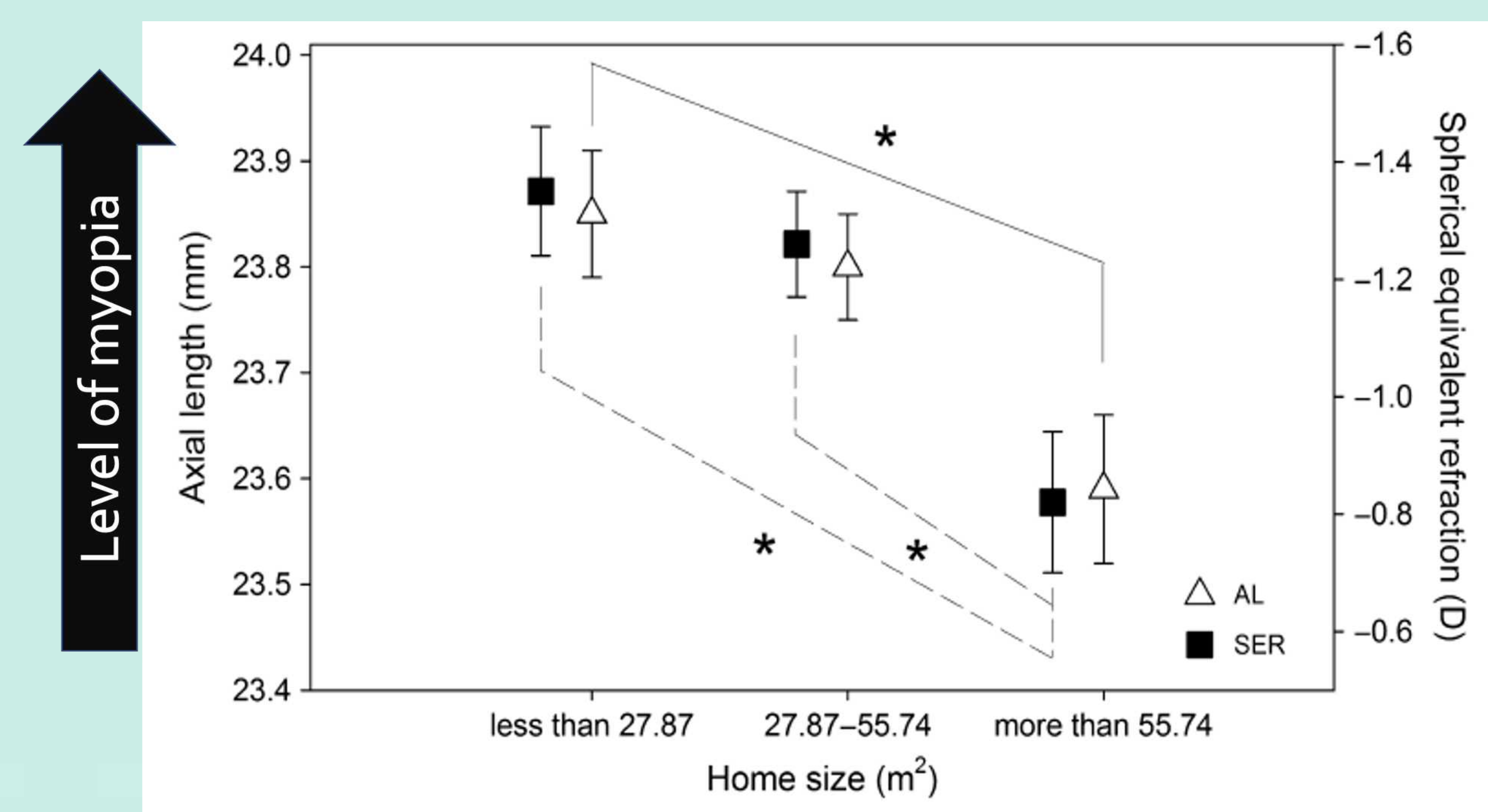
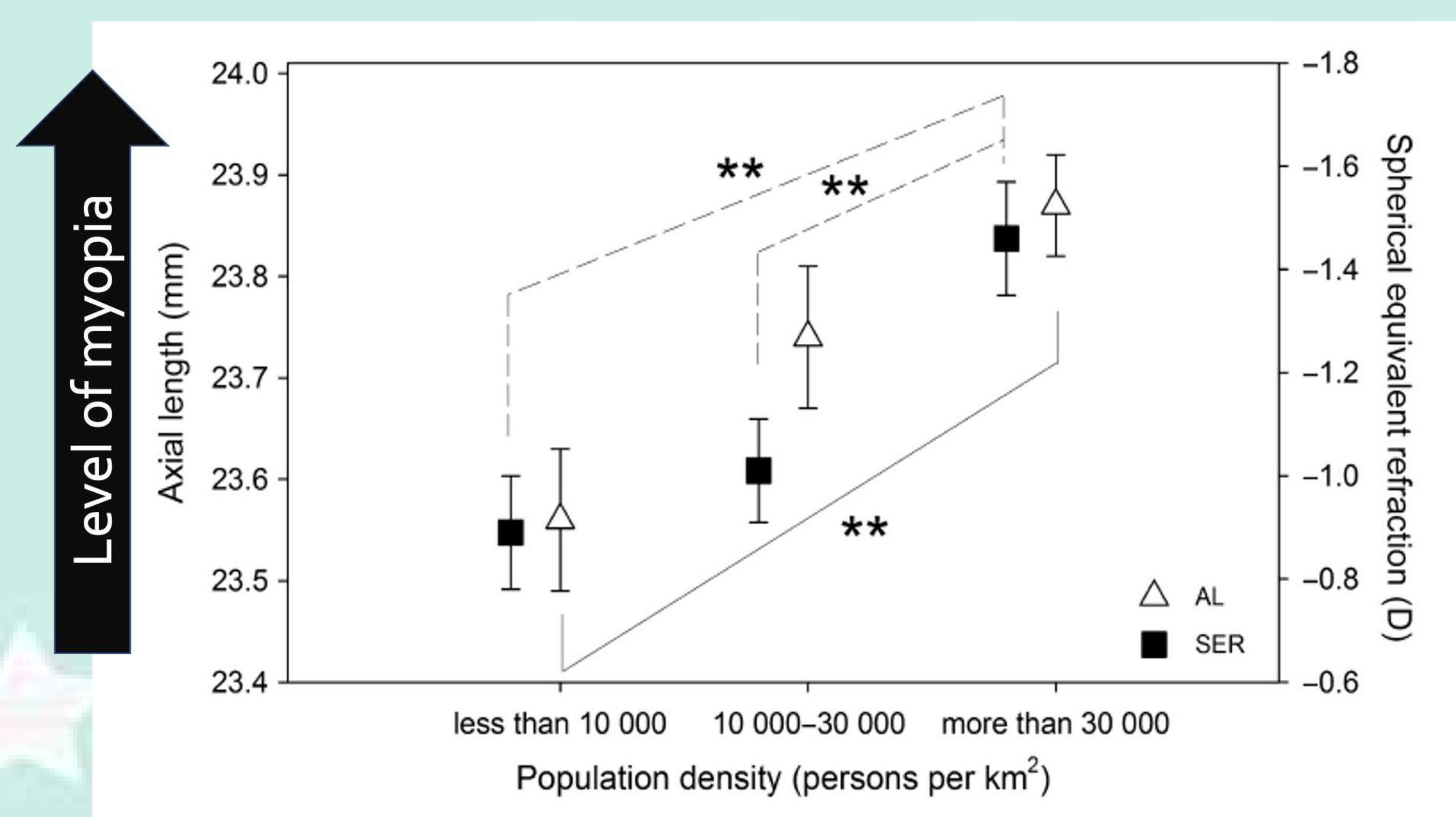
Effect of Living Environment on Refractive error in School-aged Children



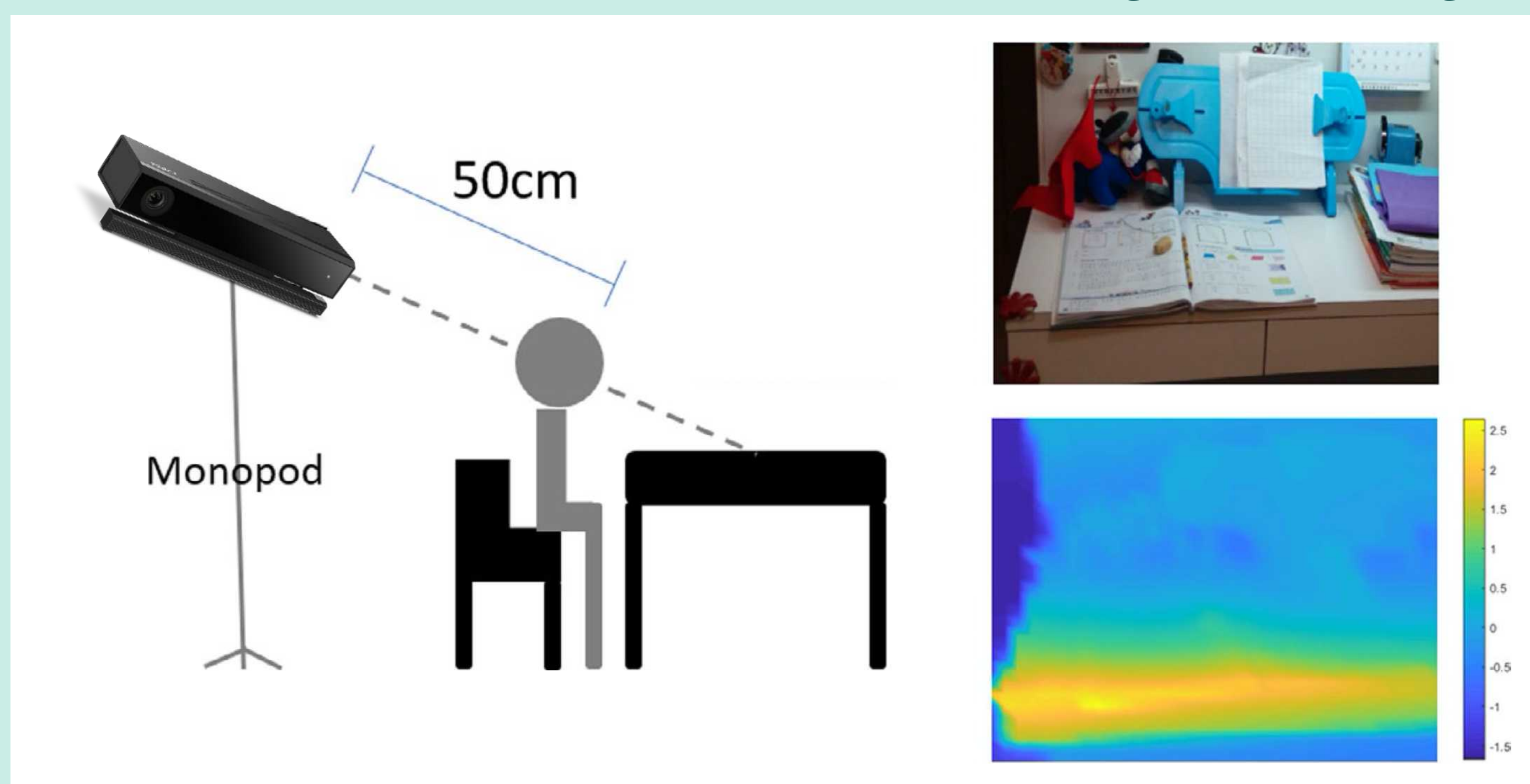
Myopia risk factors may be more abundant in constricted living environments, e.g. densely populated areas and small homes

Children living in districts of high population density (> 30k ppl/km²) had 0.53D more myopia / 0.24mm longer eye than those living in low (<10k ppl/km²) districts.¹

In contrast, children living in a small home size (<300ft²) had 0.47D more myopia / 0.25mm longer eye than those living in a large home (>600ft²).¹



Further research on reading/writing environment (e.g. a desk) at home²



- 3D reconstruction of the environment
- Follow-up eye exam after 1 year
- More varied object distances in the scene
→faster myopia progression²
- It is believed to have implication on hoarding issues in SDUs

1. Choi KY, Yu WY, Lam CH et al. Childhood exposure to constricted living space: a possible environmental threat for myopia development. *Ophthalmic Physiol Opt* 2017; 37(5):568-575.
2. Choi KY, Mok AY, Do CW et al. The diversified defocus profile of the near - work environment and myopia development. *Ophthalmic Physiol Opt* 2020; 40:463-471.



The Centre for Myopia Research, School of Optometry has been working closely in collaboration with companies and NGOs in Hong Kong . We hope to provide more appropriate education and intervention on myopia development, especially to underprivileged children, in translation of our research findings.

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