



Po Leung Kuk
Lo Kit Sing (1983) College

保良局羅傑承(一九八三)中學

Cheung Hong Estate, Tsing Yi, N.T., Hong Kong

香港新界青衣長康邨

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Dear Parents,
各位家長：

P26018

Invitation to the PolyU "E-Breathing" Project
香港理工大學「智能呼吸訓練」計劃參與邀請函

Our school is recently collaborating with the Hong Kong Polytechnic University (PolyU) on a "E-Breathing" program. This program is designed to help students better understand and manage their daily emotions by using a simple, non-invasive app installed on their own mobile phones. If a student reports feeling a bit down or stressed, the app will gently suggest a slow breathing exercise. These short, guided breathing exercises have been proven to help reduce stress and anxiety.

We believe this program offers fantastic benefits for our students. Students will learn to recognize and name their emotions, which is a powerful life skill. The breathing techniques can also be used anytime, anywhere, helping them manage exam stress or social pressures. If you agree to your child's participation in this program, our school will screen the students on 14th September using standard stress and well-being questionnaires.

Eligible students will be invited to participate in this research study. The study is divided into three groups. Participants will be required to download and use the designated mobile application on their phones over a period of two weeks. During this period, participants will be asked to complete five brief emotional assessment questionnaires each day, with each session taking less than one minute. When the application detects that a participant is feeling slightly low or under stress, the system will promptly guide them through breathing exercises or Pilates exercises. Should you have any enquiries, please contact Ms Mak Yuet Ngor or Ms Chow Pui Yee at 24977110.

本校與香港理工大學將展開一項全新合作計劃，推出名為「智能呼吸訓練」的手機應用程式。本計劃旨在透過安裝於學生個人手機上的簡易應用程式，協助他們更有效地認識及管理日常情緒。當應用程式檢測到學生情緒略為低落或感到壓力時，會適時引導他們進行慢節奏呼吸練習。這些簡短的引導式呼吸練習已被證實有助減輕壓力及焦慮。

我們深信本計劃能為學生帶來莫大益處。學生將學會識別及表達自身情緒，呼吸技巧亦有助他們應對考試壓力或人際社交方面的困擾。如閣下同意貴子弟參與本計劃，本校將使用標準壓力及身心健康問卷於9月14日為學生進行篩選。

凡符合資格之同學，將獲邀參與本研究。研究共分三組，參加者須於手機下載並使用指定應用程式，為期兩週。期間，參加者每日須完成五次簡短之情緒評估問卷，每次耗時少於一分鐘。當應用程式偵測到參加者情緒略見低落或感到壓力時，系統將適時引導其進行呼吸練習或普拉提練習。如閣下對研究程序或學生私隱安排有任何疑問，歡迎隨時與麥月娥老師或周貝怡老師聯絡。(電話:24977110)。

Po Leung Kuk Lo Kit Sing (1983) College
保良局羅傑承(一九八三)中學

Law Wing Chung, Principal 羅穎忠校長
4th September, 2026 二零二六年九月四日



E-class Reply Slip
電子通告回條

I acknowledge the above captioned circular and

本人知悉 貴校來函，並

- ☐ agree that my child will take part in the activity.
同意敝子弟參與上述活動。
- ☐ do not agree that my child will take part in the activity.
不同意敝子弟參與上述活動。

INFORMATION SHEET

Ecological Momentary Intervention (E-Breathing) to Reduce Psychological Distress in Adolescents

You are invited to participate in the above project conducted by Prof. Hector Tsang Wing-Hong, who is chair professor of the Department of Rehabilitation Sciences in The Hong Kong Polytechnic University (PolyU). The project has been approved by the PolyU Institutional Review Board (PolyU IRB) (or its Delegate) (Reference Number: HSEARS20251218002).

Study Purpose and Potential Benefits

The primary aim of this project is to develop the “E-Breathing” mobile application to monitor and improve the mental health of adolescents. The application uses a real-time, real-world assessment approach called Ecological Momentary Assessment (EMA) to capture adolescents' psychological states and needs in their daily lives. It collects physiological and psychological data via smartphones and wearable devices, such as motion sensors and heart rate monitors. When signs of psychological distress are detected, the application delivers an Ecological Momentary Intervention (EMI) in the form of a prompt to engage in slow-paced breathing exercises, with the aim of reducing emotional distress and promoting mental well-being.

Participant Eligibility

The inclusion criteria are as follows:

- 1) Aged between 11 to 17 years;
- 2) Report symptoms of depression, anxiety, and/or stress, as indicated by the Depression Anxiety Stress Scales-21 (DASS-21), with scores of ≥ 10 for depression, ≥ 8 for anxiety, and/or ≥ 15 for stress;
- 3) Have no diagnosed hearing, visual, or intellectual impairment that may affect participation in the study;
- 4) Have no history of major psychiatric disorders or other health conditions that may interfere with study participation;
- 5) Be able to understand and read Chinese; and
- 6) Own a smartphone with internet access (mobile data).

Study Procedure

All eligible participants will be invited to complete EMA surveys during the data collection phase. The EMA surveys will be conducted via the E-Breathing mobile application to assess positive and negative affect. Participants will be randomly assigned to either the EMI group or the EMA-only group. Participants in both groups will complete EMA for a period of 2 weeks.

The EMA focuses on assessing seven negative affects (e.g., irritated, sad, ruminating) and six positive affects (e.g., cheerful, relaxed, content). Response options for these items use a 7-point Likert scale [not at all = 0; a little = 1; somewhat = 2; neutral = 3; quite a bit = 4; quite a lot = 5; very much = 6]. Each EMA prompt will be sent at specific times each day: (1) morning (after wake-up and before school), (2) lunch (during the lunch break), (3) mid-to-late afternoon (after school), (4) evening (around the dinner time), and (5) before going to bed at night. To ensure that the EMA schedule does not interfere with participants' school schedules, schools or participants can

customize the timing of each assessment as needed. The application will send up to three reminder notifications before each assessment expires at 15-minute intervals.

Participants in the EMI group who achieve a negative affect score of ≥ 3 on an EMA survey will be prompted by the E-Breathing to take part in a slow-paced breathing exercise designed to alleviate psychological distress. Before the study begins, participants in the EMI group will be invited to attend a training session at PolyU's laboratory, where they will receive breathing technique guidance from a professional yoga or meditation instructor. During the study period, participants will be required to place a motion sensor on their abdomen for each slow-paced breathing exercise in order to measure their breathing amplitude and rate. Based on the user's breathing frequency, the application will provide prompts to guide them to adjust their breathing to the appropriate range of six breaths per minute. Each day before bedtime, participants in the EMI group who received a slow-paced breathing practice prompt will complete an additional survey (i.e. the bedtime EMA survey). This survey will ask if they followed the recommendation to practice slow-paced breathing [Yes/No] and will assess the effectiveness and satisfaction of the EMI using a 5-point Likert scale (not at all = 0; a little = 1; somewhat = 2; quite a lot = 3; very much = 4). Some participants will also be invited to wear a chest-strap heart rate monitor and a wrist-worn watch to record their heart rate variability while completing the EMA and EMI.

Prior to the commencement of the study, the research team will assist participants in downloading E-Breathing on their smartphone and will provide instructions and a user manual to help them become familiar with its functions and operation. Before the commencement of the study, at the end of the study, and one month after study completion, participants in both the EMA and EMI groups will be invited to the laboratory at PolyU to complete several questionnaires related to mental health, sleep quality, and physical health. Each session will take approximately 45 minutes.

Potential Risk(s) or Discomfort(s) and their minimization(s)

Throughout the study, some participants may need to place a motion sensor on their abdomen or wear a chest-strap heart-rate recorder. These devices may cause mild discomfort, such as a feeling of pressure or minor skin irritation, but they are not expected to pose any significant risks. If you experience any discomfort while wearing the devices, please inform the research team immediately, and we will assist you in adjusting or removing the devices. If you experience significant emotional distress during or after participating in this study, or if you find it difficult to cope or feel that you need psychological support, please seek help from trusted family members, friends, teachers, or qualified mental health professionals as soon as possible. You can also contact the Government Mental Health 24-hour Support Hotline (18111) by telephone or WhatsApp to access immediate emotional support. If you have thoughts about harming yourself or others, or if you believe that you are in immediate danger, please call 999 immediately for emergency assistance, or go to your nearest Accident and Emergency Department in hospital for an immediate assessment and treatment.

Confidentiality of Personal Data

The information you provide as part of the project is the research data. Any research data from which you can be identified is known as personal data. Personal data does not include data where the identity has been removed (anonymous data). We will minimize our use of personal data in the study as much as possible. The principal investigator and his research team will have access to personal data and research data for the purposes of the study. Responsible members of PolyU may be given access for monitoring and/or audit of the research.

Data Retention

All information related to you will remain confidential and will be identifiable by codes only known to the researcher. The information collected will be kept for up to three years after the publication

or public release of the research results. The Hong Kong Polytechnic University takes reasonable precautions to prevent the loss, misappropriation, unauthorized access or destruction of the information you provide.

Acknowledgment of Participation

Upon completion of the entire study, participants will receive compensation based on the completion rate of EMA, EMI, and questionnaire assessments. You will receive a supermarket or bookstore voucher worth HK\$5 for each EMA or EMI you complete, and HK\$50 for each questionnaire assessment completed at laboratory. Those who consent to wearing a chest-strap heart rate monitor and a wrist-worn watch will receive a supermarket or bookstore voucher worth HK\$200 as additional compensation for your time.

Participation and Withdrawal

Your participation in the study is completely voluntary. You have every right to withdraw from study at any time without giving any reason.

Enquiries and Comment

If you have any questions, you may ask our researchers now or later, even after the study has started.

You may contact Dr. Yvonne Weng (tel.no.: 3400 3273 and email: yvonne.weng@polyu.edu.hk) or Mr. Tom Yuen (tel.no.: 3400 3273 and email: king-leong.yuen@polyu.edu.hk) of PolyU under the following situations:

- a. if you have any other questions in relation to the study;
- b. if, under very rare conditions, you become injured as a result of your participation in the study;
or
- c. if you want to get access to/or change your personal data during the study.

In case you feel any discomforts during the study, please report to the Principal Investigator/Chief Investigator immediately as soon as possible. Thank you for your interest in participating in this study.

In the event you have any concerns/complaints about the conduct of this research study, you may contact the Secretary of the PolyU Institutional Review Board in writing (institutional.review.board@polyu.edu.hk) or via phone at 2766 6379 stating clearly the responsible person and department of this study as well as the Reference Number.

Prof. Hector Tsang Wing-Hong
Principal Investigator

Hung Hom Kowloon Hong Kong
Tel: (852) 3400 3273
Email: yvonne.weng@polyu.edu.hk or
king-leong.yuen@polyu.edu.hk

參與者須知

生態瞬時介入「智能呼吸訓練」減少青少年心理困擾

香港理工大學康復治療科學系誠邀閣下參與由曾永康教授進行的上述研究項目。此項目已由香港理工大學研究倫理審查委員會批准（參考編號：HSEARS20251218002）。

研究目的及潛在利益

本研究的主要目標是研發一款名為「智能呼吸訓練」的移動應用程式，用於監測和改善青少年使用者的心理健康。「智能呼吸訓練」利用實時、自然環境內評估方法——生態瞬時評估（EMA）調查——來捕捉青少年的心理狀態和需求。該應用程式透過智慧型手機、運動感測器和心率記錄器等設備收集的實時的生理和心理數據，用於分析其健康變化。同時，當檢測到青少年有情緒困擾時，該移動應用程式會提示其進行慢節奏呼吸練習作為生態瞬時介入（EMI），以改善青少年心理健康狀況。

參與者資格

納入標準如下：

- 1) 年齡在 11 歲至 17 歲之間；
- 2) 具有憂鬱、焦慮或壓力等心理健康狀況，根據 DASS-21 量表報告的得分為：憂鬱（ ≥ 10 ）、焦慮（ ≥ 8 ）、或壓力（ ≥ 15 ）；
- 3) 未診斷出可能影響研究參與的聽力、視覺或智力障礙；
- 4) 無重大精神疾病診斷史，或其他可能影響研究參與的健康狀況；
- 5) 可以理解並閱讀中文；以及
- 6) 擁有手機及數據流量。

研究程序

所有符合資格的參與者都將被邀請在資料收集階段完成生態瞬時評估（EMA），該評估主要通過「智能呼吸訓練」應用程式對正面情緒和負面情緒進行評分。參與者將隨機分配到生態瞬時介入（EMI）組或生態瞬時評估（EMA）組，兩組的參與者都需完成為期 2 週的 EMA。

EMA 主要評估及衡量七種負面情緒（如：惱怒、悲傷、沉思）和六種正面情緒（如，快樂、放鬆、滿足）。這些項目的選項採用 7 分制問卷 [一點也不 = 0；一點點 = 1；有點 = 2；中立 = 3；有點多 = 4；相當多 = 5；非常多 = 6]。每次評估將在每日特定時間發送，具體時間為：(1) 上午（起床後和上學前）、(2) 下午（午休期間）、(3) 傍晚（放學後）、(4) 晚上（晚餐時間左右）和 (5) 睡前。為確保 EMA 的時間不影響青少年的日常課程，學校或參與者可根據需要自訂每次評估的時間，應用程式會在每次評估失效前發送最多 3 次提醒（每隔 15 分鐘一次）。

EMI 組的參與者在完成每次 EMA 後，如果負面情緒分數 ≥ 3 ，應用程式將指導他們進行慢節奏呼吸練習，以改善心理困擾。在實驗開始前，EMI 組的參與者將被邀請到香港理工大學的實驗室，接受專業瑜伽導師或冥想導師的呼吸訓練指導。在實驗期間，參與者在每次練習過程中需要將運動感測器放置在腹部，以測量呼吸幅度和速度。應用程式將根據用戶的呼吸頻率，提示其調整至合適的範圍（每分鐘 6 次）。在每日睡前，獲得練習提示的 EMI 組參與者將接受一項額外的調查（即睡前 EMA 調查），詢問他們是否按照建議採取行動（即練習慢節奏呼吸）[是/否]，並以 5 分制評估 EMI 的有效性和滿意度：[完全沒有 = 0；有一點 = 1；有些 = 2；相當多 = 3；非常多 = 4]。部分參與者還將被邀請佩戴胸帶式心率監測器及手錶，以記錄其在進行 EMA 和 EMI 時的心率變異性。

在實驗開始前，研究人員將協助參與者下載「智能呼吸訓練」應用程式，並提供使用指導及一份手冊，以幫助用戶熟悉其功能和使用方法。此外，在實驗開始前、結束時以及結束一個月後，EMA 組和 EMI 組的參與者都將被邀請來到香港理工大學實驗室完成幾份調查問卷，問卷內容與心理健康、睡眠質素及身體健康有關。每次問卷調查將需花費約 45 分鐘的時間。

潛在風險或不適及處理措施

在整個研究過程中，部分參與者可能需要將運動感測器放置在腹部或佩戴胸帶式心率記錄器。這些可能會引起非常輕微的不適（例如壓迫感、皮膚刺激），但一般不會涉及潛在的風險。如參與者於佩戴期間感到任何不適，可隨時告知研究人員，研究人員將立即協助調整或移除設備。如您在參與本研究期間或完成研究後感到嚴重情緒困擾、難以應對，或認為自己需要心理支援，建議您盡早向信任的家人、朋友、老師或專業心理健康服務尋求協助。您亦可致電或透過 WhatsApp 聯絡政府精神健康 24 小時支援熱線（181111），以獲得即時情緒支援。如您出現傷害自己或他人的念頭，或認為自己正處於緊急危險，請立即致電 999 尋求緊急援助，或前往就近醫院急症室接受即時評估及治療。

個人資料保密

您在參與項目過程中提供的資料為研究數據。任何可以識別您身份的研究數據屬個人資料。個人資料不包括個人身份被移除的數據(匿名數據)。我們將會盡可能減少在研究中使用個人資料。研究人員及其團隊、導師、合作者將因應研究需要存取個人資料和研究數據。香港理工大學的相關負責人員可能基於對研究監管或審計存取資料。

資料保存期限

所有關於您的資料將會保密。在所有評估當中都會使用代碼，而非名稱來保護機密性。同時，所有數據將存儲在電腦的加密文件中。所有收集的資料將會保存至研究結果發表後的 3 年。香港理工大學將採取合適的預防措施以防止您提供的資料遺失、遭盜用、未經授權的存取或銷毀。

感謝參與

完成整個實驗後，研究團隊將根據您的 EMA、EMI 和問卷調查的完成度提供相應的津貼（每次完成 EMA 或 EMI 後可獲得價值 5 元的超市購物券或書籍購物券，每次完成問卷調查後可獲得價值 50 元的超市購物券或書籍購物券作為補償）。部分願意佩戴胸帶式

心率記錄器和腕式手錶的參與者將獲得額外補償（價值 200 元的超市購物券或書籍購物券）。

參與及退出

您的參與純屬自願，您可隨時退出研究而毋須給予任何理由。

查詢及意見反饋

如有任何查詢，可隨時聯絡研究人員。

您可向香港理工大學翁博士[電話：3400 3273 及電郵：yvonne.weng@polyu.edu.hk]或袁先生[電話：3400 3273 及電郵：king-leong.yuen@polyu.edu.hk] 查詢以下事宜：

- a. 您對本研究項目有任何問題；
- b. 在非常罕見的情況下，您因參與本項研究而受傷；或
- c. 您希望查閱或在參與研究的過程中更改您的個人資料。

如您在參與研究的過程中感到任何不適，請立即通知首席研究員。感謝您對本研究項目的支持及參與。

如您想表達對本研究項目的關注或不滿，請以電郵 (institutional.review.board@polyu.edu.hk) 或 電話 (2766 6379)聯絡香港理工大學研究倫理審查委員會秘書並提供項目的負責人、學系/學院及參考編號。

曾永康教授
首席研究員