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**Materials and Methods**

Methods

The current study was preregistered on October 24, 2019, prior to data collection (https://osf.io/jkug8/). This study was performed following the principles of the Declaration of Helsinki. The ethics committee at the sponsoring university approved all procedures used in the current study. Informed consent was obtained from all the participants after they were provided with a brief description of the study. Software G\*Power 3.1 was used to perform a power analysis, which indicated that a sample size of 58 with a power of 0.80 (0.05 alpha error probability rate) was required to detect the minimum effect (i.e., *r* = 0.36) – as found in the previous EEG study measuring the association between resting-state neural oscillations and wise advising (*7*).

Participants

We recruited a total of 55 participants aged 18 to 26 years (*M*±*SD* = 20.80 ±1.99; 38 males, 17 females). Two participants did not complete the advising tasks, and one participant showed significant artifacts from the fMRI (i.e., the head motion was more than 3mm; while most participants’ frame-wise displacement calculated by Jenkinson's method (*31*) were no more than 3 mm). Thus, the final data included 52 participants (*M*±*SD* = 20.90 ± 1.95; 36 males, 16 females). Participants were all native-born Chinese participants without any history of psychiatric, neurological, or medical conditions.

Materials

Wise Advising questionnaire

The questionnaire consisted of four advising tasks; two were randomly assigned to a second-person perspective, and the other two were assigned to a third-person perspective. For each advising task, a brief description of the life dilemma of a protagonist was provided from a first- or a third-person perspective. For example, a dilemma in the first-person condition was "I told my good friend my most important secret, but I didn't expect this good friend to reveal the secret to others. For this, I am very distressed.". In contrast, a dilemma in the third-person condition was "A young man told his best friend of his most important secret, but he did not expect that this good friend would reveal the secret to others. For this, he was very distressed". Subsequently, participants were provided with the following instructions for advising from a second-person perspective: "Now please close your eyes and imagine this young man is right in front of you and needs your advice. Please try to think about how these events will develop. Why did it develop like this? What should this man do? Please refer to this man using the second-person term "you". Similarly, participants were instructed from a third-person perspective as follows: "Now please close your eyes and imagine this young man needing your advice. Please try to think about how these events will develop. Why did it develop like this? What should the protagonist do? Please refer to this man using the third-person term "he".

See the appendix for the detailed questionnaire in English and the original language (i.e., Chinese).

Procedure

Before entering the MRI scanner, written consent was obtained from the participants. Additionally, participants completed the International Interview Examination for neuropsychiatric disorders (MINI) and Beck Depression Inventory (BDI). Participants with mental disorders, claustrophobia, metal implants, or brain injury within a year were excluded.

All participants removed any metal item(s) from their bodies (e.g., jewelry, wallets) to avoid injury and interference from the fMRI. Once participants entered the scanner, they were instructed to keep their eyes closed and lay motionless to reduce head motion during scanning. A sponge filling was used to fill the space outside the head to reduce movement and the impact of noise on participants.

Scanning

A total of 20 participants were scanned with a 3-Tesla Siemens Trio scanner using a gradient-echo EPI sequence in 33 axial slices with echo time (TE) = 30 ms, repetitive time (TR) = 2000 ms, flip angle = 90°, slice thickness = 3 mm, field of view (FOV) = 220×220 mm2, matrix size = 64×64, and resting-state images consisting of 240 functional volumes. Another 32 participants were scanned on a 3-Tesla GE MR 750 scanner with gradient-echo EPI sequence in 43 axial slices with TE = 30 ms, TR = 2000 ms, flip angle = 90°, slice thickness = 3.2 mm, FOV = 220×220 mm2, matrix size = 64×64, and resting-state images consisting of 240 functional volumes. There was no significant difference in wisdom ratings or ALFF values between the data collected by different scanners (*p* > 0.05).

Advising

After receiving an eight-minute fMRI scan, participants completed the advising task on a printed-out questionnaire with a pen. After advising each protagonist, the participants indicated the psychological distance between themselves and the protagonist on a 7-point Likert Scale (0 - no distance, 6 - furthest distance).

Data Analysis

Rating of Wisdom for each advising

Following the procedures of previous studies on wise advising (*6,7*), two raters naive to the purpose of the experiment were trained on sample materials until they reached high inter-rater reliability. These trained raters then rated each of the participants' advice on the four life dilemmas with each of the wisdom criteria (i.e., meta-level humility (MH), meta-level flexibility (MF), and perspective-taking (PT)).

The raters rated the transcripts on a 5-point scale (0 = no instance fitting the criterion, 4 = entirely fitting the criterion). Inter-rater reliability for wisdom ratings for advising on each life dilemma on each of the criteria reached a statistically acceptable level of agreement. The average measure of *Intra-class Correlation Coefficient* *(ICC)* with two-way random effects model are as follows: 0.74 (D1, MH), 0.75 (D2, MH), 0.79 (D3, MH), 0.80 (D4, MH); 0.80 (D1, MF), 0.74 (D2, MF), 0.84 (D3, MF), 0.63 (D4, MF); 0.92 (D1, PT), 0.67 (D2, PT), 0.67 (D3, PT), 0.76 (D4, PT). Therefore, ratings by different raters were averaged to get the final scores of MH, MF, and PT for advising on each life dilemma before calculating the average score of MH, MF, and PT when advising from the second- or third-person perspective.

fMRI Data Preprocessing

Functional images were preprocessed with the DPARSF toolbox in MATLAB2014b (*32*). Initially, we translated data formats from DICOM to NIFTI and discarded the first ten time-point slices to improve the quality of the data. Next, slice-timing corrections were conducted with the middle slice as the reference slice. Then, the data was reoriented and realigned to the first slice. Participants with maximum displacement in any direction larger than 3.0 mm or head motion bigger than 3.0 mm were excluded. Subsequently, the data were spatially normalized to the standard Montreal Neurological Institute (MNI) space and re-sliced to 3×3×3 mm voxels. Subsequently, the data were smoothed using a 4-mm full width at half maximum (FWHM) isotropic Gaussian kernel. Finally, several sources of spurious variances were removed, including the head motion parameters, linear drift, global BOLD signals, and BOLD signals in white matter and cerebrospinal fluid.

The amplitude of low-frequency fluctuation analysis in the whole brain and default mode network

The DPARSF software was also used to calculate the resting-state ALFF. The ALFF summarizes the local brain activity’s amplitude characteristics and reliable properties in the time domain (*22*). Specifically, the time series of any given voxels was transformed through the Fast Fourier Transform (FFT), then the ALFF was calculated as the average square root of power in the low-frequency band (0.01 – 0.1 Hz) (*22*).

We calculated the ALFF for each participant within the default mode network (DMN) and the whole brain, respectively. Previous studies indicate that the ventral medial prefrontal cortex (BA 10, 24, 32), posterior cingulate cortex (BA 23, 29, 30, 31), inferior parietal lobule (BA 39, 40), lateral temporal cortex (BA 21), and dorsal medial prefrontal cortex (BA 9, 10, 24, 32) were essential regions for a DMN mask (*9, 23*). For the whole-brain analysis, the whole brain grey matter mask was applied. Subsequently, a correlation analysis between ALFF and wisdom scores (i.e., MF, MH, PT) was conducted, with gender and age as covariates. Additionally, the Gauss random field (GRF) correction was used for multiple corrections. Specifically, we selected the voxels with *p* < 0.001, and the clusters with *p* < 0.05.

Correlation between functional connectivity within the DMN and wise advising

DMN functional connectivity analysis was calculated in the DPARSF. Afterward, we analyzed the correlation between functional connectivity within the DMN and wise advising from different perspectives, with corrections for multiple comparisons (i.e., family discovery rates, GRF, or threshold-free cluster enhancement).

**Appendix. An example of the Questionnaires of Wise advising used (English version)**

Number: \_\_\_\_\_\_ Gender: \_\_\_\_\_\_\_\_\_ Age: \_\_\_\_\_

Hello, thank you for participating in our research. Next, you are expected to provide advice to some young people going through trouble in their lives! Some people may prefer your suggestions from the third-person perspective, while others prefer the second-person perspective. Therefore, for two questions, please use the second-person perspective to give suggestions (for example: "what should you think, what should you do"); for the other two questions, please use the third-person perspective to give suggestions (for example: "what should he think, what should he do").

You will see four questions and corresponding requirements. Please read the questions carefully and answer them as required. There is no right or wrong answer. Your hard work and seriousness will play a key role in our research! It may even change the lives of many people! Here, thank you in advance for your contribution!

Question 1. The second-person perspective

A young man said: "I told my best friend the most important secret. I didn't expect this best friend to leak the secret to others. For this, I was very distressed."

Now please close your eyes and imagine: this young man is right in front of you and wants to hear your thoughts and suggestions. Would you please think about how things will develop? Why did it develop like this? What should the person do? Please call this youth in the second person "you" and write down your thoughts and suggestions that you would like to tell the youth in front of you in the box below.

Suggestion: I think you

Excuse me, when you provided the advice just now, how much distance did you feel to this young man: 0-no distance, 1-very close, 2-relatively close 3-moderate, 4-relatively far, 5-very far, 6-infinitely distant. Please choose a number that reflects your true feelings.

Question 2. The third-person perspective

A young man thinks that a kind person is often not rewarded, but a person who pretends to be kind is more likely to succeed, so he doubts whether to be a kind person.

Now please close your eyes and imagine this young man needs your advice and wants to hear your thoughts and suggestions. Would you please think about how things will develop? Why did it develop like this? What should the person do? Please address this youth in the third person "he" and write down your thoughts and suggestions that you would like us to convey to him in the box below.

Suggestion: I think he

Excuse me, when you provided the advice just now, how much distance did you feel to this young man: 0-no distance, 1-very close, 2-relatively close 3-moderate, 4-relatively far, 5-very far, 6-infinitely distant. Please choose a number that reflects your true feelings.

Question 3. The third-person perspective

There is a young man who thinks that many people can succeed without going to university, and many university students cannot find a suitable job after graduation, so this young man doubts whether going to university is genuinely meaningful. He felt very confused.

Now please close your eyes and imagine this young man needs your advice and wants to hear your thoughts and suggestions. Would you please think about how things will develop? Why did it develop like this? What should the person do? Please address this youth in the third person "he" and write down your thoughts and suggestions that you would like us to convey to him in the box below.

Suggestion: I think he

Excuse me, when you provided the advice just now, how much distance did you feel to this young man: 0-no distance, 1-very close, 2-relatively close 3-moderate, 4-relatively far, 5-very far, 6-infinitely distant. Please choose a number that reflects your true feelings.

Question 4. The second-person perspective

A young man said: "I am bankrupt and owe a debt that I cannot pay off for a lifetime. My relatives and friends despise me. I want to end my life."

Now please close your eyes and imagine this young man is right in front of you and wants to hear your thoughts and suggestions. Would you please think about how things will develop? Why did it develop like this? What should the person do? Please call this youth in the second person "you" and write down your thoughts and suggestions that you would like to tell the youth in front of you in the box below.

Suggestion: I think you

Excuse me, when you provided the advice just now, how much distance did you feel to this young man: 0-no distance, 1-very close, 2-relatively close 3-moderate, 4-relatively far, 5-very far, 6-infinitely distant. Please choose a number that reflects your true feelings.

**Appendix. An example of the Questionnaires of Wise advising used (English version)**

编号： ; 性别： ; 年龄：

您好，谢谢您参加我们的研究。接下来，我们希望您给一些人生困境中的青年一些建议！有些人可能更喜欢您从第3人称视角建议，而有些人更喜欢第2人称视角。所以，其中有2道题目请您用第2人称视角给建议（例如："你应该怎样想、你要怎样做"）；另外2道题目请您用第3人称视角给建议（例如："他应该怎样想、他要怎样做"）。

您将看到4个问题和相应的要求，请务必仔细阅读问题并按照要求进行回答，回答没有对错之分。您的努力和认真将会对我们的研究起关键性的作用！甚至可能改变许多人的命运！在此，预先感谢您的认真回答！

问题一. 第2人称视角

一个青年说："我把最重要的秘密告诉了自己的好朋友，没想到这个好朋友又把秘密泄露给了别人。为此，我很苦恼。"

现在请您闭眼想象一下：这个青年就在您面前，想听听您的想法和建议。请您思考事情会怎样发展？为什么会这样发展？当事人应该怎么做？请以第二人称"你"来称呼这个青年，在下列框中写下您希望告诉眼前这青年的想法和建议。

建议：我觉得你

请问，您刚才建言时，在心里觉得与这个青年的距离：0-没有距离，1-很近，2-比较近3-适中，4-比较远，5-很远，6-无限遥远。（请选择一个数字反映您心里真实的感受）

问题二. 第3人称视角

有个青年觉得善良的人往往得不到好报，而伪装善良的人却更容易成功，因此他怀疑是否要做一个善良的人。

现在请您闭眼想象一下：这个青年正需要您的忠告，想听听您的想法和建议。请您思考事情会怎样发展？为什么这样发展？当事人应该怎么做？请以第三人称"他"来称呼这个青年，在下列框中写下您希望我们转告他的想法和建议。

建议：我觉得他

请问，您刚才建言时，在心里觉得与这个青年的距离：0-没有距离，1-很近，2-比较近3-适中，4-比较远，5-很远，6-无限遥远。（请选择一个数字反映您心里真实的感受）

问题三. 第3人称视角

有个青年认为，很多人没有上大学也能成功，而许多大学生毕业后却找不到合适的工作，因此这个青年很怀疑上大学是否真的有意义。他感到很迷茫。

现在请您闭眼想象一下：这个青年正需要您的忠告，想听听您的想法和建议。请您思考事情会怎样发展？为什么这样发展？当事人应该怎么做？请以第三人称"他"来称呼这个青年，在下列框中写下您希望我们转告他的想法和建议。

建议：我觉得他

请问，您刚才建言时，在心里觉得与这个青年的距离：0-没有距离，1-很近，2-比较近3-适中，4-比较远，5-很远，6-无限遥远。（请选择一个数字反映您心里真实的感受）

问题四. 第2人称视角

一个青年说："我破产了，欠了一辈子也还不清的债，亲戚朋友都瞧不起我。我想结束自己的生命。"

现在请您闭眼想象一下：这个青年就在您面前，想听听您的想法和建议。请您思考事情会怎样发展？为什么会这样发展？当事人应该怎么做？请以第二人称"你"来称呼这个青年，在下列框中写下您希望告诉眼前这青年的想法和建议。

建议：我觉得你

请问，您刚才建言时，在心里觉得与这个青年的距离：0-没有距离，1-很近，2-比较近3-适中，4-比较远，5-很远，6-无限遥远。（请选择一个数字反映您心里真实的感受）