Simulation of sea surface temperature based on non-sampling error and psychological intervention of music education

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Received: 4 June 2021 / Accepted: 10 July 2021 / Published online: 27 July 2021
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Abstract
In statistical survey, except sampling error, the error caused by other reasons is called non-sampling error. Non-sampling errors may affect survey results. This paper mainly studies the emergence of non-sampling error in the system, the corresponding history and culture and related applications, seeks the causes of the error and explores the solutions, and designs a method that can be used to measure. By using this analysis method, the percentage of non-sampling error in the total error can be adjusted through statistics. In addition, the adaptability and path of this measurement method, as well as the adjustment method for the measurement error and estimation problems found in the multi-order model are also studied. As we all know, the subtropical northeast Pacific plays an extremely important role in the whole process of transmission to the tropics. Through the investigation of the physical and mental health, interpersonal relationship, and other problems of the students in a medical college, this paper analyzes the intervention effect of this treatment method by using a variety of treatment methods such as music and song performance organized by the masses, and probes into whether this intervention method can promote the improvement of college students’ mental health level and test the effectiveness of the treatment effect. It provides an important reference for the development of physical and mental health education of college students. This paper discusses the effect of psychological intervention in music education by simulating sea surface temperature with non-sampling error.

Keywords Non-sampling error · Sea surface temperature · Music education · Psychological intervention

Introduction
To study the factors that affect the quality of survey data and reduce the impact of errors, no matter the structural analysis of survey data, the principal analysis of statistical methods, or to reduce the impact of errors, we can draw reliable conclusions. In statistical survey, except for sampling error, the direct error caused by other reasons is collectively referred to as non-sampling error (Thanh 2019). Non-sampling errors may affect survey results. This paper mainly studies the emergence of non-sampling error in the system, the corresponding history and culture, and related applications, seeks the causes of the error and explores the solutions, and designs a method that can be used to measure. By using this analysis method, the percentage of non-sampling error in the total error can be adjusted through statistics. In addition, the adaptability and path of this measurement method, as well as the adjustment method for the measurement error and estimation problems found in the multi-order model are also studied. The purpose of this paper is to deeply study the influence of non-sampling error on the quality of survey data in combination with the analysis methods of China’s official statistical survey (Renard and Freimund 1994).

The tropical Pacific climate will have a great impact on the climate change of the whole earth. From the coast of the entire Spratly Islands of Indonesia to the coast of southwestern South America, the tropical and Western Pacific waters distribute across the half of the...
earth’s equator. The trade wind movement can directly make the warm SST widely distributed in the northwest tropics and the Western Pacific tropics, forming a high temperature “warm pool”. On the contrary, the trade wind cold water up movement caused by trade wind movement is widely referred to as trade wind cold tongue (Sánchez et al. 2007). A large number of warm pools and cold tongue directly constitute the natural ecological environment in the warm climate of tropical Pacific SST. However, the change of SST in the tropical Pacific is not unchanged (Simeonov et al. 2003). Its duration cycle is usually 2–8 years, which is widely known as interannual fluctuation. The phenomenon that the mean value of SST in the equatorial ocean, the Middle East Pacific, is obviously higher than that of the mean climate is called El Nino, and the phenomenon that the mean value of SST in the equatorial ocean, the Middle East Pacific, is lower than that of the mean climate is called La Nina. Music therapy is a new kind of therapy, which not only integrates music, but also medicine and psychology. By using this method, we can achieve the purpose of health treatment (Singh et al. 2019). With the improvement of people’s living standards, people pay more attention to health, so the development of music therapy has a certain prospect.

Materials and methods

Source of sea surface temperature data

The data used in this paper is NCEP/NCAR reanalysis 1. The main contents of these statistical data include the average pressure on the surface of ocean fluid, the heat flow term on the surface of ocean air, and the average wind speed on the surface of ocean fluid. In this paper, some of the reanalysis data of NCEP-doe reanalysis 2 are used to reduce the dependence of the reanalysis results on the data set used (Vasistha and Ganguly 2020). The temperature data used in this paper are mainly from the National Oceanic and Atmospheric Administration: ERSST v4. The resolution of the analysis data is 1.125° × 89, covering 1854 to the present. Due to the limitation of the amount of data intercepted by atmospheric reanalysis, this paper analyzes the monthly average statistical data intercepted from 1952 to 2020 and makes a long-term diagnostic data analysis on the data resources of atmospheric reanalysis during 69 years. The OISST V2 published by NOAA and the ocean data published by NCEP are also used in this paper. It is also because the data collected by them are relatively short in time, so they are mainly used to verify some conclusions.

Non-sampling error measurement method based on designs

According to the well-known definition, the total survey error can be expressed as Eq. (1)

\[
MSE(Y_r) = E[Y_r - y_r]^2 = E[Y_r - E(Y_r) + E(Y_r) - y_r]^2 = E[Y_r - E(Y_r)]^2 + E(E(Y_r) - y_r)^2
\]

(1)

To understand, we introduce the real mean of the survey unit,

\[
E(Y_r) - y_r = [E(Y_r) - y] + [y - y_r]
\]

(2)

Namely

\[
MSE(Y_r) = RSE(Y_r) + NSE(Y_r)
\]

(3)

If the influence of measurement error is not considered, the formula (1) can further express (1) as

\[
MSE(Y_r) = E[Y_r - y_r]^2 = Var(Y_r) + (y - y_r)^2
\]

(4)

In this way, unbiased estimation of the total error of investigation can be given based on the sampling theory

\[
MSE = \frac{S_Y^2}{n_r} + (y - y_r)^2
\]

(5)

But the starting point of sampling survey scheme design is not the above content. Because from the point of view of random sampling, the random sampling error in statistical survey not should be unanswered, so

\[
RSE = \frac{S_Y^2}{n}
\]

(6)

Unbiased estimation is as follows

\[
NSE = \frac{S_Y^2}{n_r} - \frac{S_Y^2}{n} + (y - y_r)^2
\]

(7)

The proportion of total error of investigation is as follows

\[
\frac{NSE}{MSE} = \frac{S_Y^2}{n_r} - \frac{S_Y^2}{n} + (y - y_r)^2
\]

(8)

In order to measure the influence of non-sampling error, the above formula needs to be deformed

\[
1 - \frac{n_r S_Y^2}{n S_Y^2} = \frac{NSE - (y - y_r)^2}{MSE - (y - y_r)^2} \leq \frac{NSE}{MSE} \leq 1
\]

(9)
By definition of reliability, formula (9) can be further expressed as the form shown in formula (10):

$$1 - pR = 1 - \frac{n_r}{n} R \leq \frac{NSE}{MSE} \leq 1$$

(10)

**Design of simulation experiment for sea surface temperature**

One of the main ideas of SSTA experiment design is to get the change caused by disturbance itself, which is the difference between the system after the disturbance and the undisturbed one. In the previous control mode experiment, the mode has successfully output a large amount of data for the full value of the control mode hot start in the initial stage of each month (Versari et al. 2002). In the SSTA experiment, the starting time is 0:00 on January 1 of each year. The purpose of this paper is to fully verify the consistency of the two groups of sea and gas experiments before disturbance, which may increase the computation amount of several months in each air–sea experiment, but it can guarantee the accuracy and reliability of the experimental results. The results of the analysis of the diagnosis results show that the NPSSTA applied disturbance observation signal associated with ENSO is concentrated in the spring of the northern hemisphere to a large extent. Therefore, in each SSTA observation experiment in this paper, the best time for SST to be disturbed is selected at 0:00 on April 1. It is important to note that the disturbance phenomenon of SST applied at other times is selected for several verified simulation experiments. The results of sample analysis show that the time of applying SST disturbance at these times is earlier than expected or delayed within 1 or a half month, and will not directly affect the experimental results of this sample.

**Design of psychological intervention method in music education**

The main process of guided therapy of group music appreciation art performance is divided into music appreciation, performance, interaction, and the end of singing. There are 15 intereners, a senior manager as the guide of music art therapy, and a small assistant. The activities mainly include music appreciation, video appreciation, games, segment simulation of Skits Sharing, and discussion.

In the input stage, all the data are first entered with the help of EpiData software, and then the data is processed successively with the help of stata11.0 software. Independent samples were used for $t$ test and paired samples for $t$ test $\alpha = 0.05$.

**Quality control**

At the beginning of the research and questionnaire design, we consulted a large number of domestic and foreign literature and consulted the relevant academic teachers, and finally chose the questionnaire reasonably to ensure the accuracy of the questionnaire; Before the beginning of the survey, all the scales were pre-investigated to effectively ensure the smooth development of the work. All the investigators were trained in a unified way, and a series of questions that need special attention in the survey were explained in detail. The role of group music performance in medical subjects was discussed. After the collection, the investigators will check and select the questionnaires that are filled out carelessly and scribbled. All the questionnaires will be entered in double ways to ensure the practicality and accuracy of the statistical data.

**Results**

**Research on sea surface temperature based on data analysis**

**Relationship between SSTA signal and ENSO in the subtropical northeast Pacific**

In this paper, the SSTA of all previous ENSO warm events since 1952 are synthetically analyzed. Because the amplitude intensity of tropical SSTA in the equatorial central and eastern Pacific is much higher than that in other tropical regions, in order to highlight the current subtropical wave signal accurately, we use the “standardized SSTA” measurement method based on the standardized signal processing of the month where the equator is located to measure and analyze it as shown in Fig. 1.

As shown in Fig. 2, at a time point 9 months ahead of the Niño 4 index, the regression coefficient of the center can reach 0.2. As shown in Fig. 3, at a time point lagging behind the NPSSTA signal for 9 months, the maximum value of the correlation coefficient at the center of the region can reach about 0.6.

Figure 4 shows that the NPSSTA index is positively correlated with the winter Niño 4 index in the second half of the year.

**Characteristics of SSTA in the subtropical northeast Pacific**

As shown in Fig. 5, to a certain extent, it shows that in the year of the NPSSTA temperature event, the abnormal temperature flux of latent heat in winter and spring causes the temperature slope of the entire SSTA to rise continuously, and finally makes the SSTA reach a maximum in spring and summer for the increase in value.
Changes in various marine environmental conditions, such as SST, sea state, sea surface wind speed, air temperature at the air–sea interface, and humidity ratio, will have a direct impact on the flow rate through the various submersible insulation layers used at the air–sea interface. In the sea area near the subtropical northeast Pacific Ocean, the interannual wind speed fluctuations of the currents on both sides and the geographic relative position below are also relatively close and more significant. This also shows that they correspond to the airflow synthesis analysis of NPSSTA, and the latent heat flux generally occurs in winter and spring of the warm event year, as shown in Fig. 6.

The connection between SSTA signal generation and NPO

As shown in Fig. 7, the spatial structure relationship of an axial projection of the latent heat flux anomaly and the sea surface wind speed anomaly of the NPO time phase sequence shows that when the NPO is in an absolute phase that is high in the south and low in the north, they may correspond to each other. The northeast tropical trade winds and seawater evaporation effects have increased.

The spatial structure shown in Fig. 7 verifies that the formation of NPO and NPSSTA are related to a certain degree, and their spatial structure also shows good mutual correspondence.

In terms of time, as shown in Fig. 8, events with NPO volatility higher than other standard deviations are basically distributed in December, January, and February. In terms of seasonal distribution, NPO also has a good correlation with the one when the abnormal wind speed and latent heat flux on the surface of the subtropical Northeast Pacific Ocean occurred in the previous analysis.

As shown in Fig. 9, a synthetic analysis of latent heat flux anomalies and sea surface wind speed anomalies was carried out.

The physical mechanism of SSTA signal transmission

Figure 10 shows the specific time series of the subtropical northeast Pacific cyclone SSTA in the same period and the specific spatial structure of the correlation coefficient between the tropical pressure field on the sea surface and the wind field on the sea surface during the same period. The SSTA of the selected area has a significant negative correlation effect relationship with the atmospheric pressure on the ocean surface above and westward, and the selected area is the center of the abnormal low pressure, and the correlation effect coefficient for the center is the highest. The value can reach −0.5. In view of the observation of the structural complexity of the
atmospheric circulation system in the nearby area and the mutual interference with strong interference signals such as ENSO, this correlation coefficient can to a certain extent clearly indicate that the SSTA in this disturbance area has its vicinity. The main disturbing effect of the circulation field of the atmospheric system is shown in Fig. 11 in this area.

As shown in Fig. 11, under the action of latent heat flux, the SSTA signal of this sea area propagates to the equatorial Pacific Ocean.

Analysis of simulation results of ocean surface temperature

In the presence of a large numerical deviation calibration based on basic climate change and sea temperature in the virtual model, the basic climate state of the entire air–sea system is simulated in the model without causing excessive numerical deviations. This article passes the simulation conducted a brief data analysis of the physical annual average growth status and annual cyclic growth of the tropical and subtropical western Pacific in the tropics and sub-tropics, and the results showed that they were more closely consistent with actual meteorological observations. This model problem needs to be re-diagnosed mainly due to some major variations between the scales of the entire air–sea system in the study of the system model from a certain season to the entire inter-year duration.

As shown in Fig. 12, the model analysis can accurately simulate the basic dynamic conditions and characteristic patterns of the interannual amplitude fluctuations of the entire air–sea system. Among them, the amplitude of the interannual amplitude fluctuations of the tropical SSTA is relatively small, and the standard deviation is extremely large. The range of the mean range is slightly westward. Based on the experimental
model, the event Niño 3.4 index synthesis control system experimental event ENSO warm event winter warm SSTA internal structure is basically the same as we observed; similar to this, a maximum value area of SSTA is slightly biased. The Pacific Ocean is in the Earth’s equator.

As shown in Fig. 13, the difference between the synthesized 30 SSTA experiments and the corresponding control air sea system experiment SST shows the feedback of the model air sea system to the SST disturbance signal applied by the laboratory. In more than 1 month after we applied the interference, the signal mainly remained near the place and area we applied, but the signal has clearly shown a trend of transmitting to the southwest, and the SST signal will go in the right direction with the transmission in the next few months.

As shown in Fig. 14, two groups of SSTA experiments used SST disturbance signals, and the signal value gradually decreased from 1 and 2 in the center to 0 at the boundary.

As shown in Fig. 15, 1 month after the SST is synthesized, in its southwest moving direction, there is an abnormal direction wind field which is completely opposite to the moving direction of the abnormal climate state. That is to say, the generation of a SLP wind field may directly lead to a significant weakening of the wind speed of the whole sea surface gas field in the southwest North direction. One of the direct consequences of the rapid dissipation and gradual weakening of the SLP winds is the gradual weakening of the evaporation and convection effect of the sea water near the trade winds, and the gradual reduction of the upward convective latent heat and osmotic flow activity. Finally, the trade wind SST in some coastal areas of Southwest China will start to slowly continue to warm again. However, in the sea area where the atmospheric disturbance system was signalized and strongly intervened, the SST will be cooled slowly by latent heat, sensible heat, long wave electromagnetic radiation, and other means because the atmosphere cannot keep the highest SST which exceeds its average state. In this way, the warm anomaly in the tropical sea area with SST signal gradually begins to decrease, while the SST in the southwest part gradually increases and becomes warmer. Finally, this performance is known as the two-way transmission feedback mechanism of SST through monsoon evaporation sea surface temperature, which is transmitted from the tropical sea area of Taiping Ocean in the northeast of subtropical zone to the tropical equatorial central Pacific in the southwest part.
Research results of psychological intervention in music education

The general demographic data of the experimental group and the control group are shown in Table 1. The difference of SCL-90 between the two groups was statistically significant. See Table 2 for details. There was no significant difference in the total score of interpersonal relationship. See Table 3 for details. There was no statistically significant difference in the total score of social support. See Table 4 for specific information. The self-efficacy results were not statistically significant. See Table 5 for specific information.

Discussion

Analysis of mental health level of experimental group and control group before intervention

The results showed that the total score of SCL-90 was more than 160 before the implementation of early intervention; Therefore, the total score of the scientific objects included in the research project should meet the research objectives of the intervention project. In addition, the results of the research group show that before the practice of the intervention group once a year, there is no statistically significant difference in the SCL-90 scores between the two groups, which indicates that the interaction between the intervention group and the experimental group is mathematically comparable (Afifal et al. 2018).

Analysis of psychological intervention effect of music education

Interpersonal relationship

Interpersonal relationship level of experimental group and control group before intervention The interpersonal interaction between the two groups is comparable. The average scores of the experimental group and the clinical control group were basically maintained at more than 14 points, which had reached the degree of serious social and interpersonal psychological barriers (Anandhi and Kannan 2018).

Comparison of interpersonal relationship between experimental group and control group after intervention Before the intervention, the level of SDIs in the experimental group and the control group was basically the same. After the intervention, through a statistical analysis, it has a positive effect on improving the interpersonal relationship of college students (Bhateria and Jain 2016). First of all, in terms of sensitivity to interpersonal relationship, group music therapy can help promote communication among team members, learn to understand themselves and others from many aspects, and improve self-cognition, so as to cultivate the ability to improve interpersonal communication and improve good interpersonal relationship. In the aspect of depression and anxiety, listening to music can effectively help regulate the mind and relieve the pressure. Especially through the discussion among the group members, it can make the subjects not only consider others from their own point of view, but also enable them to learn transposition thinking and understand others, so as to cultivate and improve their psychological quality.

Social support

Before and after the intervention, the scores of social supports in the experimental group and the control group were not statistically significant. This is inconsistent with the conclusion made by Chen Hailong. Social support mainly refers to the emotional experience and satisfaction brought by the intimate relationship between people and the spiritual or material help for individuals. Research evidence at home and abroad shows that social support has a significant impact on mental health (Chhetri et al. 2020). All kinds of music activities in the group effectively promote the members to express their true
inner emotions and feel the intervention of music. Each learner has different psychological experience, and each learner’s physical emotional feelings and psychological formation after listening to music is a whole process, most of the social support scales are obtained from close friends or family members. Music education intervention only in school for a period of time cannot change immediately. It requires too much substantive content.

Self-efficacy

**Analysis** First, self-efficacy refers to the prediction of whether one can achieve a certain level of instruction, which is produced before the formal occurrence of the activity; Second, self-efficacy refers to the ability to recognize and perceive a specific behavior, which is different from the self-awareness concept of ability in this behavior; Third, self-efficacy is the
subjective evaluation of whether they can achieve a certain goal or a specific performance state. Therefore, it needs a long and systematic process to change self-efficacy greatly, a single intervention may not complete it.

**Before and after the intervention, the scores of each scale in the experimental group and the control group were compared within the group**

**Mental health level of experimental group before and after intervention**

Before and after the implementation of the intervention test, the difference is large, with significant statistical value. The process of group music performance must conform to the cognitive theory of social economics. There are many close relationships between music and various physiological functions of human body. To a certain extent, music can directly affect the contraction of the heart, muscle tension, and frequent breathing, which have been confirmed by modern scientific and experimental research (Jabbar and Grote 2020).

**Mental health level of the control group before and after the intervention may lead to the aggravation of mental health problems**

The difference before and after the beginning of this intervention trial has significant clinical statistical value. To a certain extent, it shows what happens to people with psychological problems if they don’t have access to timely and effective mental health interventions. At the same time, the time of the second assessment is during the assessment month. During the examination month, due to the concentration of examinations, students may be anxious and nervous during the preparation process.

**Interpersonal relationship level of experimental group before and after intervention**

There was significant difference in interpersonal relationship before and after the intervention. College students build trust with each other in music activities, so that they can show their heart to others. When they show themselves, they can also get resonance from others, so that they can open their closed self after experiencing the same experience with others. Accept everything with a tolerant attitude and strengthen the experience of good emotions. Relieve the bad mood and improve the interpersonal relationship (Renard et al. 1991).

**Self-efficacy level of experimental group before and after intervention**

There was significant difference in self-performance level before and after the intervention program was implemented. Music cannot only greatly improve the aesthetic ability of young Chinese college students, but also promote the students to have a wider imagination space in their own study and appreciation, thus adjusting their mentality and reducing the
boring and boring brought by the pressure of learning. Through learning and activities of music, the main function is that it can mobilize people’s spiritual emotions. These positive emotions can greatly reduce the alienation of people to social society, and having good interpersonal relationship will produce a huge sense of self-efficacy and satisfaction for college students’ daily learning and work. Thus, they can improve their physical and mental health.

**Three months later after intervention**

After 3 months of intervention, researchers of the project conducted a tracking test on the members of the experimental group. After a lot of statistics and analysis, it was found that the score of the tracking assessment of the experimental group was still significantly lower than that before the intervention, which showed that the performance of the music team has not only immediate effect on improving the level of interpersonal relationship, and it has a long-term significance for the improvement of interpersonal relationship.

**Feeling and evaluation of activities**

**Activity feelings to some members**

Member A: when I first entered the group activity room, I suddenly felt that today’s group activities were different from those of the past. Every teaching group activity in the past...
Fig. 13  The difference of monthly mean SST between synthetic SSTA experiment and control experiment in April, May, June, and July.

Fig. 14  The difference of monthly mean SST between two groups of synthetic SSTA experiment and control experiment using elliptic perturbation in April.
made me feel a little bit of the same feeling of having class in school. I usually don’t know how to communicate with other students. Once I open my mouth, I will feel scalded on my face. I don’t know what kind of psychological state it is, and I am very worried about it. In these music group activities, I suddenly found that I found myself finding a shortcut, and found that I was actually closing my heart. After several activities, I felt very relaxed and actively talked to other students. I like this kind of group activity very much, I also hope to participate in several group activities in the future, and make use of what I learned in the activities in life.

Member B: I am actually a girl with very introverted personality. At the beginning of freshman, my communication with my classmates was really very few. Many times, I was alone. Some students said I was not close to others. I also hope to be with them. After several activities, I felt happy a lot, and slowly I didn’t resist that. I really can’t take a step at first. After participating in the event, I feel very surprised. I am very surprised by the changes. I hope there will be many other opportunities to participate in group music activities in the future.

Member C: I like such a music group. Several music members perform live music activities. In the music environment of our medical school, it is very difficult to have close physical contact with other people. Especially when I hear the song “love one family”, a classmate in our dormitory was the same as me at the time of college entrance examination, He was in a bad mental state several days before the college entrance examination this year. After we returned to our bedroom at the end of the midnight self-study time, we sat together, listened to this song, cried loudly, encouraged and cheered each other. Now, we have the opportunity to hear such a song together again, let those beautiful scenery picture again flash in front of me. So, in these music group concert sharing activities, I like to use this music method to share group music, can naturally from the deep inside of my heart to accept a new child, to talk to him about their feelings.

Member D: it took me all courage to choose to participate in group music activities, but it was worth it. Through these activities, I suddenly found that it was really very happy to be with them. I saw other classmates like me, and felt really warm and nice. Everyone listened to others’ confusion and helped to solve them. In fact, I feel the recognition that I have

Table 1 General demographic data of experimental group and control group

| Variable                           | Number of experimental group (n) | Composition ratio (%) | Number of control group (n) | Composition ratio (%) |
|------------------------------------|---------------------------------|-----------------------|-----------------------------|-----------------------|
| Gender                             |                                 |                       |                             |                       |
| Male                               | 5                               | 33.33                 | 8                           | 53.33                 |
| Female                             | 10                              | 66.77                 | 7                           | 46.77                 |
| Birthplace                         |                                 |                       |                             |                       |
| Town                               | 3                               | 20.00                 | 3                           | 20.00                 |
| Rural area                         | 12                              | 80.00                 | 12                          | 80.00                 |
| Single parent                      |                                 |                       |                             |                       |
| Yes                                | 4                               | 26.77                 | 0                           | 0                     |
| No                                 | 11                              | 73.33                 | 15                          | 100                   |
| Is the only child                  |                                 |                       |                             |                       |
| Yes                                | 12                              | 80.00                 | 9                           | 60.00                 |
| No                                 | 3                               | 20.00                 | 6                           | 40.00                 |
| Have you received mental health training |                                 |                       |                             |                       |
| Yes                                | 11                              | 73.33                 | 11                          | 73.33                 |
| No                                 | 4                               | 26.77                 | 4                           | 26.77                 |
| Have you sought professional psychological help |                       |                       |                             |                       |
| Yes                                | 14                              | 93.33                 | 12                          | 80.00                 |
| No                                 | 1                               | 6.77                  | 3                           | 20.00                 |
never felt before in this group, and hope to participate in this group activities more in the future.

Objective evaluation

Through the 10-school collective music performance activities, as the guide of this activity, and as the practitioners of this writing, I have witnessed the development and growth of the school collective members and revolutionary changes. From the strange things when we first met, to the chatting and nagging when we met later, from the beginning, everyone played their mobile phones to avoid communication and then everyone was enthusiastic. From the late arrival to the early arrival in time, it can be regarded as a very pleasant change for the members. At the time of the last event, each group members spoke their own words and expressed their own reluctance. Some group members said they hoped that the event would not be over.

Conclusion

The main research topic of this paper is the non-sampling error problem in the ocean surface temperature simulation and music education psychological intervention. Some quantitative

| Table 2 | Comparison of total score of SCL-90 between experimental group and control group before and after intervention |
|-----------------|-------------------------------------------------|-----------------|-----------------|-----------------|
| SCL-90 score of experimental group (n=15) | SCL-90 score of control group (n=15) | t | P |
| Before | 168.6±74.220 | 170.93±4.131 | 1.487 | 0.147 |
| After | 142.47±8.935 | 173.73±5.230 | 11.696 | 0.000 |

| Table 3 | Comparison of total scores of interpersonal relationships between experimental group and control group before and after intervention |
|-----------------|-------------------------------------------------|-----------------|-----------------|-----------------|
| Interpersonal relationship score of experimental group (n=15) | Interpersonal relationship score of control group (n=15) | t | P |
| Before | 19.27±2.154 | 19.33±2.582 | 0.077 | 0.939 |
| After | 14.93±1.944 | 19.20±2.242 | 5.567 | 0.000 |

| Table 4 | Comparison between the experimental group and the control group social support groups before and after the intervention |
|-----------------|-------------------------------------------------|-----------------|-----------------|-----------------|
| Social support score of experimental group (n=15) | Social support score of the control group (n=15) | t | P |
| Before | 36.47±4.422 | 38.53±5.139 | 1.181 | 0.248 |
| After | 38.40±5.396 | 37.93±3.731 | −0.276 | 0.785 |

| Table 5 | Comparison of the total group self-efficacy between the experimental group and the control group before and after intervention |
|-----------------|-------------------------------------------------|-----------------|-----------------|-----------------|
| Self-efficacy score of the experimental group (n=15) | Control group self-efficacy score (n=15) | t | P |
| Before | 23.33±3.039 | 24.87±4.809 | 1.044 | 0.305 |
| After | 26.00±3.485 | 24.53±4.155 | −1.047 | 0.304 |
and confirmatory learning methods are closely combined to study by various methods. Because the amplitude intensity of tropical SSTA in the Middle East Pacific Ocean of equator is far higher than that of other tropical regions, the “standardized SSTA” measurement method based on the monthly standardized signal processing of the equator is adopted to measure and analyze it. Through the diagnosis and analysis of the data of reanalysis and the comprehensive analysis of the experimental results, the following conclusions are drawn: (1) there is a positive correlation between the SST anomaly of the subtropical northeast Pacific and the equatorial Pacific. (2) The warm signal of the northeast Pacific Ocean extends from subtropical to the equatorial Middle Pacific. (3) The main factor controlling the seasonal variation of the tropical sea temperature in the northeast Pacific Ocean of the subtropical region is the latent heat flux. Through the research on the present situation and intervention in the early stage, the following conclusions can be concluded: (1) the mental health of freshmen in a university and the overall situation caused by interpersonal communication problems are not optimistic. (2) There is a significant positive correlation between the physical and mental health of Chinese college students and interpersonal communication; Interpersonal relationship and self-efficacy are the main predictors of SCL-90. (3) There is a negative correlation between the total score of interpersonal relationship and self-efficacy, social support, and other influencing factors. Subjective social support and social support are a predictor variable that affect the degree of interpersonal relationship distress of Medical College for freshmen. (4) The group music performance can significantly improve the mental health and interpersonal relationship of medical college freshmen.

Declarations

Conflicts of interest  The author declares that he has no competing interests.

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