2024, Vol. 4, No. 1, 34–45
https://doi.org/10.47602/johah.v4i1.71

The Impact of Social-Emotional Skills on Mental Well-Being Among Chinese Underprivileged-Background Students: Empirical Evidence from SSES 2019

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The present study investigated the impact of social-emotional skills on the mental well-being of Chinese underprivileged-background students (N = 1,811) based on the 2019 Survey on Social and Emotional Skills (SSES 2019) data, separately using the ordinary least squares (OLS) regression and the quantile regression (QR) methods. The OLS regression model indicated that the mental well-being of Chinese underprivileged-background students is significantly and positively affected by self-control, optimism, stress resilience, trust, curiosity, energy, and sociability, but significantly and negatively influenced by tolerance. Whereas, persistence, responsibility, emotional control, cooperation, empathy, creativity, and assertiveness had no significant impact on the students' mental well-being. Further, the QR model revealed that the impact of social-emotional skills on the mental well-being of Chinese underprivileged-background students can be significant when the mental well-being is at a relatively moderate level, whereas being insignificantly related to the lowest and the highest level of the mental well-being. The results were discussed generally based on the characters of underprivileged-background students in Chinese educational context. Overall, the findings may provide several practical implications for policy application in social-emotional education and the improvement of mental well-being for Chinese underprivileged-background students.

Keywords: Social-emotional skills, mental well-being, underprivileged-background students, OLS regression, quantile regression

Mental well-being is viewed as a positive mental state that allows individuals to thrive across lifetime, more than the absence of mental illness (Bjornsen et al., 2019; Clarke et al., 2011; WHO, 2018). Particularly, adolescent mental well-being has attracted much attention among scholars in recent years (e.g., Arslan, 2023; Martínez-García, 2022; Niu et al., 2023; Stark et al., 2021; Vella et al., 2019; Zhou et al., 2020). Adolescents with lower levels of mental health are more vulnerable to social exclusion, discrimination, stigma, educational difficulties, risk-taking behaviors, physical ill-health, and human rights violations (WHO, 2017; 2018; 2021). More unfortunately, the consequences of failing to address adolescent mental health conditions may extend to adulthood, impairing their long-range opportunities to lead fulfilling lives in future (Aslanyan et al., 2021; Converse et al., 2018; WHO, 2016). The WHO (2021) reported that one in seven 10-19-year-olds suffers from the mental disease, accounting for 13% of the global burden of potential illness in this age group, with depression, anxiety, and behavioral disorders being dominating causes. Further, adolescents in low- and middle-income countries are at an elevated risk of poor mental health (WHO, 2017). Particularly, Chinese students generally experience high rates of depression, anxiety, sleep problems, and self-harm, with overall perishing mental health (Yu, 2022). Therefore, it is necessary to improve the mental well-being of Chinese students so that they can continuously achieve positive psychological and behavioral development.

Numerous studies indicated that social-emotional skills shape the potential foundation of individuals' psychological growth and social adjustment (Arslan, 2019; Elias et al., 1997; Frydenberg et al., 2017; Humphrey et al., 2011; Martinez-Yarza et al., 2023; Weare & Gray, 2003; Weissberg et al., 2015; Zins et al., 2007). Previous literature revealed that social-emotional skills are closely associated with students' mental well-being (e.g., Appel et al., 2023; Aslanyan et al., 2021; Boals et al., 2011; Clarke et al., 2021; Extremera & Fernández-Berrocal, 2006; Martínez-García, 2022; Wills et al., 2016). Whereas most studies were conducted in a Western context, such a relatedness has rarely been discussed in China. More than that, existing cases generally employ normal student samples, few research has been administrated among underprivileged-background students due to their marginalized status. Over the past few decades, China's government and educational department have devoted to counteracting the disadvantages of students from underprivileged SES backgrounds, with more allocation and resources provided for them, aiming at enhancing educational equity in a comprehensive way (Chu & Yang, 2008; Li & Xue, 2022). Nevertheless, there still exist a large number of students from low socio-economic status (SES) families in China. Therefore, it is necessary to explore the impact of social-emotional skills on the mental well-being of underprivileged-background students, so as to find reasonable countermeasures to improve the educational practice of social and emotional learning (SEL) and the overall mental well-being for Chinese students.

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Theoretical Basis

In order to deeply understand the impact of social-emotional skills on the mental well-being of underprivileged-background students in China, the modelling process in this study was guided by emotional intelligence theory (Goleman, 1995) and emotional literacy theory (Park et al., 2003), which could be considered as the theoretical basis of the potential models. The two theories suggest that individuals' emotional and social skills can help them regulate emotional state, navigate complex social situations, build strong relationships, and make effective decisions, which generally conduce to students' psychological growth and mental well-being, even if they are at a socioeconomic disadvantage. Therefore, emotional intelligence theory and emotional literacy theory provide a reasonably theoretical reference for modelling to explore the role of social-emotional skills in the mental well-being of Chinese underprivileged-background students.

Social-Emotional Skills

Particularly, this study adopts the concept of social-emotional skills as defined by the 2019 Survey on Social and Emotional Skills (SSES 2019). SSES 2019 was conducted by the Organization for Economic Co-operation and Development (OECD) to assess students' social-emotional skills based on the Big Five model, which has been proved to be rational and feasible to concisely and comprehensively organize and measure social-emotional skills among numerous assessment tools (Murano et al., 2021; Niu, 2024; Walton et al., 2023). Social-emotional skills within the framework of SSES 2019 were divided into 5 dimensions, namely task performance, emotional regulation, collaboration, open-mindedness, and engaging with others. Specifically, each of them contains three sub-dimensions: Task performance refers to persistence, responsibility, and self-control; emotional regulation involves emotional control, optimism, and resilience; collaboration covers cooperation, empathy, and trust; open-mindedness consists of creativity, curiosity, and tolerance; and engaging with others comprises assertiveness, energy, and sociability (OECD, 2019; 2021).

Social-Emotional Skills and Student Mental Well-Being

Research on the association between adolescents' social-emotional skills and mental well-being has been prevalent in recent years (e.g., Aslanyan et al., 2021; Fuspita et al., 2018; Golshiri et al., 2023; Martínez-García, 2022; Vella et al., 2019). Numerous studies showed the significantly positive relations between social-emotional skills and individuals' mental well-being (e.g., Arslan & Wong, 2024; Appel et al., 2023; Boals et al., 2011; Extremera & Fernández-Berrocal, 2006; Jakovljevic, 2018; Wills et al., 2016). In fact, social-emotional skills are correlated with students' physical, mental, and social health. For example, Extremera and Fernández-Berrocal (2006) argued that emotional attention is positively and significantly related to high anxiety, depression, and to low levels of role emotional, social functioning, and mental health; inversely, high emotional clarity and mood repair are associated with low levels of anxiety and depression, high role physical, social functioning, mental health, vitality, and general health. Pannebakker et al. (2019) noted that SEL-related programs may facilitate students' multifaceted skills, which in turn conduce to their self-efficacy and mental well-being, especially alleviating potential depressive symptoms. It was also reported that engaging in community activities and taking part in group collaboration are beneficial for SEL competence and mental well-being of students from under-represented and marginalized communities, generally reducing their depression and anxiety (Appel et al., 2023). Nevertheless, students' situational anxiety is more likely to be affected by their negative social and emotional behaviors such as hostility and personal anxiety, which increases parallel to the increase in self-aggression or guilt (Aslanyan et al., 2021).

As a few of crucial elements of social-emotional skills, self-control, empathy, and trust are proved to be effective predictors influencing individuals' mental well-being with explicit functional processes (Boals et al., 2011; de Ridder & Gillebaart, 2017; Martinez et al., 2019; Niu et al., 2023; Wills et al., 2016). de Ridder and Gillebaart (2017) argued that self-control enhances personal well-being by activating adaptive behaviors but impeding maladaptive behaviors. Wills et al. (2016) empirically proved that emotional and behavioral self-control can affect students' positive well-being and symptomatology through academic competence, stressful events, and deviance-prone attitudes and cognitions, while emotional dysregulation is detrimental to their mental health. Generally, high self-control is correlated with more mental well-being and psychological resilience, whereas individuals with low self-control are less likely to obtain mental well-being because of their unhealthy coping strategies when facing problems (Boals et al., 2011; Gokalp, 2023; Kim et al., 2022). Further, from the perspective of bidirectional interdependence, Jakovljevic (2018) suggests that empathic expressions, such as love, kindness, and compassion in interpersonal relationships increase individuals' sense of coherence and resilience, leading to more mental well-being. Additionally, greater trust is indicative of higher quality of reciprocal communications and increased psychological well-being, whereas lower trust is linked to potential mental health illness and distress (Clarke et al., 2021; Martinez et al., 2019; Miething et al, 2017).

Generally, engaging in creative activities may positively impact individuals' mental well-being (Brock, 2021; Leckey, 2011; Shen et al., 2021; Stebbins, 2018). For instance, Leckey (2011) clarified that creative activities exert a therapeutic and protective effect on individuals' mental well-being, promoting mental relaxation, facilitating self-expression, boosting the immune system, while reducing blood pressure and psychological stress. Shen et al. (2021) reported that creativity conduces to mindfulness, which in turn beneficials to mental well-being. Also, Jovanovic and Brdaric (2012) noted that adolescents with high curiosity have higher levels of life satisfaction and positive affect and greater sense of purpose in life and hope than adolescents with both low and average curiosity. Macaskill and Denovan (2014) indicated that gratitude, hope, and curiosity predict mental health, positive affect, life satisfaction, and self-esteem. Additionally, by examining the role of four components of assertiveness, namely, open expression, control of emotion, consideration for others, and self-direction, for mental health, Watanabe (2009) showed that excessive "consideration for others" is related to mental unhealthiness. Further evidence proved that assertiveness training may increase self-esteem and mental well-being but decrease depression (Fuspita et al., 2018; Golshiri et al., 2023). More than that, with a range of increased positive emotions, it was found that optimism is also closely related to depressive

symptomatology prevention as resources for coping with hopelessness (Martínez-García, 2022).

Research revealed that sociability is identified as a significant predictor of adolescent mental health trajectories (Vella et al., 2019). With more social interactions embodied in interpersonal relationships, engaging in extraverted behaviors is generally related to greater positive affect, negative affect, life satisfaction, and happiness in comparison with participating in introverted behaviors (Margolis & Lyubomirsky, 2020; Schimmack et al., 2004; Steel et al., 2008). Further, Margolis et al. (2020) reported that the correlation between the energy level facet and well-being merely accounts for the association between extraversion and well-being, and both sociability and assertiveness are not uniquely associated with well-being when energy level was included as a predictor, thus effects of assertiveness and sociability on well-being and can be nearly attributed to these constructs' relationships with energy level. Additionally, Armstrong et al. (2014) revealed that individuals' persistence from middle to late childhood predicts their mental health symptoms at age 18. Moreover, it was found that task persistence exerts a robust impact on childhood poverty-worsening mental health (Hao et al., 2022). Also, research reported that responsibility is positively related with individuals' mental health, serving as an integrated and systematic role (Lakeman, 2016; Pope et al., 2018).

The Present Study

Although the relationship between social-emotional skills and individuals' mental well-being has been recognized among scholars, it was rarely examined in Chinese educational context. Additionally, such an association was mainly examined among normal adolescent groups, few research has been conducted among underprivileged-background students due to their marginalized status. Chinese exam-oriented education system has traditionally focused on students' cognitive training but neglected their all-round development, inevitably leading to downplaying students' psychological growth and social adjustment, especially for those from low SES families. Nevertheless, researchers reported that the development of social-emotional skills is equally or even more important than cognitive skills on fostering students' mental well-being (e.g., Elias et al., 1997; Stark et al., 2021; Weare & Gray, 2003; Weissberg et al., 2015). Therefore, based on the existing literature, the present study aims to empirically explore the impact of social-emotional skills on the mental well-being of Chinese Underprivileged-Background students to effectively proceed with SEL in Chinese educational context.

Based on the existing literature, the current study was primarily conducted to answer the following research question: How do social-emotional skills influence the mental well-being of Underprivileged-Background students in China?

Method

Participants

The data in the current study were obtained from SSES 2019. SSES 2019 aimed at exploring potential family, school, and community factors that form 10- and 15-year-old students' social-emotional skills, with 9 countries involved in total (OECD, 2019). The sampling design of SSES 2019 is a two-stage stratified probability, which means that schools and students are individually selected in sequence to gain representative samples (OECD, 2021). Using student questionnaires, the participants in this study were selected from Suzhou, China. As this study aims at investigating effects of social-emotional skills on the mental well-being of underprivileged-background students, participants from the poorest 25% of SES were selected as underprivileged-background students (Wang et al., 2022). Particularly, SES was assessed by the standardized index composited from parental educational backgrounds and occupation types, as well as household possessions, according to SSES 2019 (OECD, 2021). The missing data were processed with the multiple imputation method and the outliers were deleted. The final sample contained 1,811 students across both 10- and 15-year-old cohorts (boys = 1,001, girls = 810; younger = 907, older = 904) who are in the crucial years for the development of social-emotional skills (OECD, 2015; Roberts & DelVecchio, 2000).

Variable Description

Dependent Variable: Mental well-being was conducted as the dependent variable, being assessed by WHO-5 well-being within SSES 2019. Five well-being-related expressions were employed as assessment indices, namely felt cheerful and in good spirits, felt calm and relaxed, felt active and vigorous, woken up feeling fresh rested, and daily life has been filled with things that interest me. Students were given relevant options on a five-point Likert scale to indicate how often these situations occurred: 1 for "at no time", 2 for "some of the time", 3 for "more than half of the time", 4 for "most of the time", and 5 for "all of the time." Higher scale scores corresponded to more perceived mental well-being. Particularly, corresponding linear transformation was used to process raw scores of WHO-5 well-being in SSES 2019, which were consequently standardized to a metric for potential comparison across different participating countries (OECD, 2021).

Independent Variable: Social-emotional skills were used as the core independent variables. The measurement of the 15 sub-dimensions of social-emotional skills totally involved 97 items in the student assessment final scales (OECD, 2021). All items were assessed with a Likert-type format with ratings from 1-5, respectively, as follows: "strongly disagree", "disagree", "neither agree nor disagree", "agree" and "strongly agree." A series of calibration procedures were used to process raw scores, according to SSES 2019 (OECD, 2021). Firstly, the generalised partial credit model (GPCM; Muraki, 1992) within the item response theory (IRT) framework was applied to parameter estimates, and the original value of assessment scales was derived from the weighted likelihood estimate (WLE; Warm, 1989). Further, the adjusted value for avoiding potential estimate errors was calculated from the Acquiescence Response Style (ARS). Finally, the WLEs (originally on a logit metric) were transformed to a metric where the scale averages of 500 for equally weighted data from all participants. The average score reflected the results for participants who had chosen average mid-points ("neither agree nor disagree") across items in each scale. Similarly, the standard deviation for the combined dataset with equally weighted site data was set to 100. Consequently, the standardized scores were used in the present study according to SSES 2019. Corresponding examples of items of social-emotional skills are displayed in Table 1.

Table 1. Examples of items of social-emotional skills

Variables	Item wording	Item examples
Persistence	PER01	Keep working on a task until it is finished.
Responsibility	RES06	A responsible person.
Self-control	SEL01	Careful with what I say to others.
Emotional control	EMO02	Keep my emotions under control.
Optimism	OPT02	Believe good things will happen to me.
Stress resilience	STR01	Relaxed and handle stress well.
Cooperation	COO06	Always willing to help my classmates.
Empathy	EMP06	Understand what others want.
Trust	TRU01	Think most of my classmates keep their promises.
Creativity	CRE04	Sometimes find a solution other people don't see.
Curiosity	CUR04	Like to know how things work.
Tolerance	TOL05	Like hearing about other cultures and religions.
Assertiveness	ASS02	Want to be in charge.
Energy	ENE08	Maintain high energy throughout the day.
Sociability	SOC07	Make friends easily.

Note. The data were obtained from SSES 2019 Technical Report (OECD, 2021).

Gender and age were incorporated as covariates in the current analyses. On the one hand, they have been widely used in this way to ensure the unbiasedness of the results within social sciences research (Bernerth & Aguinis, 2016). On the other hand, they are theoretically and empirically relevant to mental well-being according to previous studies (e.g., Bjornsen et al., 2019; Bradshaw et al., 2011; Haller & Hadler, 2006; Helliwell & Wang, 2011; Wills et al., 2016; Zhou et al., 2020). In terms of the gender variable, it was coded as 0 for male and 1 for female. With regard to the age variable, it was coded as 0 for 10-year-old group and 1 for 15-year-old group.

Analytical Strategies

OLS Regression: Stata 17.0 was employed as the software in the analytical processes. To examine the potential impacts of social-emotional skills on the mental well-being of Chinese underprivileged-background students, this study first adopted the ordinary least squares (OLS) regression method. The model composed of both dependent variable and independent variables, is displayed in Equation (1).

$$\text{Mental well-being}_i = \beta_0 + \beta_1\text{persistence} + \beta_2\text{responsibility} + \beta_3\text{self-control} + \beta_4\text{emotional control} + \beta_5\text{optimism} + \beta_6\text{stress resilience} + \beta_7\text{cooperation} + \beta_8\text{empathy} + \beta_9\text{trust} + \beta_{10}\text{creativity} + \beta_{11}\text{curiosity} + \beta_{12}\text{tolerance} + \beta_{13}\text{assertiveness} + \beta_{14}\text{energy} + \beta_{15}\text{sociability} + \beta iXi + \varepsilon_i \quad (1)$$

Where mental well-being$_i$ indicates the scores of students' mental well-being. β_0 embodies the constant term, and β_1 to β_{15} involve the regression coefficients of students' social -emotional skills across various components, individually. βi denotes the regression coefficients of the covariates, and Xi represents students' scores on the covariates. ε_i is the random error term.

Quantile Regression: Although empirically quantitative analyses in education, psychology, and the social sciences generally adopt linear statistical models such as OLS regression, the regression coefficients produced by such a linear modeling approach are mean estimates, namely, conditional-mean modeling (Hao & Naiman, 2007; Konstantopoulos et al., 2019). The mean estimates may not provide information regarding the effects that variables at different points of the outcome distribution of scores, without considering estimates for noncentral locations in the distribution of scores (Hao & Naiman, 2007; Konstantopoulos et al., 2019). In view of this, the current study further employed the quantile regression (QR) method to examine whether potential heterogeneity exists with regard to the impacts of social-emotional skills on the mental well-being at different levels among underprivileged-background students. The model consisted of both dependent variable and independent variables, is displayed in Equation (2).

$$Q^p\ (\text{Mental well-being}_i) = \beta^p_0 + \beta^p_1\text{persistence} + \beta^p_2\text{responsibility} + \beta^p_3\text{self-control} + \beta^p_4\text{emotional control} + \beta^p_5\text{optimism} + \beta^p_6\text{stress resilience} + \beta^p_7\text{cooperation} + \beta^p_8\text{empathy} + \beta^p_9\text{trust} + \beta^p_{10}\text{creativity} + \beta^p_{11}\text{curiosity} + \beta^p_{12}\text{tolerance} + \beta^p_{13}\text{assertiveness} + \beta^p_{14}\text{energy} + \beta^p_{15}\text{sociability} + \beta^p iXi + \varepsilon_i \quad (2)$$

Where p is the quantile. In this study, the coefficients of dependent variables at different quantiles were separately calculated in a reversed order, including students in the bottom 10% quantile (with very low mental well-being), in the 25% quantile (with low mental well-being), in the 50% quantile (with moderate mental well-being), in the 75% quantile (with high mental well-being), and in the 90% quantile (with very high mental well-being), according to Konstantopoulos et al. (2019).

Table 2. Descriptive statistics

Variables	*M*	*SD*
Mental Well-being	43.259	12.508
Persistence	593.313	95.757
Responsibility	588.969	96.605
Self-Control	576.973	83.484
Emotional Control	553.567	102.799
Optimism	573.481	91.7630
Stress Resilience	479.989	98.2532
Cooperation	622.854	98.4379
Empathy	619.393	99.122
Trust	605.762	109.049
Creativity	572.421	91.826
Curiosity	590.543	87.061
Tolerance	605.207	94.391
Assertiveness	505.344	71.997
Energy	543.920	85.224
Sociability	586.009	93.075
Gender	0.450	0.497
Age	0.500	0.500

Note. M = Mean, *SD* = Standard Deviations.

Table 3. Results of the OLS regression analysis.

Variables	Coefficient	*SE*	T-ratio	95% CI
Gender	-0.271	0.449	-0.60	-1.152, 0.609
Age	-0.810	0.491	-1.65	-1.772, 0.153
Persistence	0.004	0.004	0.86	-0.005, 0.012
Responsibility	-0.004	0.004	-1.10	-0.011, 0.003
Self-Control	0.010**	0.004	2.81	0.003, 0.018
Emotional Control	0.001	0.003	0.29	-0.006, 0.007
Optimism	0.036***	0.004	9.12	0.028, 0.043
Stress Resilience	0.011**	0.003	3.46	0.005, 0.017
Cooperation	-0.002	0.004	-0.35	-0.010, 0.007
Empathy	0.002	0.004	0.52	-0.006, 0.010
Trust	0.007**	0.003	2.71	0.002, 0.013
Creativity	-0.006	0.004	-1.72	-0.014, 0.001
Curiosity	0.012**	0.004	2.86	0.004, 0.021
Tolerance	-0.006*	0.003	-1.97	-0.013, -0.00001
Assertiveness	0.005	0.004	1.30	-0.002, 0.012
Energy	0.036***	0.004	8.80	0.028, 0.044
Sociability	0.009*	0.004	2.45	0.002, 0.016
Cons.	-19.876***	2.212	-8.98	-24.216, -15.537
Parameters	R^2	Adj.R^2	*F*	
Values	0.464	0.459	91.46***	

Note. *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$. *SE* = Standard Errors. CI = Confidence Interval.

Results

Descriptive Statistics

The data screening test indicated that the values of skewness and kurtosis of all variables were smaller than |± 2| and |± 5|, individually, showing that the data were in line with the normal distribution with a robust estimate (Curran et al., 1996). Table 2 shows the results of descriptive statistics, including mean (*M*) and standard deviations (*SD*). It was found that the averages of Chinese underprivileged-background students' social-emotional skills in descending order were cooperation, empathy, trust, tolerance, persistence, curiosity, responsibility, sociability, self-control, optimism, creativity, emotional control, energy, assertiveness, and stress resilience respectively.

OLS Regression

The results of OLS regression model are displayed in Table 3. It was found that underprivileged-background students' mental well-being was significantly and positively affected by self-control (β = 0.010, $p < 0.01$), optimism (β = 0.036, $p < 0.001$), stress resilience (β = 0.011, $p < 0.01$), trust (β = 0.007, $p < 0.01$), curiosity (β = 0.012, $p < 0.01$), energy (β = 0.036, $p < 0.001$), and sociability (β = 0.009, $p < 0.05$), but significantly and negatively influenced by tolerance (β = -0.006, $p < 0.05$). While persistence (β = 0.004, $p > 0.05$), responsibility (β = -0.004, $p > 0.05$), emotional control (β = 0.001, $p > 0.05$), cooperation (β = -0.002, $p > 0.05$), empathy (β = 0.002, $p > 0.05$), creativity (β = -0.006, $p > 0.05$), and assertiveness (β = 0.005, $p > 0.05$) had no significant impact on the mental well-being of underprivileged-background students. With regard to the covariates, there were no significant differences found across both gender (β = -0.271, $p > 0.05$) and age (β = -0.810, $p > 0.05$).

Quantile Regression

As seen from Table 4, the results of QR model indicated that the significance regarding the coefficients of social-emotional skills impacting the mental well-being of underprivileged-background students was broadly consistent with the results of the OLS regression model. It was found that the significance of the coefficients of social-emotional skills impacting the mental well-being of underprivileged-background students mainly focuses on the range from 25% quantile to 75% quantile rather than 10% quantile or 90% quantile, except for optimism and energy. Specifically, the regression coefficients of social-emotional skills positively impacting the mental well-being of underprivileged-background students generally showed increasing trends from 25% quantile to 75% quantile, regarding the variables of self-control (β = 0.009, $p < 0.05 \rightarrow \beta$ = 0.011, $p < 0.05$), stress resilience (β = 0.010, $p < 0.01 \rightarrow \beta$ = 0.013, $p < 0.01$), trust (β = 0.009, $p < 0.01 \rightarrow \beta$ = 0.010, $p < 0.01$), and curiosity (β = 0.014, $p < 0.01 \rightarrow \beta$ = 0.020, $p < 0.01$). While tolerance (β = -0.006, $p < 0.05$) displayed a significantly negative effect on 50% quantile. Inversely, sociability (β = 0.012, $p < 0.01 \rightarrow \beta$ = 0.007, $p < 0.05$) demonstrated a decreasing trend from 25% quantile to 75% quantile. Particularly, the significance regarding the coefficients of social-emotional skills impacting the mental well-being of underprivileged-background students was found from 10% quantile to 90% quantile on optimism and energy. There was no significance found on persistence, responsibility, emotional control, cooperation, empathy, creativity, and assertiveness.

Discussion

The present study investigated the impact of social-emotional skills on the mental well-being of Chinese underprivileged-background students, separately using OLS regression and QR methods based on SSES 2019 data. The results of the OLS regression model indicated that the mental well-being of Chinese underprivileged-background students is significantly and positively affected by self-control, optimism, stress resilience, trust, curiosity, energy, and sociability, but significantly and negatively influenced by tolerance. However, persistence, responsibility, emotional control, cooperation, empathy, creativity, and assertiveness had no significant effect on the mental well-being of Chinese underprivileged-background students. Further, the results of the QR model showed a relatively consistent effect with the OLS regression

Table 4. Results of the QR analysis.

Variables	Q10	Q25	Q50	Q75	Q90
Persistence	0.006 (0.008)	0.001 (0.006)	0.001 (0.005)	-0.001 (0.006)	0.007 (0.009)
Responsibility	-0.008 (0.007)	-0.001 (0.006)	-0.006 (0.004)	-0.004 (0.007)	0.004 (0.006)
Self-Control	0.011 (0.007)	0.009* (0.004)	0.005 (0.003)	0.011* (0.005)	0.005 (0.007)
Emotional Control	-0.002 (0.006)	-0.001 (0.005)	0.0002 (0.004)	-0.001 (0.006)	0.010 (0.006)
Optimism	0.041*** (0.007)	0.039*** (0.006)	0.037*** (0.006)	0.034*** (0.005)	0.038*** (0.007)
Stress Resilience	0.006 (0.007)	0.007 (0.007)	0.010** (0.003)	0.013** (0.004)	0.007 (0.006)
Cooperation	0.006 (0.009)	-0.002 (0.006)	-0.004 (0.005)	-0.005 (0.004)	0.008 (0.009)
Empathy	-0.011 (0.007)	-0.005 (0.005)	0.005 (0.004)	0.009 (0.005)	0.011 (0.007)
Trust	0.005 (0.005)	0.009** (0.003)	0.010** (0.003)	0.005 (0.004)	-0.001 (0.005)
Creativity	-0.004 (0.008)	-0.005 (0.005)	-0.006 (0.004)	-0.004 (0.005)	-0.005 (0.006)
Curiosity	0.007 (0.008)	0.005 (0.006)	0.014** (0.004)	0.020** (0.007)	0.014 (0.010)
Tolerance	-0.007 (0.005)	-0.001 (0.005)	-0.006* (0.003)	-0.005 (0.005)	-0.009 (0.005)
Assertiveness	0.004 (0.007)	0.008 (0.005)	0.003 (0.003)	0.001 (0.005)	-0.0004 (0.006)
Energy	0.040*** (0.007)	0.036*** (0.006)	0.040*** (0.005)	0.038*** (0.005)	0.028** (0.009)
Sociability	0.007 (0.007)	0.012** (0.004)	0.006 (0.004)	0.007* (0.003)	0.003 (0.006)
Control variables	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Cons.	-23.588*** (4.679)	-23.070*** (3.567)	-16.950*** (2.343)	-16.549*** (3.054)	-13.845** (4.106)
P.R^2	0.209	0.252	0.282	0.292	0.354

Note. $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$. Standard errors are in parentheses. P.R^2 = Pseudo R^2.

model. Generally, it revealed that the significance of the regression coefficients of social-emotional skills impacting the mental well-being of Chinese underprivileged-background students mainly focuses on the range from 25% quantile to 75% quantile, except for optimism and energy with the significance of the regression coefficients ranging from 10% quantile to 90% quantile. The findings were discussed generally based on the characters of underprivileged-background students in Chinese educational context.

Within the task performance dimension of social-emotional skills, it was found that the mental well-being of Chinese underprivileged-background students is significantly and positively related to self-control, but insignificantly associated with persistence and responsibility. The finding is in accord with some previous studies (e.g., Boals et al., 2011; de Ridder & Gillebaart, 2017; Gokalp, 2023; Kim et al., 2022; Wills et al., 2016), but inconsistent with others (e.g., Armstrong et al., 2014; Hao et al., 2022; Lakeman, 2016; Pope et al., 2018). Such an inconformity may be due to the uniqueness of Chinese underprivileged-background students. In China, schools tend to follow a "rational" education pattern, emphasizing knowledge-dominated instruction while ignoring psychological factors of students, which is particularly detrimental to the global growth of students from low SES families (Wang et al., 2010; Yu & Jiang, 2017). Although the underprivileged-background students may handle potential challenges with a persistent and responsible attitude, they may not achieve the expected results due to poor comprehensive capabilities, which is therefore unrelated to their mental well-being. Nevertheless, the significant effect of self-control on the mental well-being of underprivileged-background students provides a new direction for Chinese social-emotional education. Self-control within SEL may further emphasize regulating interpersonal behaviors when socializing with others, instead of merely focusing on the intrapersonal goal-directed process, whereby enhancing the mental well-being of Chinese underprivileged-background students globally.

Within the emotional regulation dimension of social-emotional skills, it revealed that the mental well-being of Chinese underprivileged-background students is significantly and positively related to optimism and stress resilience, but insignificantly relevant for emotional control, which is reflected by Martínez-García (2022) but different from Zaki (2020). Such a finding probably embodies that Chinese underprivileged-background students may gain more mental well-being by responding to external circumstances in a positive way rather than relying on regulating the internal emotions, and optimism and resilience may exert a more evident impact on their mental health in comparison to emotional control. Consequently, strengthening optimism and resilience is more likely to efficiently support the mental well-being of underprivileged-background students. In view of this, Chinese school administrators should foster an instructional climate in which underprivileged-background students may experience effective psychological education. With the growing popularity of SEL, the Chinese government and schools has recently placed greater emphasis on students' psychological health education. However, psychological health education-related contents should be properly integrated and closely arranged by adopting diversified approaches within school programs or curricula (Meng, 2003; Yu & Jiang, 2017). In addition, psychological education in families and psychological counseling in communities closely related to students' mental well-being may be incorporated into the school psychological health education system in China, with especial stress on underprivileged-background students.

Within the collaboration dimension of social-emotional skills, it indicated that the mental well-being of Chinese underprivileged-background students is significantly and positively related to trust, but insignificantly associated with cooperation and empathy. Such a finding is in accord with some extant research (e.g., Clarke et al., 2021; Martinez et al., 2019; Miething et al, 2017), but inconsistent with others (e.g., Appel et al., 2023; Jakovljevic, 2018; Wei et al., 2011). This is reflected by Coleman Report (Coleman et al., 1966)

and cultural capital theory (Bourdieu & Passeron, 1977), which suggest that SES inequalities may damage student global development, leading to fewer opportunities in interpersonal interactions for underprivileged-background students (Bourdieu, 2006). Most of their peers may be loath to interact with underprivileged-background students even if they show a tendency towards empathy and cooperation, thus their preference to live in harmony and work as a team is useless to some extent. Nevertheless, trust can mitigate the healthy disadvantages related to individuals' low SES (Wang & Ma, 2020). The significant impact of trust may guide a robust direction for enhancing the mental well-being of Chinese underprivileged-background students, with more interpersonal trust implying higher quality of reciprocal interactions (Martinez et al., 2019). However, it should be noted that trust is harder to be developed duo to the stress on in-group boundaries and social control from tight-knit groups in Chinese context (Jasielska et al., 2018). Considering such a point, cross-group interactions should be salient to extend interpersonal trust radius for Chinese underprivileged-background students, whereby conducing to their global mental well-being.

Within the open-mindedness dimension of social-emotional skills, it demonstrated that the mental well-being of Chinese underprivileged-background students is significantly and positively related to curiosity but significantly and negatively related with tolerance, while being insignificantly associated with creativity. This is in accord with some existing studies (e.g., Jovanovic & Brdaric, 2012; Macaskill & Denovan, 2014), but inconsistent with others (e.g., Brock, 2021; Leckey, 2011; Shen et al., 2021; Stebbins, 2018). In fact, featured by emphasizing repetition while overlooking innovation, Chinese exam-oriented education model has long stressed students' cognitive training but neglected their all-round development, which is not conducive to cultivating their creative thinking. More unfortunately, students with low SES are more likely to lack of creative training such as adopting high-quality approach-to-learning, and they generally perform worse on initiative, invention, imagination, curiosity, attentiveness, and target consciousness than those from high SES families (Wang et al., 2010). While curiosity may contribute to sense of purpose in life for students (Jovanovic & Brdaric, 2012), which should be favorably identified by Chinese school administrators. Additionally, the negative effect of tolerance on mental well-being is probably due to the unique measurement framework of tolerance in SSES 2019: Tolerance mainly involves the degree of acceptance of foreign cultures and peoples, indicating that the more underprivileged-background students showed tolerance for foreign cultures, the lower their mental well-being. Generally, Chinese students are occupied in Neijuan (rat race) aiming at improving academic performance with all the time available, thus they may have no much attention for cultural activities. Also, the low SES of underprivileged-background students does not allow them to invest much in cultural consumption, thus there is a huge gap between the desire for foreign cultures and the low SES in reality, whereby impairing their mental well-being.

Within the engaging with others dimension of social-emotional skills, it displayed that the mental well-being of Chinese underprivileged-background students is significantly and positively linked to energy and sociability, but insignificantly associated with assertiveness. This finding is in accord with some existing research (e.g., Margolis & Lyubomirsky, 2020; Schimmack et al., 2004; Steel et al., 2008; Vella et al., 2019), but inconsistent with others (e.g., Fuspita et al., 2018; Golshiri et al., 2023; Watanabe, 2009). It was found that low socioeconomic groups have a lower frequency of social interactions with friends, which in turn decreases their healthy advantages (Wang & Ma, 2020). Similarly, students from low SES families are more likely to be isolated, while being sociable and extroverted may disperse their loneliness, depression, and disappointment. Additionally, being full of energy is crucial for underprivileged-background students to have a positive mental outlook. Such a finding can also be guided by ecological systems theory. In the perspective of ecological systems theory (Bronfenbrenner, 1992), actively carrying out social interactions with an energetic and sociable attitude is more likely to be exposed to complex microsystem, mesosystem, exosystem, and macrosystem, and enjoy relatively diversiform experiences, whereby benefiting to their mental well-being growth. However, the insignificant impact of assertiveness on the mental well-being of Chinese underprivileged-background students actually reveals potential social disadvantages of this group. Students from low SES families are generally not at the center of social circles and unable to convince their peers undemandingly even if they have sufficient assertiveness and good leadership skills, which may not exert a significant impact on their mental well-being. Inversely, individuals of higher SES share more diverse social relationships than those of lower SES (Wang et al., 2023; Zhou et al., 2020), which is also supported by Bourdieu's cultural reproduction theory and social reproduction theory (Bourdieu, 2006; Bourdieu & Passeron, 1977; Edgerton et al., 2014).

Some findings can also be derived from the QR analysis. This study further explored potential homogeneity and heterogeneity in the impact of social-emotional skills on the mental well-being of Chinese underprivileged-background students with different levels of mental well-being through conditional QR model. It was found that the impacts of optimism and energy on the mental well-being of underprivileged-background students show homogeneity and significantly promote various levels in different quantiles, indicating that optimism and energy have significantly positive impacts on those students with different levels of mental well-being. Differently, the effects of self-control, stress resilience, trust, curiosity, sociability, and tolerance on the mental well-being of underprivileged-background students demonstrated significant heterogeneity, with the influence mainly focusing on 25% quantile to 75% quantile. As mental well-being increased, the influences of self-control, stress resilience, trust, curiosity, and tolerance on the mental well-being of underprivileged-background students generally strengthened, besides the variable of sociability. The results revealed that the effects of self-control, stress resilience, trust, curiosity, sociability, and tolerance on the mental well-being of underprivileged-background students can be generally significant when mental well-being is at a relatively moderate level, whereas being insignificantly related to the lowest and the highest level of the mental well-being of underprivileged-background students. Such a finding particularly calls for more concerns to underprivileged-background students with the lowest level of mental well-being in China, with all-around measures supported rather than merely

resting upon the cultivation of their general social-emotional skills.

Implications and Research Prospects

This study explored the impact of social-emotional skills on the mental well-being of Chinese underprivileged-background students. The findings suggest that the mental well-being of underprivileged-background students is significantly and positively affected by self-control, optimism, stress resilience, trust, curiosity, energy, and sociability, while being significantly and negatively influenced by tolerance. Nevertheless, persistence, responsibility, emotional control, cooperation, empathy, creativity, and assertiveness had no significant impact on the mental well-being of underprivileged-background students. Although some components of social-emotional skills may be effective to enhance positive outcomes in a specifical context, they may not be as effective in other settings (Miyamoto et al., 2015; Niu et al., 2023). Potential discrepancies of the educational impacts of social-emotional skills may be derived from distinct contexts, thus investigating the impact of social-emotional-related variables on students' psychological outcomes, based on unique groups, is required. Overall, the findings may provide several practical implications for policy application in school social-emotional education and the improvement of mental well-being among Chinese underprivileged-background students.

Firstly, given that SEL has been highly recommended by Chinese educational policymakers in recent years (Mao, 2018; Wang et al., 2017), they may distinctively conduct SEL in order to comprehensively promote students' mental well-being in an effective way, cultivating students' corresponding social-emotional skills across high and low SES groups. Particularly, the targeted SEL for Chinese underprivileged-background students may underline self-control, optimism, stress resilience, trust, curiosity, energy, and sociability, whereby efficiently improving the mental well-being of such a group. Secondly, although the influences of self-control, stress resilience, trust, curiosity, sociability, and tolerance on the mental well-being of Chinese underprivileged-background students generally strengthen as mental well-being increases, such an effect is significant only if the mental well-being is at a relatively moderate level. Therefore, additional focus should be exerted on underprivileged-background students with the lowest level of mental well-being in Chinese schools, because the impact of aforementioned social-emotional skills may be still not available to them. Thirdly, given that no gender and age differences are reported to be significantly associated with the mental well-being of underprivileged-background students, the policymakers may proceed with SEL to foster the mental well-being of such a group without considering gender and age cohorts in Chinese primary and secondary education context.

To some extent, the current study makes up for the shortcomings of the existing literature, enriches the research regarding the development of the mental well-being of specific groups by cultivating corresponding social-emotional skills, and provides scientific evidence for conducting targeted SEL in Chinese primary and secondary school education. Nevertheless, this study also has some limitations need to be considered in the future. Above all, the cross-sectional design of SSES 2019 dataset may not allow for causal inferences, thus a trend analysis of the mental well-being of underprivileged-background students containing longitudinal factors, is warranted. Then, the measurement of social-emotional skills and mental well-being was uniquely based on students' perceptions in this study. Therefore, future research may include data from the perspectives of teachers, peers, and parents to decrease the potential social desirability effect, especially when concentrating on the low-SES groups. Finally, the participants of this study were sampled from China, thus future studies may perform cross-national comparisons among Eastern and Western countries as well as among Asian countries, exploring whether social-emotional skills distinctively influence the mental well-being of underprivileged-background students across various educational and cultural contexts.

Compliance with Ethical Standards

Ethical Standards

All study procedures involving human participants followed institutional and/or national research committee ethical standards and the 1964 Helsinki declaration and its later amendments or comparable ethical standards. The international organization OECD has completed the ethical norm for all participating countries/economies in the 2019 Survey on Social and Emotional Skills (SSES 2019).

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

Informed Consent

Informed consent for all individual participants in the study has been officially completed by the international organization OECD.

Data Availability Statement

The datasets generated during and/or analyzed during the current study are available in the 2019 Survey on Social and Emotional Skills (2019 SSES) repository, https://www.oecd.org/education/ceri/social-emotional-skills-study/

Received: January 8, 2024
Accepted: March 27, 2024
Published Online: April 1, 2024

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