

# The Impact of Coping Styles on the Mental Health of Outstanding Physical Education Students in Shanghai During the Normalization Epidemic: The Chain Mediation Role of Meaning in Life and Prosocial Behavior

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**Purpose:** The continuous spread of the epidemic has inflicted serious harm upon individual's mental well-being, and effective coping mechanisms are associated with positive mental health outcomes. Prosocial behavior and a sense of meaning in life can enhance individuals' subjective well-being, which can subsequently positively impact their mental health. Thus, in the context of epidemic prevention and control, this study investigates the relationship between the meaning in life, prosocial behavior, and coping styles of outstanding physical education students and the impact on their mental health.

**Methods:** The study involved a questionnaire survey on 498 outstanding physical education students, consisting of 297 boys (mean age = 13.16) and 201 girls (mean age = 12.87 years). Subsequently, the data was analyzed using the mediating effect and Bootstrap tests.

**Results:** The coping style positively predicted the meaning in life ( $\beta=0.294$ ) and prosocial behavior ( $\beta=0.293$ ). Conversely, mental health was predicted in a negative direction ( $\beta=-0.494$ ). Mental health negatively predicted prosocial behavior ( $\beta=-0.810$ ), although prosocial behavior positively predicted meaning in life ( $\beta=0.644$ ). Finally, prosocial behavior negatively predicted mental health ( $\beta=-0.513$ ). Additionally, the interplay between prosocial behavior and meaning in life is established in terms of both the individual and chain mediating roles.

**Conclusion:** This study demonstrates that coping styles during a normalized epidemic prevention and control situation directly impact the mental health of Shanghai's outstanding physical education students. Additionally, these coping styles indirectly influence mental health through the mediating effects of meaning in life and prosocial behaviors. Furthermore, meaning in life and prosocial behaviors act as chain mediators in this relationship.

**Keywords:** coping style, mental health, meaning in life, prosocial behavior

## Introduction

Since 2019, the global spread of the new coronavirus pandemic has significantly influenced social life and public health conditions across several countries and regions. As a prominent global economy and culture hub, Shanghai has encountered substantial difficulties throughout this global health crisis. As the epidemic progressed, different tiers of government implemented a range of preventive and regulatory measures, such as lockdowns and restrictions, to curb the spread of the virus.<sup>1</sup> These actions have had a profound impact on the normal functioning of society, resulting in the closure of schools and educational institutions, which in turn has necessitated the adoption of remote learning for students. Amidst the ongoing pandemic, outstanding sports students in Shanghai encounter unique challenges. Sports students usually depend on educational institutions and sports facilities, such as gyms, for their training and competitions.

Nevertheless, the closure of these venues and the cancellation of events have profoundly affected their sports careers, placing enormous strain on their physical and mental well-being.<sup>2,3</sup> Undoubtedly, the prolonged global epidemic has placed significant psychological pressure on society. Due to restrictions and limitations on social activities, individuals have been experiencing various unpleasant emotions such as loneliness, anxiety, and depression.<sup>4,5</sup> Hence, conducting research on the coping style of outstanding sports students in Shanghai amidst the prolonged pandemic holds significant practical and theoretical value in understanding their impact on mental health. Understanding the role of these two factors in mental health can provide a better insight into how students adapt psychologically in the context of a prolonged pandemic. Moreover, it can offer a scientific basis for developing effective psychological health interventions. Expanding upon this basis, the study focuses on meaning in life and prosocial behavior in the mental well-being of outstanding sports students in Shanghai.

Keyes and Lopez argue that mental health encompasses more than just the absence of mental illness or psychological disorders.<sup>6</sup> Instead, it refers to an individual's capacity to effectively face the challenges of life, form healthy interpersonal relationships, adapt to various stresses and changes, and achieve their maximum potential. Literature suggests that various factors influence athletes' mental well-being, including stress, competitiveness, setbacks, social support, interpersonal relationships, and coping strategies. Athletes' coping styles play a crucial role that directly impacts their performance, training outcomes, and competitive results.<sup>7</sup> Coping style refers to the psychological and behavioral approaches that individuals employ when confronted with stress, difficulties, or obstacles. People use strategies and techniques to address external events and internal emotions to resolve problems, alleviate stress, regulate emotions, and adapt to their environment.<sup>8</sup> The ability to effectively cope with stress, manage emotions, and employ stress management techniques is crucial for maintaining a state of psychological well-being.<sup>9</sup>

Furthermore, the self-determination theory emphasizes that individuals who are able to fulfill their demands for autonomy, competence, and relatedness are more inclined to use mature coping strategies and enhance their psychological well-being.<sup>10</sup>

An increasing number of experts have investigated the relationship between athletes' coping style and their mental health in the context of the pandemic. Zhang highlights that coping styles have a significant role in enhancing psychological well-being. When individuals are in risky situations, a suitable coping mechanism can weaken or buffer the adverse impact on their mental well-being.<sup>11</sup> Based on this, this study puts forward a hypothesis:

H1: Coping styles can predict the mental health of adolescent athletes.

The concept of meaning in life (MIL) refers to a personal and subjective experience where an individual perceives their life as comprehensible, driven by meaningful objectives, and ultimately worthwhile.<sup>12</sup> Moreover, it includes two dimensions: possessing and pursuing meaning.<sup>13</sup> Developing a strong sense of meaning in life can help reduce adverse mental health issues, enhance positive experiences, and improve symptoms of depression and anxiety.<sup>13,14</sup> During the pandemic, athletes faced restrictions such as training suspensions and the inability to participate in competitions. As a result, their pursuit of goals was diminished, and their sense of meaning in life decreased, ultimately impacting their mental health.<sup>15</sup> Furthermore, individuals can cultivate a mature coping style to have a profound and optimistic attitude toward life, allowing them to consistently strive for and uncover the meaning of life.<sup>16</sup> Research has shown that adopting positive coping styles can alleviate emotional distress and tension and promote an individual's sense of meaning in life. This, in turn, leads to increased self-satisfaction, emotional stability, and self-esteem, which favorably impact mental health.<sup>16,17</sup> Hence, coping techniques have the potential to accurately forecast the meaning of life, and the meaning of life can likewise impact mental well-being. This study proposed the hypothesis:

H2: The meaning in life mediates the relationship between coping styles and mental health.

Prosocial behavior refers to socially acceptable behaviors that benefit society and others. These include behaviors such as cooperation, sharing, and helping, which are voluntarily displayed by individuals. Prosocial behavior is considered a critical positive behavior and is essential for an individual's physical and mental well-being.<sup>18</sup> Prosocial

behaviors include acts of altruism and helpfulness, among others. Altruistic behaviors are actions that involve helping others without considering one's own safety or personal gain. Research has revealed a strong association between altruistic behaviors and mental health. Engaging in high levels of altruistic activities has been shown to improve individuals' psychological well-being, foster meaningful relationships, reduce stress and depression, and boost overall mental health.<sup>19</sup> In addition, there is an association between coping styles and prosocial behavior.<sup>20</sup> Simultaneously, employing effective coping strategies might enhance individuals' emotional regulation and social skills, enhancing their empathy and support towards others.<sup>21,22</sup> When individuals adopt positive coping strategies to deal with challenges and stresses, they are more likely to demonstrate an increased ability to adapt and maintain a positive mindset. Positive coping styles, such as caring for others, providing support, and engaging in social interactions, significantly impact prosocial behaviors. They also increase empathy and sympathy and build positive interpersonal relationships and a greater sense of social responsibility. These behaviors can contribute to improved mental health.<sup>23</sup> This depicts that coping techniques have a favorable linkage with prosocial behaviors and can also influence mental health. Consequently, this study formulated a hypothesis:

H3: Prosocial behavior acts as a mediator between coping styles and mental health.

The meaning in life significantly impacts one's values, professional identity, creativity, sense of belonging, and contribution to society.<sup>24</sup> Furthermore, individuals with a higher meaning in life are more likely to integrate into social groups and perform meaningful behaviors for the benefit of the group.<sup>25</sup> Research reports that there is a positive association between the intensity of an individual's meaning in life and their goals and pursuits. When confronted with the pressures of life, individuals possess the ability and self-confidence to face difficulties and manage challenges, thus improving their prosocial behavior. Furthermore, adopting positive attitudes and effective coping mechanisms in the face of adverse life events can lead to a greater sense of personal agency and autonomy. This, in turn, fosters increased self-confidence and a deeper understanding of the value and meaning of one's life.<sup>26,27</sup> Those actively seeking meaning in their lives are also more likely to exhibit prosocial behavior and care for others.<sup>28,29</sup> Simultaneously, engaging in prosocial behaviors can enhance individuals' ability to fulfill their basic psychological needs, leading to improved well-being, life satisfaction, and the maintenance of excellent mental health.<sup>30,31</sup> Therefore, the relationship between meaning in life and prosocial behavior shows a sequential pattern in predicting how coping methods contribute to mental health. This forms a mediating chain where indirect effects occur. Thus, this study proposes a Hypothesis:

H4: The meaning in life and prosocial behaviors mediate the relationship between coping styles and mental health.

## Methods

### Participants

Using the whole cluster sampling method, we recruited 500 sports students from all grades of the Shanghai Junior Sports School (between 6 April 2022 and 8 May 2022). Informed consent is signed by their parent or legal guardian. Following that, the questionnaires were distributed by the Questionnaire Star platform. Out of 500 students, 498 successfully completed the questionnaires. Based on the research design, the sample size was determined to be 366 after removing invalid samples. Invalid samples included those with incomplete answers, incomplete basic information, multiple choice responses, and consistent selection of all items on the same scale. The effective rate of the sample was 73.2%. Out of the remaining 366 participants, 208 were males, while the rest were female. The mean age of the sample was 12.96 years ( $SD=3.34$ ). The participants engaged in a variety of activities, including basketball, football, volleyball, badminton, table tennis, baseball, and softball. The Ethics Committee of Yangzhou University School of Medicine (YXYLL-2022-128) granted approval for this study. This research adheres to the principles outlined in the Declaration of Helsinki.

## Measurement of Coping Styles

The Coping Styles Scale for Secondary School Students, developed by Xiting Huang,<sup>32</sup> consists of 30 items categorized into six dimensions: problem-solving, help-seeking, avoidance, venting, fantasizing, and endurance. The dimension score is the sum of the items related to each dimension. A higher score indicates a greater tendency for the individual to adopt this coping style.<sup>32</sup> The instrument has good construct and scale validity, and the internal consistency coefficients are acceptable. The scale was subjected to reliability and validity assessments, resulting in a Cronbach's alpha coefficient of 0.923 and a KMO value of 0.922.

## Measurement of Mental Health

The Mental Health Scale for Chinese Middle School Students (MSSMHS) was developed by Jisheng Wang.<sup>33</sup> The scale has ten dimensions of obsessive-compulsive symptoms: paranoia, hostility, interpersonal sensitivity, depression, anxiety, sense of learning pressure, maladjustment, emotional instability, and psychological imbalance, encompassing a total of 60 questions. A five-point scale was used, with 1 representing the absence of the condition, 2 indicating a mild level, 3 indicating a moderate level, 4 indicating a severe level, and 5 indicating a very severe level. The dimension score is obtained by adding the items within each dimension. A higher score indicates poorer mental health in individuals. Regarding the reliability and validity of the scale, the Cronbach's alpha coefficient was 0.984, and the KMO value was 0.966.

## Measurement of Sense of Meaning in Life

Initially, the Meaning in Life scale was developed by Steger<sup>14</sup> and revised by Xinqiang Wang.<sup>34</sup> It assesses two dimensions (ie, Sense of Meaning in Life and Sense of Seeking Meaning). The scale is comprised of ten items, utilizing a 7-point scale where one signifies "completely inconsistent" and seven signifies "completely consistent". The higher the score, the stronger the meaning in life.<sup>34</sup> For reliability and validity of the scale, the Cronbach's alpha coefficient was 0.796, and the KMO value was 0.874.

## Measurement of Prosocial Behavior

The Prosocial Behaviour Tendency Scale was developed by Carlo and revised by Wenjun Cong.<sup>35</sup> The scale encompasses six dimensions: emotionality, compliance, altruism, anonymity, openness, and urgency, distributed across 23 items. It employs a 7-point scale, where higher scores reflect stronger prosocial behaviors. Regarding the reliability and validity of the scale, the Cronbach's alpha coefficient was 0.927, and the KMO value was 0.925.

## Data Analysis

The reliability of the questionnaire, descriptive statistics, and correlation analysis were examined in this study using SPSS 26.0. Additionally, the Process program and the Bootstrap method were used to test the mediation effect and preliminary validate the hypothesis of the relevant research.

## Results

### Common Method Variance

Before analyzing the data, we performed a test for common method bias. Harman's one-factor method yielded 20 factors with eigenvalues exceeding 1. The first component accounted for 33.02% of the variance, which falls short of the critical threshold of 40%. This study does not show any significant evidence of method bias.<sup>36</sup>

### Descriptive Statistics and Correlation Analysis

Table 1 presents the descriptive analysis, including means, standard deviations, and correlations of the study variables. Pearson's correlation coefficient was used to measure the correlation between coping style, meaning in life, prosocial behavior, and mental health. As shown in Table 1, a significant negative correlation ( $r = -0.448$ ,  $p < 0.01$ ) was found between coping style and mental health. This indicates that individuals with a higher level of coping style tend to have

**Table 1** Descriptive Statistics and Correlation Analysis of Coping Style, Meaning in Life, Prosocial Behavior, and Mental Health

Variable	M ± SD	1	2	3	4
1. Coping style	99.7±18.29	1			
2. Meaning in life	51.38±9.07	0.592**	1		
3. Prosocial behavior	84.81±13.62	0.647**	0.662**	1	
4. Mental health	97.43±39.96	-0.448**	-0.433**	-0.443**	1

Note: \*\* $p < 0.01$ .

Abbreviation: SD, standard deviation.

better mental health. In addition, a significant positive association was observed between coping style and meaning in life ( $r=0.592$ ,  $p<0.01$ ) and prosocial behavior ( $r=0.647$ ,  $p<0.01$ ). This indicates that persons with effective coping strategies are more likely to experience a better sense of meaning in life and engage in prosocial behavior. There was a significant negative correlation between mental health and meaning in life ( $r=-0.433$ ,  $p<0.01$ ) and prosocial behavior ( $r=-0.443$ ,  $p<0.01$ ). This suggests that those with lower levels of meaning in life and prosocial behavior are more prone to experience mental health problems. There was a significant positive correlation between meaning in life and prosocial behavior ( $r=0.662$ ,  $p<0.01$ ), indicating that meaning in life promotes prosocial behavior.

## Regression Analysis

Previous research has established that coping style, gender, age, participation in sports, and being an only child are significant factors that influence the mental well-being of outstanding physical education students. Therefore, it is imperative to consider gender, age, sports involvement, and sibling status as control variables. Regarding control variables, the coping style score significantly negatively affected the mental health score  $\beta=0.102$ ,  $p<0.01$  (Table 2). The findings indicated a positive correlation between coping style and mental health, with higher levels of coping style associated with better mental health. However, only age demonstrated statistical significance as a control variable, suggesting that age is an important variable to consider when examining the impact of coping style on mental health. This finding aligns with the characteristics of adolescence, a developmental stage during which students have not yet established. A chain mediation model was established using coping style as the independent variable and mental health as the dependent variable, with meaning in life and prosocial behavior as mediating variables (Table 3). The results found a significant direct effect on coping style, meaning in life, prosocial behavior, and mental health. The coping style positively predicted the meaning in life ( $\beta=0.294$ ,  $p<0.001$ ) and prosocial behavior ( $\beta=0.293$ ,  $p<0.001$ ), while the negative direction predicted mental health ( $\beta=-0.494$ ,  $p<0.0003$ ). The meaning in life positively predicted prosocial

**Table 2** Hierarchical Regression Results Table

Variable	E	STE	E	STE	E	STE	E	STE	E	STE
Constant	194.976		197.349		145.155		130.32		130.473	
Coping style	-0.978	0.102	-0.978	0.102	-0.909	0.097	-0.907	0.097	-0.905	0.098
Gender			-1.664	3.76	-2.069	3.556	-2.213	3.559	-2.211	3.563
Age					3.541	0.533	3.263	0.599	3.304	0.616
Programs							3.293	3.231	3.251	3.239
Child									-0.268	0.926
R <sup>2</sup>	0.201		0.201		0.288		0.29		0.121	
F	91.352**		45.673		24.017**		36.85		29.422	
$\Delta R^2$	0.198		0.001		0.09		0.002		0.001	
$\Delta F$	91.352		0.196		44.145		1.178		0.593	

Note: \*\* $p < 0.01$ .

Abbreviations: E, coefficient; STE, standardized coefficient.

**Table 3** Path Analysis

	SC	SE	p value
Coping style→Meaning in life	−0.294	0.021	***
Coping style→Prosocial behavior	0.293	0.033	***
Coping style→Mental health	−0.494	0.135	***
Meaning in life→Prosocial behavior	−0.644	0.066	***
Meaning in life→Mental health	−0.810	0.277	0.004
Prosocial behavior→Mental health	−0.513	0.195	0.009

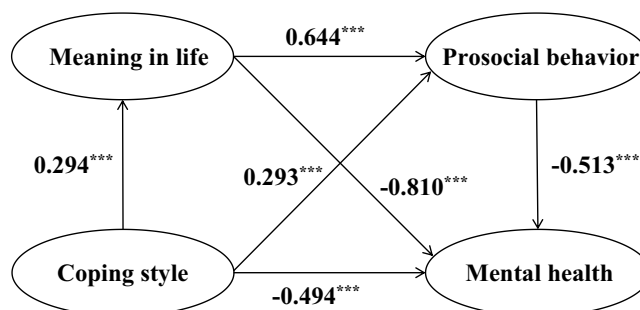
**Note:** \*\*\* $p < 0.001$ .

**Abbreviations:** SC, standardization coefficient; SE, standard error.

behavior ( $\beta = 0.644$ ,  $p < 0.001$ ), but the negative direction predicted mental health ( $\beta = -0.810$ ,  $p = 0.004$ ). Finally, prosocial behavior negatively predicted mental health ( $\beta = -0.513$ ,  $p = 0.009$ ) (Figure 1). A stable perspective on life and the world, as well as their psychology, will change rapidly with age.

## Mediating Effect Analysis

This study examines the relationship between coping style (independent variable) and mental health (dependent variable), with two intermediary variables: meaning in life and prosocial behavior. Initially, the Model 6 model was selected based on the confidence interval method (Table 4). The results indicate that the total effect value was  $-0.978$ , the direct effect was  $-0.493$ , and the total mediation effect value was  $-0.484$ . The confidence interval test examined the relationship between excellent sports students' mental health and their coping style, meaning in life, and prosocial behavior. The results showed that both the mediation effects of "coping style - meaning in life - mental health" and "coping style - prosocial behavior - mental health" had a 95% confidence interval that did not include zero. This suggests that both meaning in life and prosocial behavior act as mediators in this relationship. In the mediation analysis, the meaning in life variable coefficient was  $-0.238$ , explaining 24.3% of the total effect. Similarly, the coefficient for the prosocial conduct variable was  $-0.15$ , explaining 15.3% of the total effect. The mediating influence of the meaning in life is evident and explains a greater proportion. Pathway analysis reveals that individuals who embrace positive coping methods experience a heightened sense of meaning in life, leading to a decrease in the prevalence of mental health issues. Individuals with a greater level of coping style exhibit improved prosocial conduct and have healthier psychology. Therefore, the present study demonstrates that H2 and H3 have been verified. The analysis revealed that the mediation effect of "coping style-meaning in life-prosocial behavior-mental health" has a 95% confidence interval of  $(-0.18, -0.025)$ . It is evident that the confidence interval does not include the value of 0. This discovery also serves to corroborate the idea of H4. Path analysis reveals that a positive coping style can enhance an individual's sense of meaning in life and their inclination towards prosocial conduct. Furthermore, enhancing these three factors can effectively decrease the probability of experiencing mental health issues.



**Figure 1** Mediation model of the influence of coping style on mental health.

**Note:** \*\*\* $P < 0.001$ .



**Table 4** Mediating Effects of Coping Style and Mental Health on the Relationship Between Meaning in Life and Prosocial Behavior

	Effect	BootSE	BootLLCI	BootULCI	
Direct effect	−0.493	0.135	−0.7596	−0.2273	50.4%
Coping style→Meaning in life→Mental health	−0.238	0.101	−0.44	−0.05	24.3%
Coping style→Prosocial behavior→Mental health	−0.15	0.061	−0.273	−0.039	15.3%
Coping style→Meaning in life→Prosocial behavior→Mental health	−0.097	0.039	−0.18	−0.025	10%
Total effect	−0.978	0.102	−0.697	−0.295	

**Abbreviations:** CI, confidence interval; SE, standard error.

## Discussion

### Relationship Between Coping Styles and Mental Health

The study examined the relationship between coping style and mental health in outstanding physical education students, taking into account the context of epidemic prevention and control. Additionally, the study aimed to explore the underlying mechanisms that contribute to this association. The findings indicate that coping techniques have a significant detrimental impact on the mental health scores of outstanding physical education students in primary and secondary schools, consistent with previous research.<sup>37</sup> The sudden onset of a significant epidemic induces feelings of depression and anxiety,<sup>38</sup> resulting in severe detriment to an individual's physical and mental health. Individual coping strategies play an essential role in managing stress and substantially impact physical and mental health.<sup>39</sup> Developing mature coping styles can effectively relieve psychological pressure caused by adverse events, thus reducing the likelihood of experiencing psychological problems.<sup>40</sup> On the contrary, immature coping styles, such as avoiding acceptance and self-blaming, are associated with poor mental health.<sup>40</sup> Inadequate coping mechanisms serve as essential predictors of COVID-19-related dread and contribute to heightened levels of depression, anxiety, and stress.<sup>41</sup> Primarily, it signifies the presence of an individual's comprised mental state.<sup>41</sup> The coping style scores of elite sports students were found to be comparatively lower, while their mental health scores were relatively higher in this study. This could be attributed to the suspension or cancellation of the competition during the epidemic prevention and control period. Athletes had an interruption in their competition status, which hindered their ability to concentrate on training as they normally would. As a result, they suffered psychological consequences and may have faced unpleasant psychological states such as frustration and powerlessness. In addition, they may adopt immature coping mechanisms such as avoidance of acceptance, self-blame, and emotional detachment, resulting in diminished mental health.

This study demonstrated that in the context of routine epidemic prevention and management, outstanding physical education students in primary and secondary schools exhibited inadequate coping strategies, resulting in their lowered levels of mental well-being. Therefore, mental health education must enhance the guidance and correction of athletes' coping strategies, strengthen their coping styles and attitudes when confronted with stressful situations, and enhance their overall mental well-being.

The mediating role of the meaning in life

Numerous studies argue that the meaning in life serves as a mediator between coping styles and mental health. Sawyer believes that meaning in life serves as a protective factor for mental health. Additionally, the conscious choice of mature coping can relieve mental depression, achieve psychological balance, enhance the meaning of life, and improve overall physical and mental health.<sup>42</sup> The meaning in life refers to a person's purpose, direction, and attitude, and it is considered a high-level psychological experience.<sup>43</sup> Tang emphasized that having meaning in life is necessary for mental health.<sup>44</sup> Experiencing this state of being will evoke feelings of elation, spirit, and happiness in an individual. Unhealthy psychological states, such as helplessness and loneliness, will occur. In the time of stress and stressful events, coping styles can significantly affect the meaning of life. Athletes, being a high-achieving group, are faced with enormous pressure, including daily training, competition pressure, concerns about underperforming and getting injured, and the pressure exerted by coaches and their coaching methods. Mastering effective coping strategies for managing pressure has become crucial for athletes to achieve optimal sports performance.<sup>45</sup> Additionally, it is also an essential part of

developing athletes' happiness, suggesting that athletes who adopt mature coping styles have a higher sense of life meaning.<sup>43</sup> Based on this, meaning in life plays a mediating role in the influence of coping style on mental health.

## The Mediating Role of Prosocial Behavior

The study findings indicate a considerable intermediary influence of prosocial behavior on the relationship between coping style and mental health. The inverse relationship between prosocial behavior and psychological health suggests that engaging in prosocial behavior serves as a buffer for psychological well-being, which aligns with the findings of prior research.<sup>46</sup> The primary and middle school phases are essential for cognitive and emotional development. During this stage, students have not formed a perfect cognitive system. They may have problems such as weak ideology and are easily affected by social public opinion.<sup>47</sup> During this critical physical and mental development period, it is important to cultivate good prosocial behavior in individuals. This benefits their social development and improves their personal outlook, enhances the effectiveness of moral education, and promotes the development of students' mental health.<sup>48</sup> During the process of managing the epidemic, when outstanding physical education students in primary and secondary schools encounter problems such as training cessation, competition delay, and home isolation, they often experience adverse psychological and behavioral reactions following personal trauma, which can affect their ability to engage in prosocial behavior.

The coping style and prosocial behavior of middle school students have a strong positive link, consistent with the findings of the predecessors.<sup>49</sup> Coping styles can be divided into mature and immature coping styles, each of which has different impacts on an individual's psychology and behavior. Outstanding physical education students with mature coping styles are more adept at seeking assistance, exercising patience, and employing mature coping strategies to solve the problem. As a result, their level of interpersonal harmony is significantly higher than that of students who employ immature coping mechanisms. This demonstrates that a mature coping style can assist individuals in alleviating tension and fostering a positive cycle to some degree. It can facilitate the rational resolution of problems and indirectly cultivate prosocial conduct among elementary and secondary school pupils. Therefore, prosocial activities act as a mediator between coping methods and mental health.

### Chain mediation role of the meaning in life and prosocial behavior

This study found that there is a relationship between prosocial behavior and meaning in life, which in turn affects coping style and mental health. The mediation effect size of this relationship is 10%. The theory of social cognition posits that behavior, cognition, individual factors, and environmental factors mutually influence each other.<sup>50</sup> The actions of outstanding physical education students during sports activities and competitions have a twofold impact on cognition. On the one hand, their capacity to overcome setbacks and handle pressure influences their cognitive functioning. On the other hand, the overall environment of their team also affects the cognitive abilities of individual team members. Furthermore, the distinctive essence of "courage" and "perseverance" in athletics cultivates a mature coping style among elementary and middle school students, enabling them to develop effective strategies to enhance the significance of their lives. Outstanding physical education students get support and encouragement from coaches, teachers, and families, which helps them overcome psychological anxiety and stress during the expected epidemic and significantly enhances their recent life goals and the significance of life. From the final result, students who possess a strong sense of meaning in life may have a correct outlook on life, values, and worldview. They usually use learning, competition, and life experiences to acquire mastery in social interactions and improve their prosocial behavior. This process promotes the development of a cooperative mindset and mental health.

Research has indicated that persons who possess a heightened sense of purpose in life are more inclined to actively engage with and contribute meaningfully to the collective. Thus, within the normality of the epidemic, outstanding physical education students, who possess a heightened feeling of life's significance, formulated their objectives and aspirations during this period. When confronted with the unpredictable elements introduced by the pandemic, they possess the courage to confront and enhance their ability to adapt to society. Hence, it is imperative to integrate existential purpose and prosocial conduct into the future educational curriculum of primary and secondary schools. This holistic approach would not only enhance the psychological well-being of students but also foster their moral development.



Overall, it is evident that coping style, meaning in life, and prosocial behavior have a substantial impact on individuals' mental health. Additionally, coping styles might indirectly influence mental health by influencing the perception of meaning in life or engagement in prosocial behavior. Furthermore, aside from these behaviors, there are additional aspects that might impact an individual's mental well-being, including self-control, emotional stability, interpersonal communication, and more. Several signs have been examined by previous researchers, while others remain unexplored. This study had limits. Thus, only a few indicators were included. In the future, other indications that were not researched could be used.

The findings of this study have the potential to provide valuable guidance to the government, society, and educational institutions. For instance, the government can incorporate mental health indicators such as coping styles, sense of meaning in life, and prosocial behaviors into the evaluation of education policies. Additionally, in physical training, it is crucial to not only focus on students' athletic performance but also prioritize their mental well-being. Regular mental health education and evaluation should be conducted for students. Furthermore, the findings of the study can assist local coaches in mitigating mental health issues among outstanding student-athletes. Furthermore, schools have the option to seek assistance from the community in order to enhance the quality of mental health services provided to students.

## Research Limitations and Prospects

Additionally, this study has limitations. The study used cross-sectional data to explore the association between variables. Future research might use longitudinal studies to confirm the longitudinal relationship between coping styles, meaning in life, prosocial behaviors, and mental health. Additionally, while meaning in life and prosocial behaviors serve as mediators in the model of coping styles and mental health, varying baseline levels of meaning in life and prosocial behaviors may have distinct effects on an individual's mental health. In future research, we can enhance the model by including various baseline levels of meaning in life and prosocial behavior for a more comprehensive analysis and discussion. Additionally, it is important to note that this study used a survey approach, which may have been influenced by subjective factors, such as individuals' unwillingness to share their psychological issues. In the future, we can explore the integration of neuroscience with other fields to perform experimental research. This approach aims to enhance objectivity and minimize subjectivity, hence enhancing the reliability and validity of the collected data. Furthermore, the sample used in this study was drawn solely from a single district school, which resulted in a lack of representativeness. Further investigations are required to verify if the insights found may be generalized to schools in other districts. Future research should investigate how changes in the epidemic affect the mental health of outstanding sports students in various countries. Additionally, it is important to note that this study primarily examined adolescent exceptional sports students and did not encompass the adult athlete group. In order to validate the model in the future, it is necessary to increase the size of the research population.

## Conclusion

This study investigated the influence of coping methods on the mental well-being of outstanding physical education students during the normalization phase of epidemic prevention and control. Additionally, the study examined the role of meaning in life and prosocial behavior as mediating variables in the model. The findings indicated that a positive coping style had a significant predictive impact on mental well-being. Moreover, the coping style could indirectly influence an individual's mental health by means of the mediating effects of finding meaning in life and engaging in prosocial behaviors. Positive coping techniques facilitated the enhancement of life's purpose, so strengthening prosocial conduct and ultimately reducing the likelihood of mental health issues. These empirical findings can serve as guidance for educators in preventing and intervening in mental health issues among outstanding physical education students.

## Data Sharing Statement

The raw data supporting the conclusions of this article will be made available by the corresponding author without any reservations.

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## Disclosure

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