

**THE INFLUENCE OF NATURE RELATEDNESS
ON CHARACTER STRENGTHS AMONG
CHINESE AND MALAYSIAN UNIVERSITY
STUDENTS**

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UNIVERSITI SAINS MALAYSIA

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**THE INFLUENCE OF NATURE RELATEDNESS
ON CHARACTER STRENGTHS AMONG
CHINESE AND MALAYSIAN UNIVERSITY
STUDENTS**

by

ZUO CHUNRONG

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Yours sincerely,

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LIST OF ABBREVIATIONS

M	Mean
SD	Standard Deviation
NR	Nature Relatedness
MF	Mindfulness
TMF	Trait Mindfulness
CS	Character Strengths
SPSS	Statistical Package for the Social Sciences
AMOS	Analysis of Moment Structures
USM	Universiti Sains Malaysia
IPS	Institut Pengajian Siswazah
PPIP	Pusat Pengajian Ilmu Pendidikan
APA	American Psychological Association
H0	Null Hypothesis
H1	Alternative Hypothesis

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**PENGARUH PERKAITAN ALAM SEMULA JADI TERHADAP
KEKUATAN KARAKTER DALAM KALANGAN PELAJAR UNIVERSITI
CINA DAN MALAYSIA**

ABSTRAK

Kekuatan karakter adalah trait positif dalam pemikiran, emosi, dan tingkah laku individu. Menyelidiki kekuatan karakter pelajar universiti dapat mendedahkan kunci untuk meningkatkan kesejahteraan psikologi dan kebahagiaan mereka. Kajian ini mengkaji pengaruh hubungan dengan alam terhadap kekuatan karakter dalam kalangan pelajar universiti, dengan fokus pada tiga universiti di Cina dan satu universiti di Malaysia. Pertama, versi bahasa Cina Skala Hubungan dengan Alam telah disemak menggunakan data daripada 692 pelajar universiti Cina. Proses semakan ini melibatkan terjemahan dan terjemahan semula, penilaian kefahaman item (N=64 untuk penilaian pertama dan N=40 untuk penilaian kedua), analisis item (sampel 1, N=346), analisis faktor eksploratori (sampel 1, N=346), analisis faktor pengesahan (sampel 2, N=346), serta analisis kesahan dan kebolehpercayaan (sampel 2, N=346). Kedua, kedua-dua versi bahasa Cina dan Inggeris Skala Hubungan dengan Alam, Borang Pendek Soal Selidik Kesedaran Lima Dimensi, dan Inventori Tiga Dimensi Kekuatan Karakter digunakan untuk menilai hubungan dengan alam, kesedaran ciri, dan kekuatan karakter dalam kalangan 386 pelajar Cina dan 247 pelajar Malaysia, dengan analisis perbezaan demografi. Ketiga, pengaruh hubungan dengan alam terhadap kekuatan karakter telah dianalisis. Akhirnya, kesan mediator kesedaran ciri dalam hubungan ini turut dianalisis. Hasil kajian mendedahkan bahawa versi bahasa Cina Skala Hubungan dengan Alam menunjukkan kesahan yang tinggi (hasil analisis faktor pengesahan: $\chi^2/df=2.508$, NFI=0.888, RFI=0.863, IFI=0.934, TLI=0.918, CFI=0.933, RMSEA=0.061; korelasi dengan Skala Penyertaan Alam

dalam Diri, $p < 0.001$), dan kebolehpercayaan yang tinggi (NR-self = 0.88, NR-perspective=0.75, NR-experience=0.71, Jumlah=0.91). Perbezaan signifikan dalam keterhubungan dengan alam, sifat kesedaran, dan kekuatan watak didapati dalam kalangan pelajar universiti Malaysia merentasi faktor demografi (jantina, tahun akademik, status anak tunggal, lokasi keluarga) dan pemboleh ubah lain (pengalaman kesedaran, aktiviti, dan pengalaman emosi dalam alam semula jadi). Pelajar universiti Cina menunjukkan perbezaan yang signifikan dalam sifat-sifat ini hanya dari segi pengalaman emosi dalam alam semula jadi. Perbezaan signifikan juga dikenal pasti antara pelajar universiti di Cina dan Malaysia (pengalaman kesedaran, pengalaman emosi di alam, alam dalam diri, kesedaran ciri, kekuatan karakter, $p < 0.001$). Bagi pelajar universiti Cina, analisis regresi menunjukkan bahawa hubungan dengan alam secara signifikan dan positif meramalkan kedua-dua kekuatan karakter (Kesan=0.28, $p < 0.001$) dan kesedaran ciri (Kesan=0.18, $p < 0.001$), dengan kesedaran ciri juga secara signifikan dan positif meramalkan kekuatan karakter (Kesan=0.41, $p < 0.001$), di mana kesan langsung (0.28) dan kesan mediator (0.08) menyumbang 77.78% dan 22.22% daripada jumlah kesan (0.36). Khususnya, dimensi mengamati dan menggambarkan dalam kesedaran ciri memainkan peranan mediator ($\chi^2 / df = 2.46$, NFI=0.969, RFI=0.929, IFI=0.982, TLI=0.956, CFI=0.981, RMSEA=0.062). Bagi pelajar universiti di Malaysia, analisis regresi menunjukkan bahawa hubungan dengan alam secara signifikan dan positif meramalkan kedua-dua kekuatan karakter (Kesan=0.47, $p < 0.001$) dan kesedaran (Kesan=0.56, $p < 0.001$), dengan kesedaran ciri secara signifikan dan positif meramalkan kekuatan karakter (Kesan=0.49, $p < 0.001$), di mana kesan langsung (0.47) dan kesan mediator (0.27) menyumbang 63.51% dan 36.49% daripada jumlah kesan (0.74). Khususnya, dimensi mengamati, menggambarkan, dan tidak-reaktiviti memainkan peranan mediator ($\chi^2 / df = 1.838$, NFI=0.982, RFI=0.950,

IFI=0.992, TLI=0.976, CFI=0.991, RMSEA=0.058). Kajian ini menyediakan versi standard bahasa Cina bagi Skala Hubungan dengan Alam, memudahkan perbandingan merentas budaya, dan mewujudkan asas teori untuk membangunkan intervensi kesedaran berasaskan alam untuk meningkatkan kekuatan karakter dalam kalangan pelajar universiti.

**THE INFLUENCE OF NATURE RELATEDNESS ON CHARACTER
STRENGTHS AMONG CHINESE AND MALAYSIAN UNIVERSITY
STUDENTS**

ABSTRACT

Character strengths are positive traits in an individual's thoughts, emotions, and behaviors. Exploring the character strengths of university students can further reveal the key to enhancing their psychological well-being and happiness. This study investigated the influence of nature relatedness on character strengths among university students, focusing on three Chinese universities and one Malaysian university. First, the Chinese version of Nature Relatedness Scale was revised using data from 692 Chinese university students. The revision process involved translation and back-translation, evaluation of item comprehensibility (N=64 for the first evaluation and N=40 for the second), item analysis (sample 1, N=346), exploratory factor analysis (sample 1, N=346), confirmatory factor analysis (sample 2, N=346), validity and reliability analysis (sample 2, N=346). Second, both the Chinese and English versions of the Nature Relatedness Scale, Five Facet Mindfulness Questionnaire-Short Form, and Three-dimensional Inventory of Character Strengths were administered to assess nature relatedness, trait mindfulness, and character strengths among 386 Chinese and 247 Malaysian students, with demographic differences analyzed. Third, the influence of nature relatedness on character strengths was examined. Finally, the mediating effect of trait mindfulness on this relationship was analyzed. The results revealed that the Chinese version of the Nature Relatedness Scale demonstrated high validity ($\chi^2/df=2.508$, NFI=0.888, RFI=0.863, IFI=0.934, TLI=0.918, CFI=0.933, RMSEA=0.061; correlation with the Inclusion of Nature in the Self Scale, $p<0.001$), and high reliability (NR-self = 0.88, NR-perspective=0.75,

NR-experience=0.71, Total=0.91). Significant differences in nature relatedness, trait mindfulness, and character strengths were found among Malaysian university students across demographic factors (gender, academic year, only-child status, family location) and other variables (mindfulness experience, activities, and emotional experiences in nature). Chinese university students showed significant differences in these traits only in terms of emotional experiences in nature. Significant differences were also identified between Chinese and Malaysian university students (mindfulness experience, emotional experience in nature, nature in the self, trait mindfulness, character strengths, $p < 0.001$). For Chinese university students, regression analysis showed that nature relatedness significantly and positively predicted both character strengths (Effect=0.28, $p < 0.001$) and trait mindfulness (Effect=0.18, $p < 0.001$), trait mindfulness also significantly and positively predicted character strengths (Effect=0.41, $p < 0.001$), with the direct effect (0.28) and mediating effect (0.08) account for 77.78% and 22.22% of the total effect (0.36). Specifically, the observing and describing dimensions of trait mindfulness played a mediating role ($\chi^2 / df = 2.46$, NFI=0.969, RFI=0.929, IFI=0.982, TLI=0.956, CFI=0.981, RMSEA=0.062). For Malaysian university students, regression analysis revealed that nature relatedness significantly and positively predicted both character strengths (Effect=0.47, $p < 0.001$) and mindfulness (Effect=0.56, $p < 0.001$), trait mindfulness significantly and positively predicted character strengths (Effect=0.49, $p < 0.001$), with the direct effect (0.47) and mediating effect (0.27) account for 63.51% and 36.49% of the total effect (0.74). Specifically, the observing, describing, and non-reactivity dimensions played a mediating role ($\chi^2 / df = 1.838$, NFI=0.982, RFI=0.950, IFI=0.992, TLI=0.976, CFI=0.991, RMSEA=0.058). This study provides a standardized Chinese version of the Nature Relatedness Scale, facilitates cross-cultural comparisons, and establishes a

theoretical basis for developing nature-based mindfulness interventions to enhance character strengths among university students.

CHAPTER 1

INTRODUCTION

1.1 Overview

Character strengths refer to positive personality traits that manifest in an individual's thoughts, emotions, and behaviors, benefiting both the individual and others. Within the realm of positive psychology, character strengths are closely intertwined with indicators of psychological well-being, including happiness, the flow experience, self-actualization, subjective well-being, and life satisfaction (Park et al., 2004; Peterson & Seligman, 2006). Moreover, character strengths play a significant role in various aspects of individuals' lives. They contribute to personal growth and academic performance (Park et al., 2004), career development, and job performance (Harzer & Ruch, 2015), as well as social interactions and interpersonal relationships (Littman-Ovadia & Steger, 2010). Therefore, the exploration and cultivation of character strengths hold immense significance and value. By discovering and nurturing these strengths, individuals can effectively tap into their full potential.

In addition to studying the role of character strengths, researchers also investigate the development patterns and intervention strategies of character strengths. In terms of the developmental research of character strengths, some researchers have found that character strengths can be enhanced and developed through education and training during childhood and adolescence, as well as continued stable development and application during adulthood (Park & Peterson, 2006). As university students are in a transitional period between adolescence and adulthood, the development of their character strengths is crucial for their growth and development. In terms of intervention research on character strengths, some studies have shown that individual character strengths can be developed and cultivated through various training and

intervention methods, including: Positive psychology intervention (Proyer, et al., 2015), Social support (Lavy, et al., 2014), Education and training based on character strengths (Lavy, et al., 2014). In order to provide more scientific and accurate guidance for the education and training of character strengths, researchers need to delve into the factors that influence the development of character strengths.

In addition to examining the role of character strengths, researchers also explore their developmental patterns and intervention strategies. Regarding the developmental aspect, studies have revealed that character strengths can be nurtured and cultivated through education and training during childhood and adolescence, as well as continued growth and application throughout adulthood (Park & Peterson, 2006). As university students undergo a transitional phase between adolescence and adulthood, the development of their character strengths becomes crucial for their personal growth and overall development.

To provide more precise and evidence-based guidance for character strengths education and training, researchers need to delve deeper into the factors influencing their development and gain a better understanding of the mechanisms through which character strengths impact individuals. Therefore, the main focus of this research is to explore the influence of nature relatedness on the character strengths of university students, and to reveal the mechanism of character strengths through constructing a mediation model. The aim of this research is to provide a basis for the cultivation of character strengths among university students.

1.2 Research Background

1. The International Positive Psychology Association and the governments of China and Malaysia place significant importance on the character strengths of university students.

Since its establishment in 2007, the International Positive Psychology Association (IPPA) has been dedicated to promoting the focus on character strengths globally within the field of positive psychology. Increasingly, countries worldwide recognize the importance of training and developing character strengths.

The Chinese government has shown great attention to the cultivation of character strengths in university students. Since the first China International Conference on Positive Psychology was held at Tsinghua University in 2010, positive psychology has officially become part of the field of psychology in China, attracting significant attention to topics like character strengths and happiness. In 2014, the Tsinghua University Positive Psychology Research Center was established, becoming the first research center in China dedicated to positive psychology. In October 2017, Chinese President Xi Jinping emphasized the need to strengthen the development of the social psychological service system and foster a societal mindset characterized by self-esteem, confidence, rationality, peace, and positivity (Xi, 2017). In 2018, the Ministry of Education of the People's Republic of China issued the Guidelines for Psychological Health Education for University Students, emphasizing the need to standardize the development of psychological health education and counseling services and cultivate students' self-esteem, confidence, rationality, peace, and positive attitudes (Ministry of Education of the People's Republic of China, 2018)

The Malaysian government also places great emphasis on cultivating character strengths in university students, which can be seen through the functions of the Ministry of Higher Education Malaysia, the Malaysian Psychological Association

(PSIMA), and the Malaysian Positive Psychology Association (MPPA). The Ministry of Education Malaysia proposed the initiative of fostering positive school attributes in the Malaysia Education Blueprint 2013-2025 (Ministry of Education Malaysia, 2013) . The Malaysian Ministry of Higher Education also promotes the cultivation of positive psychology in university students. PSIMA collaborates with the Malaysian government to encourage cooperation, coordination, and partnerships among psychology departments in Malaysian universities, which will contribute to the development of positive psychology in Malaysian students. MPPA aims to contribute to the creation of a mentally healthier society and the growth of individuals and organizations by maximizing their strengths, potential, and well-being (Malaysian Psychological Association, 2024).

In summary, the focus on character strengths among university students has become an important topic of concern for both the Chinese and Malaysian governments, reflecting the growing societal demand for psychological research that enhances mental well-being. In China, the government's initiatives, such as the inclusion of psychological education in the university curriculum, and the establishment of institutions like the Tsinghua University Positive Psychology Research Center, underline the importance of cultivating character strengths for university students. Similarly, Malaysia's commitment is evident through the Malaysia Education Blueprint 2013-2025 and the active collaboration of associations like PSIMA and MPPA to promote positive psychology in higher education. However, while both countries emphasize the development of character strengths, research on the relationship between character strengths and other psychological variables, such as well-being, resilience, and academic performance, primarily focuses on the effects of these strengths. Little attention has been given to the underlying factors that promote

changes in character strengths. In particular, the mechanisms that drive the development and enhancement of character strengths in university students remain underexplored, with existing studies primarily investigating the outcomes of possessing strong character traits rather than the processes that facilitate their growth (Yang, 2022).

2. Western psychologists have shown significant interest in the research of character strengths, but there is a lack of studies investigating the mechanisms through which character strengths influence individual s.

A large number of positive psychologists are paying attention to the field of character strengths, which presents a rapidly and robustly growing research prospect. At the theoretical research level, many studies have shown that character strengths can positively predict individuals' emotions, attitudes and behaviors (Peterson et al., 2007), and have beneficial associations with many outcomes in the organizational domain (Weber et al., 2016), such as promoting employees' work performance and work engagement (Littman-Ovadia & Lavy, 2016) and so on. At the practical research level, character strengths interventions are widely applied in fields such as education, psychological counseling, medical health and corporate management (Bressoud et al., 2018; Duan & Bu, 2017; Littman-Ovadia et al., 2013; Boe, 2016). Therefore, character strengths are an important resource for individuals, conducive to achieving their psychological well-being and a good life. Thus, research on character strengths has important significance at both theoretical and practical levels.

Currently, research on the character strengths of university students in academia can be categorized into the following areas: definition and classification of character strengths, measurement tools for character strengths, relationships between character strengths and other variables, cultivation and development of character strengths and educational applications of character strengths. Definition and

classification of character strengths: research aims to define and classify character strengths, including identifying the dimensions and classification methods of character strengths (Peterson & Seligman, 2006). Measurement tools for character strengths: research focuses on the development and improvement of measurement tools for character strengths, including questionnaires and interviews (Peterson & Seligman, 2006; Park et al., 2004). Relationships between character strengths and other variables: research examines the relationships between character strengths and other variables such as life satisfaction, health, interpersonal relationships and academic performance (Proyer et al., 2013; Seligman et al., 2005). Cultivation and development of character strengths: research explores methods and strategies to discover, inspire, and cultivate students' character strengths (Sheldon & King, 2001; Waters, 2011). Educational applications of character strengths: research investigates the application of character strengths in education, including curriculum design, teaching methods, evaluation and feedback (Seligman et al., 2009; Niemiec & Wedding, 2014).

In summary, in Western research, the focus on character strengths in relation to other variables primarily centers around the impact of character strengths, while there is relatively little emphasis on factors that promote changes in character strengths. There is a lack of research on the influencing factors of character strengths.

3. A Comparative Study of Character Strengths, Nature Connectedness, and Mindfulness in Chinese and Malaysian University Students

3a. Comparative Research on Character Strengths in Chinese and Malaysian University Students

Researchers have conducted comparative studies on character strengths in Chinese and Malaysian university students, revealing the following similarities and differences:

(1) Measurement Methods

In the measurement of character strengths among Chinese university students, Duan et al. (2012) developed the Chinese Virtues Questionnaire (CVQ-96) and Three-dimensional Inventory of Character Strengths (TICS) specifically adapted for the Chinese cultural context, by refining the VIA-IS (Values in Action Inventory of Strengths) developed by Peterson and Seligman (2006). On the other hand, Pimthong (2015) surveyed character strengths among Malaysian undergraduate students, using a selection of 15 items adapted from the VIA-IS (Peterson & Seligman, 2006). Yong et al., (2022) studied personality traits of Malaysian university students using the Big Five personality model and other relevant assessment tools, but not specific measures of character strengths.

(2) Levels and Characteristics of Character Strengths

Studies on character strengths among Chinese university students revealed that the most common character strengths are authenticity, kindness, compassion, and fairness, creativity, insight, bravery, social intelligence, and humility are less frequently reported (Zhang, 2009). Other research identified the top five character strengths as kindness, fairness, gratitude, teamwork, and integrity, while the bottom five were self-regulation, love of learning, insight, creativity, and social intelligence (Li, 2016). In contrast, the study on personality traits among Malaysian university students (Yong et al., 2022) did not specify the specific characteristics of character strengths, but primarily focused on the impact of the Big Five personality factors.

(3) Related Research

Regarding related research on character strengths among Chinese university students, the focus has mainly been on exploring the association between character strengths and subjective well-being (Li, 2015; Zhou & Liu, 2011), as well as the

relationships between character strengths and mindfulness, psychological well-being, health behaviors, parenting styles, psychological harmony, among other factors (Yang, 2022; Duan et al., 2012). In contrast, research on Malaysian university students indirectly involves the association between personality traits and other variables, such as internet ethics (Karim et al., 2009), social anxiety (Abdollahi et al., 2022), values (Mustapha & Hyland, 2017), entrepreneurial potential (Rofa, 2022), smartphone addiction (Adawiyah, 2023), among others.

(4) Intervention Studies

In conclusion, past research has focused more on character strengths in Chinese university students, while direct studies on character strengths in Malaysian university students are scarce. There is a lack of comparative research on character strengths between Chinese and Malaysian university students, and a deficiency in studying the influencing factors of character strengths in both populations.

3b. Comparative Research on Nature Relatedness in Chinese and Malaysian University Students

Comparative studies on nature relatedness in Chinese and Malaysian university students reveal the following similarities and differences:

(1) Measurement Methods

Li (2016) modified the Connectedness to Nature Scale (Mayer & Frantz, 2004) to create a Chinese version and validated its reliability and effectiveness in measuring connectedness to nature among Chinese university students. Jing (2018) adapted the Nature Relatedness Scale by Nisbet et al. (2009) and the New Environmental Paradigm Scale (NEPS) by Dunlap et al. (2000) to survey Chinese-Malaysian university students, but the study did not include students from other Malaysian ethnicities, which is a limitation.

(2) Related Research

Researchers have explored the associations between nature relatedness and various aspects of university students' lives, including their happiness, self-esteem, depressive emotions, life satisfaction, pro-environmental behavior, body appreciation, and sense of life meaning. For instance, C. Y. Wang and C. Z. Wang (2018) identified a correlation between nature relatedness and self-esteem and depressive emotions. Gan et al., (2023) demonstrated that mindfulness influences college students' life satisfaction, with some mediating roles. Chen and Huang (2022) studied the impact of awe on pro-environmental behavior among university students, with nature relatedness acting as a mediator and environmental values serving as a moderator. Wang et al., (2020) explored the relationship between nature relatedness and the experience of life meaning among university students, with nature appreciation acting as a mediator. Li (2016) conducted a study on Chinese university students and found that mindfulness played a mediating role between nature relatedness and happiness. Research on nature connectedness among Malaysian university students is scarce, with only Sahak (2018) investigating students from Johor, Malaysia, and examining spirituality as a mediating factor between nature contact, connectedness, and student well-being.

(3) Functions and Intervention Research on Nature Relatedness

Some researchers have focused on how interventions affect nature relatedness among Chinese university students. Yang et al. (2017) reviewed the concept and measurement of nature relatedness and further examined its functions and intervention measures. Passmore et al. (2022) conducted a study called "Nature Noticing Intervention (NNI): An Extended Replication of a Happiness Intervention," involving a two-week nature intervention experiment with 173 Chinese undergraduate students.

The results showed that the increase in participants' happiness and reduction in distress were entirely attributed to their attention to the encountered natural environment in their daily lives. This study further supported the effectiveness of the Nature Noticing Intervention as a happiness intervention. Additionally, Li et al. (2018) also reviewed the functions and promotion of nature relatedness. In Malaysia, Roslan et al. (2022) conducted an experiment with 160 Muslim university students from the Malaysian Agricultural Science Foundation, revealing that these students benefitted greatly from yoga meditation and nature experiences, while spending time outdoors was an effective way to enhance their spiritual and ecological self-value.

In summary, previous research has focused more on nature relatedness in Chinese university students, while direct studies on nature relatedness in Malaysian university students are limited. There is a lack of comparative research on nature relatedness between Chinese and Malaysian university students, and a dearth of research on how nature relatedness may influence character strengths in both populations.

3c. Comparative Research on Mindfulness in Chinese and Malaysian University Students

Comparative studies on mindfulness in Chinese and Malaysian university students reveal the following similarities and differences:

(1) Measurement Methods

Deng (2009) revised the Five Facet Mindfulness Questionnaire (FFMQ) developed by Baer et al. (2008) to create a Chinese version suitable for measuring trait mindfulness among Chinese university students. In Malaysia, Ahmadi et al. (2014) conducted a mindfulness study with 273 first-year undergraduate students using the Mindful Attention Awareness Scale. Ahmadi (2016) studied mindfulness levels among Malaysian university students, with a particular focus on students from

Universiti Malaysia Perlis. Similarly, they used the Mindful Attention Awareness Scale (Brown & Ryan, 2003).

(2) Related Research

Research on the relationship between mindfulness and subjective well-being is relatively extensive. Liu et al. (2015) found that mindfulness among university students influenced subjective well-being, with emotion regulation and psychological resilience mediating this relationship. Liu and Tang (2019) explored the relationship between mindfulness levels and subjective well-being in university students, while Ding (2012) and Yang (2014) studied the impact of mindfulness practice and training on mindfulness levels and subjective well-being. Research also indicates that mindfulness training has a positive effect on university students' life satisfaction, with nature connectedness acting as a mediator (Gan, 2023; Li, 2016). The relationship between mindfulness and anxiety/aggression behavior in university students is mediated by psychological resilience (Yu et al., 2022). Duan (2016) investigated the impact of individual mindfulness on psychological well-being, with individual strengths playing a mediating role. Yang (2022) studied the influence of mindfulness on character strengths, while Xu (2020) explored the relationships between mindfulness levels, coping efficacy, perceived stress, and intervention research. Chen (2018) focused on the association between mindfulness and life satisfaction in university students, finding that nature connectedness played a mediating role. In Malaysia, Ramli et al. (2018) examined the relationship between academic stress, self-regulation, and mindfulness in Malaysian undergraduate students. The results indicated that mindfulness mediated the relationship between academic stress and self-regulation (Ramli et al., 2018). Jayaraja et al. (2017) studied the predictive effects of mindfulness and procrastination on the psychological well-being of Malaysian

university students. The study found significant correlations between mindfulness, procrastination, and psychological well-being. Ramli et al. (2018) selected 384 undergraduate students from Klang Valley, Malaysia, and investigated the influences of academic stress, self-regulation, and mindfulness. The study confirmed that mindfulness played a mediating role between academic stress and self-regulation. Rosenstreich and Margalit (2015) chose students from Universiti Sultan Zainal Abidin as participants and explored the relationship between loneliness, mindfulness, and academic performance, while also studying the moderating role of mindfulness in this relationship. Tan et al. (2021) tested the hypothesized positive correlation between mindfulness and life meaning among undergraduate students from Malaysia, Indonesia, Australia, and Taiwan, as well as the potential mechanisms underlying this relationship.

(3) Mindfulness Training and Intervention Research

Mindfulness training and intervention among Chinese university students have received considerable attention. Researchers have explored the impact of mindfulness on students' psychological health, subjective well-being, and psychological resilience. Many studies have focused on mindfulness interventions to improve individuals' mental and physical health, promote psychological well-being, and alleviate negative emotions such as anxiety and depression. For example, Shen et al. (2022) found that mindfulness training could enhance students' attentional bias and reduce smartphone dependence. Lu et al.(2023) demonstrated the intervention effect of mindfulness training on social anxiety among university students. Jia (2019), Chen (2018), Li (2016), and Cheng (2024) applied mindfulness training to address issues such as academic stress, depressive emotions, and sleep disorders among university students. These studies provide important theoretical and practical support for the application of

mindfulness among university students. In mindfulness intervention research among Malaysian university students, most studies have focused on medical students from Malaysia. Medical students in Malaysia face significant stress (Ramli et al., 2018). To help medical students cope more effectively with stress, Keng et al. (2015) explored the effects of a brief mindfulness-based intervention on psychological symptoms and well-being in Malaysian medical students. The results showed that mindfulness played a statistically significant mediating role in psychological symptoms and well-being. The research also examined whether changes in mindfulness would affect psychological symptoms and well-being, and validated whether changes in mindfulness mediated the effects of Mindful-Gym (a mindfulness training program) on psychological symptoms and well-being. Phang et al. (2016) also selected a sample of medical students from various ethnicities in Malaysia to validate the factorial validity and psychometric properties of the Mindful Attention Awareness Scale (MAAS). They explored the effectiveness of a brief group mindfulness cognitive therapy aimed at reducing stress in Malaysian medical students, confirming the applicability of mindfulness intervention in Malaysia.

In conclusion, while there has been relatively more research on nature relatedness among Chinese and Malaysian university students, there is a lack of comparative research on mindfulness in these two populations. Furthermore, there is a dearth of studies examining the role of mindfulness in the relationship between nature relatedness and character strengths among university students in both China and Malaysia.

4. Research on the Correlation between nature relatedness and character strengths has emerged, but there is a lack of studies investigating the relationships and mechanisms between nature relatedness, trait mindfulness, and character strengths in both China and Malaysia.

In recent years, nature relatedness has become one of the hot topics in environmental psychology research. Based on a synthesis of previous research, some Chinese researchers have found a close correlation between nature connectedness and certain individuals' character strengths, such as fairness, kindness, vitality, creativity, teamwork and self-regulation (Yang et al., 2017). Nature relatedness intervention (NRI) has also become a positive psychological intervention strategy (Duan & Bu, 2018). All of these studies provide a new perspective for cultivating character strengths.

In Malaysia, Jin (2018) discussed the influence of Nature Relatedness on Pro-Environmental Behaviors among Malaysian Chinese university students. In University of Technology Malaysia, the implementation of a green campus has already shown a positive impact in reducing climate change on their campus through the promotion of cycling, paper-saving, energy-saving, and water-saving initiatives (Najad et al., 2018). Mohamad Muslim (2017), using the case of Peninsular Malaysians, examined the differences in nature-related experiences during childhood between urban and rural areas. The study found that individuals who grew up in rural areas had more nature-related experiences compared to those who grew up in urban areas, providing a basis for environmental education.

From previous research, it can be seen that although nature relatedness has potential value for the cultivation and development of character strengths, the current research on the influence of nature relatedness on character strengths is still not sufficient, and there is a lack of systematic research. This indicates that further in-depth study is needed on the influence of nature relatedness on character strengths, as

well as exploration of its specific mechanisms and effectiveness, in order to better apply it to the cultivation and development of character strengths in university students. At the same time, studying the influence of nature relatedness on character strengths can also help further improve the theory and practice of character strength cultivation, and promote the comprehensive growth and development of university students.

Chinese researchers suggest that nature relatedness positively predicts levels of mindfulness, indicating that increasing contact and connection with nature can enhance an individual's trait mindfulness (Li, 2016). Yang (2022) found that trait mindfulness has a positive and beneficial impact on character strengths among university students. In Malaysian research, there is a focus on the association between mental health and mindfulness in eating among undergraduate students (Talib et al., 2021), but there is a lack of research on the relationship among nature relatedness, trait mindfulness, and character strengths.

Therefore, this study aims to investigate the influence of nature relatedness on character strengths among university students in China and Malaysia, and explore potential mechanisms, specifically examining the mediating effect of trait mindfulness on the relationship between nature relatedness and character strengths. This study is grounded in the theory and practice of character strengths and holds significant value for both theoretical understanding and practical applications.

1.3 Problem Statement

Through the review of previous studies on nature relatedness and character strengths, it is found that there are deficiencies and gaps in the following four aspects:

1. Lack of the Three-dimensional Nature Relatedness Scale in Chinese version.

Mayer and Frantz's (2004) Connectedness to Nature Scale was revised by Li (2016) in Chinese version, which has good validity and reliability . However, the Scale is a one-dimensional structure to measure the emotional connection between individuals and nature. Although Connectedness to Nature Scale is widely used, its single dimension and controversial concept also limit its application (Yang et al., 2017). In this research, it cannot fully reflect the connection between individuals and nature.

Nisbet et al. (2009) have compiled the three-dimensional Nature Relatedness Scale, according to the nature relatedness definition of three-dimensional, which has good validity and reliability , can measure the nature relatedness more comprehensively. However, there is currently no standardized Chinese version of the three-dimensional Nature Relatedness Scale. Therefore, it is of great practical significance to revise the three-dimensional Nature Relatedness Scale in Chinese, as it will provide a standardized measurement tool for assessing nature relatedness in the Chinese population.

2. Lack of Comparative Research on Nature Relatedness, Trait Mindfulness and Character Strengths among Chinese and Malaysian University Students.

On the one hand, there has been a lack of research on nature relatedness, trait mindfulness, and character strengths among Malaysian university students. Previous studies on these topics have predominantly focused on samples from countries such as the United States, Canada, Australia, and Europe, with a scarcity of samples from regions such as Asia, Africa, and South America (Henrich et al., 2010). Consequently, there has been limited research on nature relatedness, trait mindfulness, and character strengths specifically among Malaysian university students. Therefore, conducting a

study on nature relatedness, trait mindfulness, and character strengths among Malaysian university students would serve as a valuable and complementary addition to the existing research, especially within the Asian sample context.

On the other hand, there has been a lack of comparative research on nature relatedness, trait mindfulness, and character strengths between Chinese and Malaysian university students. Some researchers have highlighted that different Asian countries possess unique cultural values (Oyserman et al., 2002). People from diverse cultures have distinct cognitive perceptions and experiences concerning the relationship between humans and nature. While both China and Malaysia belong to collectivist cultures, they differ in terms of natural environment, history and tradition, religious beliefs, dietary habits, and other aspects, leading to certain cultural variations between the two countries. Therefore, conducting an investigation on Chinese and Malaysian university students and comparing their nature relatedness, trait mindfulness, and character strengths would hold significant research value (Yang et al., 2017). Therefore, studying the nature relatedness, trait mindfulness, and character strengths of Chinese and Malaysian university students serves as a complementary contribution to the field of comparative research.

3. Lack of the Study on the Relationship between Nature Relatedness and Overall Character Strengths among Chinese and Malaysian University Students, and the Causal Relationship is Not Clear.

Most researchers focus on the positive effects of character strengths (such as happiness, job satisfaction), but few studies have focused on the factors that promote the change of character strengths (Yang, 2022). Nature relatedness is a hot topic in the study of environmental psychology, previous researchers studies the concept, measuring, function, intervention, and about the nature relatedness to alleviate psychological symptoms, promoting happiness, improve cognitive function, promote

the behavior control. However, there are few studies on the direct influence of nature relatedness on character strengths. Several studies have found that nature relatedness can improve some character strengths of individuals (Yang et al., 2017; Li et al., 2018; Merino et al., 2020), not overall, but some studies have found that natural bonds can enhance certain personality strengths, such as cooperative (Zelenski et al., 2015), creativity (Atchley et al., 2012), Appreciation of beauty (Frumkin, 2001), love (Weinstein et al., 2009), social intelligence (Wakefield et al., 2007), Self-regulation (Taylor et al., 2002), zest (Ryan et al., 2010), love of learning (Benfield, 2015). From these studies, it can be speculated that nature relatedness may have a promoting effect on improving the overall character strengths. However, the existing studies are scattered and single dimension studies, and no researchers have verified the overall effect of natural connection on the character strengths, which is a research gap. Therefore, this study fills the gap by comprehensively verifying the effect of nature relatedness on character strengths from an overall perspective.

There have been few direct studies on nature relatedness and overall character strengths. Merino et al., (2020) first explored the relationship between nature relatedness and character strengths, they showed an empirical correlation between character strengths and nature relatedness, and the correlation between individual character strengths and nature relatedness indicated significant differences in aesthetic ability, with the highest correlation with nature relatedness, followed by love of learning, curiosity and zest. The researchers only used a decision tree to demonstrate the correlation between the two variables, but the causal relationship has not been effectively validated.

4. Lack of Study on the Mechanism of the Influence of Nature Relatedness on Character Strengths among Chinese and Malaysian University Students, Trait Mindfulness may have a mediating effect.

While the governments and universities in China and Malaysia have implemented various initiatives to promote positive psychology and emphasize character strengths among university students, most efforts focus primarily on the positive outcomes of these strengths. There remains a lack of systematic research on how to foster the development and enhancement of character strengths, particularly concerning the underlying factors and mechanisms that influence their growth. Addressing this gap is essential for providing effective interventions through government or university policies and educational systems. In recent years, the relationship between nature relatedness, mindfulness, and character strengths has gained increasing attention from researchers. For example, empirical evidence suggests that trait mindfulness has a positive influence on the development of character strengths (Yang, 2022). Furthermore, several studies have indicated a positive relationship between nature relatedness and mindfulness levels (Li, 2016). Research has also shown that exposure to nature contributes to an enhancement in individual mindfulness levels (Kaplan, 2001; Brymer et al., 2010; Howell et al., 2011). Additionally, Based on Wen et al.'s (2004) definition of mediating effects, it was reasonable to hypothesize that trait mindfulness may serve as a mediator in the relationship between nature relatedness and character strengths. However, the mediating effect of mindfulness on the relationship between nature relatedness and character strengths had not been extensively explored, thus highlighting a research gap in the literature.

This research aimed to investigate the research gaps in the four aspects mentioned above. First, the Chinese version of the Nature Relatedness Scale will be

revised. Subsequently, three scales were used to assess the nature relatedness, trait mindfulness and character strengths of Chinese and Malaysian university students, then analyzed their characteristics and differences. Furthermore, the influence of nature relatedness on overall character strengths among university students were analyzed. Finally, the mediating effect of trait mindfulness on the relationship between nature relatedness and character strengths among university students were explored and examined.

1.4 Research Objectives

1a: To revise the three-dimensional Nature Relatedness Scale in Chinese version.

2a: To analyze the differences in nature relatedness, trait mindfulness and character strengths among Chinese and Malaysian university students in different demographic variables.

2b: To analyze the differences in nature relatedness, trait mindfulness and character strengths among Chinese and Malaysian university students.

3a: To examine the relationship between nature relatedness and character strengths among Chinese and Malaysian university students.

3b: To determine the causal relationship between nature relatedness and overall character strengths among Chinese and Malaysian university students.

4a: To examine the relationship between nature relatedness and trait mindfulness, trait mindfulness and character strengths among Chinese and Malaysian university students.

4b: To examine the mediating effect of trait mindfulness on the relationship between nature relatedness and character strengths among Chinese and Malaysian university students.

1.5 Research Questions

RQ1: Does the three-dimensional Nature Relatedness Scale have high validity and reliability ?

RQ2a: Are there differences of nature relatedness, trait mindfulness and character strengths among Chinese and Malaysian university students in different demographic variables?

RQ2b: Are there differences in nature relatedness, trait mindfulness and character strengths among Chinese and Malaysian university students?

RQ3a: Is there a significant correlation between nature relatedness and character strengths among Chinese and Malaysian university students?

RQ3b: Does nature relatedness predict character strengths positively among Chinese and Malaysian university students?

RQ4a: Is there a significant correlation between nature relatedness and trait mindfulness, trait mindfulness and character strengths among Chinese and Malaysian university students?

RQ4b: Does trait mindfulness have a mediating effect on the relationship between nature relatedness and character strengths among Chinese and Malaysian university students?

1.6 Research Hypotheses

H1a: The Chinese three-dimensional Nature Relatedness Scale have high validity and reliability .

H2a: There are differences of nature relatedness, trait mindfulness and character strengths among Chinese and Malaysian university students in different demographic variables.

H2b: There are differences in nature relatedness, trait mindfulness and character strengths among Chinese and Malaysian university students.

H3a: There is a significant correlation between nature relatedness and character strengths among Chinese and Malaysian university students.

H3b: Nature relatedness predicts character strengths positively among Chinese and Malaysian university students.

H4a: There is a significant correlation between nature relatedness and trait mindfulness, trait mindfulness and character strengths among Chinese and Malaysian university students.

H4b: Trait mindfulness have a mediating effect on the relationship between nature relatedness and character strengths among Chinese and Malaysian university students.

The relationship between research problems and research objectives, research questions, and research hypotheses is illustrated in Table 1.1.

Table 1.1

The Relationship between Research Problems and Research Objectives, Research Questions and Research Hypotheses

Problem Statement	Research Objectives	Research Questions	Research Hypothesis
<p>1. Lack of the three-dimensional Nature Relatedness Scale in Chinese version.</p> <p>2. Lack of the comparative research on nature relatedness, trait mindfulness and character strengths among Chinese and Malaysian university students.</p>	<p>1a: To revise the three-dimensional Nature Relatedness Scale in Chinese version.</p> <p>2a: To analyze the differences in nature relatedness, trait mindfulness and character strengths among Chinese and Malaysian university students in different demographic and other variables.</p> <p>2b: To analyze the differences in nature relatedness, trait mindfulness and character strengths among Chinese and Malaysian university students.</p>	<p>RQ1: Does the three-dimensional Nature Relatedness Scale have high validity and reliability?</p> <p>RQ2a: Are there differences of nature relatedness, trait mindfulness and character strengths among Chinese and Malaysian university students in different demographic and other variables?</p> <p>RQ2b: Are there differences in nature relatedness, trait mindfulness and character strengths among Chinese and Malaysian university students?</p>	<p>H1a: The Chinese three-dimensional Nature Relatedness Scale have high validity and reliability.</p> <p>H2a: There are differences of nature relatedness, trait mindfulness and character strengths among Chinese and Malaysian university students in different demographic and other variables.</p> <p>H2b: There are differences in nature relatedness, trait mindfulness and character strengths among Chinese and Malaysian university students.</p>
<p>3. Lack of the study on the relationship between nature relatedness and overall character strengths among Chinese and Malaysian university students, and the causal relationship is not clear.</p>	<p>3a: To examine the relationship between nature relatedness and character strengths among Chinese and Malaysian university students.</p> <p>3b: To determine the causal relationship between nature relatedness and overall character strengths among Chinese and Malaysian university students.</p> <p>4a: To examine the relationship between nature relatedness and trait mindfulness, trait mindfulness and character strengths among Chinese and Malaysian university students.</p>	<p>RQ3a: Is there a significant correlation between nature relatedness and character strengths among Chinese and Malaysian university students?</p> <p>RQ3b: Does nature relatedness predict character strengths positively among Chinese and Malaysian university students?</p> <p>RQ4a: Is there a significant correlation between nature relatedness and trait mindfulness, trait mindfulness and character strengths among Chinese and Malaysian university students?</p>	<p>H3a: There is a significant correlation between nature relatedness and character strengths among Chinese and Malaysian university students.</p> <p>H3b: Nature relatedness predicts character strengths positively among Chinese and Malaysian university students.</p> <p>H4a: There is a significant correlation between nature relatedness and trait mindfulness, trait mindfulness and character strengths among Chinese and Malaysian university students.</p>
<p>4. Lack of study on the mechanism of the influence of nature relatedness on character strengths among Chinese and Malaysian university students, Trait mindfulness may have a mediating effect.</p>	<p>4b: To examine the mediating effect of trait mindfulness on the relationship between nature relatedness and character strengths among Chinese and Malaysian university students.</p>	<p>RQ4b: Does trait mindfulness have a mediating effect on the relationship between nature relatedness and character strengths among Chinese and Malaysian university students?</p>	<p>H4b: Trait mindfulness have a mediating effect on the relationship between nature relatedness and character strengths among Chinese and Malaysian university students.</p>

1.7 Conceptual Framework

This research incorporates three variables: an independent variable, a dependent variable, and a mediating variable. A graphical representation depicting the interrelationship among these three variables can be observed in Figure 1.1.

In this research, the independent variable is nature relatedness, which consist of three factors: NR-self, NR-perspective, NR-experience (Nisbet et al., 2009). The dependent variable is character strengths, which consist of three factors: caring, inquisitiveness, self-control (Duan & Bu, 2017). The mediating variable is trait mindfulness which consist of five factors: observing, describing, acting with awareness, non-judging, non-reactivity (Baer et al., 2006).

Figure 1.1

Conceptual Framework

