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Analytic Hierarchy Process for Prioritizing the Determinants of Happiness Among Chinese Higher Education Students in Malaysia

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ABSTRACT

Happiness is a major component of well-being and affects academic performance, mental health, and quality of life. Although extensively studied in various contexts, little research has focused on Malaysian Chinese higher education students. This group faces distinctive challenges, including academic pressure, financial strain, and social integration issues, which makes it important to study them directly. Existing works often provide broad ethnic comparisons but overlook these specific socio-cultural and economic influences. Therefore, the objective of this study is to determine and prioritise the factors that influence the happiness of Malaysian Chinese higher education students. The study applies the Analytic Hierarchy Process (AHP), a method well suited for evaluating complex relationships through structured pairwise comparisons and consistency checks. Data from 25 respondents revealed that health is the most significant determinant of happiness, followed by family, friends, and leisure time, while economic and political factors exert a more moderate influence. The findings highlight the importance of mental health, strong social connections, and balanced lifestyles in shaping student well-being. The study also highlights the value of targeted support services such as counselling, social activities, and career development programmes. It contributes to the literature by providing empirical evidence on happiness determinants from an underrepresented demographic and demonstrates the usefulness of AHP as a rigorous tool for prioritising subjective judgements. The outcomes are valuable for higher education institutions and policymakers in designing interventions that promote student welfare and enrich the broader understanding of well-being research.

INTRODUCTION

Overview of Happiness and Its Determinants

Happiness is a fundamental pursuit of human life, shaping personal well-being and societal progress. From an economic perspective, happiness is often equated with overall life satisfaction and well-being, sometimes used interchangeably with subjective well-being (Easterlin, 2001; Bartolini, 2014). The

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Easterlin Paradox indicates that beyond a certain limit, economic growth is positively related to happiness but begins to lose the relationship as basic needs are already met (Clark, Flèche & Senik, 2014). Meanwhile, in psychology studies, happiness could be divided into two main components which are the affective and cognitive components (Veenhoven, 2000; Diener, 2009). The affective component explains the emotional aspects such as a sense of feeling good, joy, or pleasure. On the other hand, the cognitive component illustrates the self-perceived aspiration, such as a feeling of contentment or satisfaction towards one's overall of life circumstances.

Happiness has been investigated in the last few decades because of its far-reaching implications, with scholars from various disciplines like economics, psychology, sociology, and education examining its influence (Bruni & Stanca, 2008). Higher levels of happiness had been shown to lead to various advantages, such as better health outcomes (Lyubomirsky, King & Diener, 2005), greater productivity and creativity (Oswald, Proto & Sgroi, 2015), and the ability to swiftly bounce back from adverse experiences (Fredrickson, 2013). Furthermore, happiness was also linked to economic benefits, with people who rated themselves higher in life satisfaction generally demonstrating higher earning potential and better careers (Graham & Pettinato, 2002; De Neve & Oswald, 2012).

Despite this growing body of research, studies on Malaysian higher education students, particularly those from the Chinese ethnic group, remain limited. Most existing studies focus on national or broad ethnic comparisons, overlooking the specific determinants of happiness within this demographic. The Chinese community in Malaysia has distinct socio-cultural norms that may shape happiness differently compared to other ethnic groups. Malaysian Chinese students often face intense academic pressure, partly due to cultural values that emphasize educational achievement. Academic success is highly valued in Chinese families and is often equated with social mobility and family honour (Park et al., 2024). This pressure can contribute to psychological stress and anxiety, sometimes leading to depression and suicidal thoughts (Harmer, et al., 2024). Empirical studies have also shown that Malaysian Chinese students report lower happiness levels compared to their Malay and Indian counterparts (Cheah & Tang, 2013). This disparity may be linked to socioeconomic factors, such as heavier financial burdens due to limited access to government subsidies and scholarships, leading many to depend on private or family funding, as well as challenges with social integration in Malaysia's multi-ethnic society (Ding, 2014). The Malaysian Chinese student population, therefore, represents a unique socio-cultural context where Confucian values promoting family ties and academic achievement intersect with minority status in a multicultural society. These cultural and structural dynamics likely shape how happiness is conceived and prioritised, adding important nuance to broader, cross-national studies of well-being.

To address this gap, the present study employs the Analytic Hierarchy Process (AHP) as a methodological framework. AHP is particularly suited to this research because it enables systematic prioritisation of multiple overlapping factors influencing happiness. Compared to conventional surveys, AHP offers several advantages: it relies on structured pairwise comparisons that reduce subjective bias from scale interpretation, provides transparency through consistency checks, and generates a clear hierarchy of factors. This methodological rigor allows for a more subtle analysis of competing influences on happiness and clarifies the relative weight of academic, financial, social, and psychological dimensions.

The objectives of this study are threefold: (i) to identify the key determinants influencing the happiness of Malaysian Chinese higher education students; (ii) to evaluate the relative importance of academic, financial, social, and psychological dimensions using the AHP framework;(iii) to generate context-specific insights that extend the literature on happiness while offering practical guidance for higher education policy, student support services, and mental health interventions. By focusing on an underexplored yet important group, the study makes a theoretical contribution by highlighting ethnic-specific determinants of happiness in Malaysia, and a practical contribution by providing evidence that can inform student welfare policies and interventions.

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Factors Influencing Happiness

Happiness is influenced by a wide range of factors, each contributing to an individual's overall well-being in different ways. Existing literature highlights several key determinants that shape happiness, broadly categorised into income, religious, socio-demographic variables, and relational goods (Diener, 2012). These elements interact in complex ways, influencing an individual's perception of life satisfaction and overall happiness.

Income

It was commonly accepted by economists that for an individual, income served as a good proxy measure for utility and satisfaction. As a result, income and economic growth were believed to directly correlate with individual-level happiness (Yu et al., 2019). Yet, past literature showed contradictory outcomes and conclusions. While some scholars found a strong positive correlation between income levels and happiness (Zhang et al., 2019), others noted that the contribution of income towards happiness was only negligible (Ahuvia, 2018) or completely absent. The most established theory in the economics of happiness was the Easterlin Income-Happiness Paradox. In 1974, happiness reports in a country showed a significant positive correlation with an individual's earnings at a given period (cross-sectional). However, the US time series survey conducted between 1946 and 1974 found no correlation between average happiness responses and increasing average income over the years (Easterlin, 1974). Additionally, these studies, which utilized data from different nations, also highlighted robust positive relationships between income and well-being or happiness across countries (Clark et al., 2008; Graham et al., 2017; Lim, Shaw & Liao, 2017; Stevenson & Wolfers, 2013; Syrén et al., 2020).

In Malaysia, a few studies were conducted regarding the relationship between income, materialism, and personal wealth with life satisfaction. For instance, Ang and Talib (2011) undertook a quantitative study on life satisfaction and materialism among undergraduate students in Malaysia. The findings of the study suggested that materialism was statistically significant in life satisfaction. Additionally, Howell, Howell, and Schwabe (2006) studied the relationship between wealth, which was defined as a combination of possessions and savings, and self-reported well-being of impoverished indigenous farmers in Peninsular Malaysia. The authors asserted that wealth was positively correlated with life satisfaction ($\beta = 0.24$, $p < 0.001$), after controlling demographic variables among the country's aboriginal people using hierarchical multiple regression. On the other hand, Cheah and Tang (2013) used an ordered probit model to identify the socio-demographic variables that affected the level of happiness among adults in Penang, Malaysia. The empirical results indicated that there was no evidence to show the income-happiness relationship among respondents. In addition, Noor et al. (2014) used stratified random sampling to collect primary survey data from 2808 households (one parent and one child aged 13 and older), making a total of 5616 respondents. The results of the multiple regression analysis revealed that only savings and debts were predictors of the economic situation, rendering family monthly income insignificant in comparison to the happiness indicator. Also, Boo et al. (2016) used public data to analyse the happiness and life satisfaction of Malaysians. The authors worked with data obtained from the sixth wave of the World Values Survey (2010-2014), consisting of 1289 samples. The empirical results showed that income positively correlated with measures of happiness and life satisfaction. Boo et al. (2016) also asserted that other common income-related factors like employment, health status, and satisfaction with the financial situation of households were statistically significant in positively affecting both happiness and life satisfaction among Malaysian citizens. Lim et al. (2020) indicated that the decline in the effect of income on an individual's happiness could possibly serve as an alternative explanation for the Easterlin income-happiness paradox. The moderation effect of society's values regarding the income-happiness gap for East Asians was examined using World Values Survey data.

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Religiosity

The rising focus on the study of religion in the academic field confirmed its relevance in the analysis and promotion of happiness or well-being. Such relevant research in different academic disciplines was further reinforced by growing evidence of a significant relationship between religiosity and happiness (Abdel-Khalek, 2015; Eryılmaz, 2015; Francis et al., 2004; Graham & Crown, 2014; Hossain & Rizvi, 2016; Sahraian et al., 2013; Vang, Hou, & Elder, 2019). Yet, no study claimed that there was a negative relationship between religiosity and happiness (Hossain & Rizvi, 2016).

However, there was no prior research regarding the connection between religiosity and one's happiness, life satisfaction, or well-being in Malaysia. Some studies were conducted on Muslim religiosity and women's well-being. Noor (2008) worked with a sample of 389 married Malay Muslim women. The empirical findings suggested an important three-way interaction of work experience, age, and religiosity in predicting well-being.

There was also another study by Achour et al. (2015) based on a sample of 300 female academic staff working in research universities in Kuala Lumpur, Malaysia. The results showed a significant positive correlation between religiosity and female well-being. Similarly, Achour et al. (2015) surveyed 315 Muslim female academic staff members, including those working in research universities in the Klang Valley, such as the University of Malaya, National University, and Putra University in Kuala Lumpur, Malaysia. The empirical evidence showed a significant positive relationship between personal well-being and religiosity. On the other hand, Rahim (2013) attempted to determine the impact of life satisfaction and religiosity on the happiness of postgraduates in Malaysia. The findings showed that life satisfaction, religiosity, and frequency of praying had a positive association with happiness.

Socio-Demographic Variables

Other determinants that could affect the level of happiness including socio-demographic variables like age, health status, marital status, employment status, educational level, political stability, family, friends, and freedom. In terms of age, researchers discovered a clear U-shaped relationship between age and happiness (Bittmann, 2021; Blanchflower & Oswald, 2008; Deaton, 2008; Tao, 2019; Vang et al., 2019). In comparison, the younger and the older people reported being happier than the middle-aged group (Tsurumi et al., 2019). The previous studies indicated that there is a significant positive impact of health status on happiness (Abdel-Khalek, 2015; Graham et al., 2017; Lim et al., 2017; Vang et al., 2019). In Malaysia, Boo et al. (2016) indicated that health status had a significantly positive effect on both happiness and life satisfaction, but Cheah and Tang (2013) found that chronic diseases were not statistically affecting individual happiness.

Regarding the status of employment, it has a substantial positive influence on happiness and life satisfaction. In other words, the employed individual was having greater happiness and life satisfaction than those who were unemployed. Unemployment becomes one of the crucial factors that lead to unhappiness (Boo et al., 2016). Some other empirical studies also suggested that unemployment has an adverse influence on happiness, life satisfaction, and psychological well-being (Boncompte & Paredes, 2020; Lim, 2013; Lim & Duan, 2015; Lim, 2010; Tao, 2019). On the other hand, in terms of education level, there was a positive relationship between education and happiness, life satisfaction, or subjective well-being (Boo et al., 2016; Chen, 2012; Nikolaev, 2018). Lim (2013) examined over-education among Malaysian graduates, and the empirical results indicated that over-education was significantly and negatively related to an individual's happiness.

Political stability means the stability and peaceful conditions of politics and government. The existing literature indicated that political stability could have robustly significant positive effects on individual's happiness. Moreover, Uchida and Oishi (2016) asserted that if a government is politically stable, it would be a steppingstone for the enhancement of satisfaction levels among their residents. In the same way,

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Schnoll (2015) argued that if the government provide better policies that include technology advancement and other improvements. Such good efforts could improve citizens' quality of life, well-being, and levels of happiness in parallelly. Some others empirical studies also showed that political stability and happiness could have positive relationships (Boonratmaitree et al., 2020; Ott, 2011). On the other hand, freedom is conceived of as a chance to choose, requiring 'opportunity' to choose, and 'capability' to choose. Freedom is positively related to happiness among rich nations, especially, but not the poor nations (Veenhoven, 2000). The Finns are happier than the French because they dare more to be free (Brulé & Veenhoven, 2014).

Relational goods

Other determinants that could have affected the level of happiness included socio-demographic variables like age, health status, marital status, employment status, educational level, political stability, family, friends, and freedom. In terms of age, researchers discovered a clear U-shaped relationship between age and happiness (Bittmann, 2021; Blanchflower & Oswald, 2008; Deaton, 2008; Tao, 2019; Vang et al., 2019). In comparison, younger and older people reported being happier than the middle-aged group (Tsurumi et al., 2019). Previous studies indicated that there was a significant positive impact of health status on happiness (Abdel-Khalek, 2015; Graham et al., 2017; Lim et al., 2017; Vang et al., 2019). In Malaysia, Boo et al. (2016) found that health status had a significantly positive effect on both happiness and life satisfaction, but Cheah and Tang (2013) found that chronic diseases did not statistically affect individual happiness.

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Analytic Hierarchy Process (AHP)

AHP is an advanced method to compare the criteria by building a ranking for each of them (Saaty, 1981). By using AHP, the decision-maker can make the best decision by setting priorities for each criterion. There are three crucial steps in executing AHP which are the 'goal', 'criteria' and 'alternative' (Brunelli, 2015). The use of AHP begins with the decomposition of a problem into a hierarchy of criteria so that it may be studied and compared independently. After constructing this logical hierarchy, the decision makers

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may use pair-wise comparisons for each of the criteria to systematically evaluate the options. As a technique to enter subordinate information, this comparison may employ tangible facts from alternatives or human judgments (Saaty, 2008)

To process and compare the numerical values obtained from empirical comparisons, AHP is carried out. Evaluation of each element within the provided hierarchy is made possible by the weight of each component. When compared to other approaches, the AHP technique's capacity to turn empirical data into mathematical models is its most distinguishing feature. The numerical probability of each alternative is computed once all the comparisons have been made and the relative weights between each of the criteria to be examined have been defined. This probability determines the likelihood that the option will succeed in achieving the desired result. The greater the likelihood, the more probable it is that the alternative will achieve the goal of the portfolio. Figure 1 shows the hierarchy's structure within AHP.

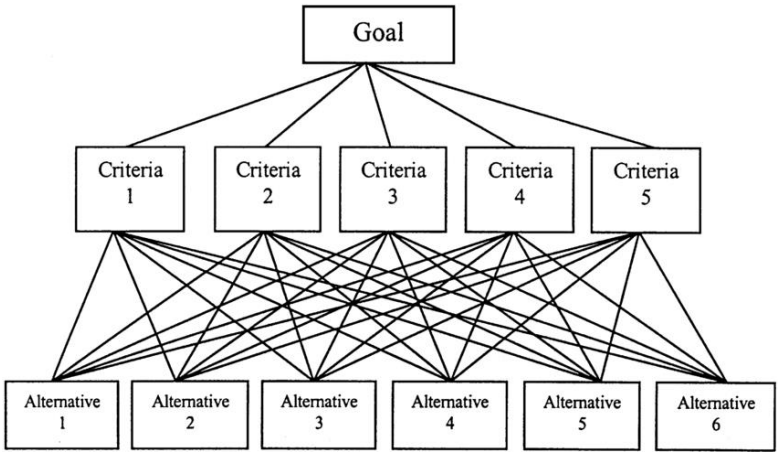

Fig. 1 Analytic Hierarchy Process (AHP) structure

According to previous studies, AHP has been widely applied in engineering, medical, and other scientific fields (Karthikeyan et al., 2016). For instance, AHP was utilised to determine the best hospital for patients undergoing treatment (Gupta, 2015). Additionally, Cingula et al. (2015) employed AHP in the banking sector to design personalised service packages tailored to clients' needs. Moreover, AHP has been used to identify key factors influencing students' enrolment in TVET programmes (Hong et al., 2023). Furthermore, AHP has also been applied to analyse the barriers to ICT implementation in the teaching and learning process across rural and urban areas (Teoh et al., 2022).

METHODOLOGY

This study employed the Analytic Hierarchy Process (AHP) to systematically evaluate and prioritise the determinants of happiness among Chinese higher education students in Malaysia. AHP, a Multi-Criteria Decision-Making (MCDM) technique, was particularly well-suited for structuring complex decision problems by breaking them down into a hierarchy of criteria and sub-criteria (Saaty, 1981). This method enabled a quantitative assessment of qualitative factors through pairwise comparisons, allowing researchers to establish relative weights for each determinant based on expert and participant judgments.

Figure 3 illustrates the relationship between various potential factors influencing happiness among Chinese students. The comparison between two factors of happiness using AHP could be done in different

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ways. However, the relative importance scale between two alternatives, as suggested by Saaty (2008), was the most widely used.

The goal of this study was to implement AHP to identify and prioritise the key factors influencing happiness among Chinese higher education students in Malaysia. The criteria were the major factors influencing happiness, such as freedom, health, family, education, social relationships, and financial stability. This study applied AHP as a prioritisation tool to determine the relative importance of happiness factors among Chinese higher education students. Unlike traditional AHP applications where alternatives were evaluated, this research focused solely on ranking the criteria based on pairwise comparisons. This approach allowed for a systematic assessment of the most influential determinants, offering valuable insights for policymakers and education administrators.

Data Collection

In this study, there are 25 respondents who were selected to participate in the AHP analysis. While this sample size may appear modest compared to conventional quantitative studies, it is well aligned with the methodological requirements of AHP. The strength of AHP lies in the reliability and consistency of expert judgements rather than statistical generalisation across large populations. Methodological guidelines indicate that AHP is most effective with fewer than 35 participants, as larger samples increase the complexity of pairwise comparisons and the risk of inconsistency in judgments (Saaty, 1980; Dolan, 2008). Accordingly, the chosen sample of 25 participants provides an appropriate balance, capturing a diversity of perspectives while maintaining methodological rigor and analytical reliability.

We collected data through a survey involving 25 respondents, all of whom were Chinese higher education students in Malaysia. Participants were recruited using purposive sampling to ensure they met the inclusion criteria of being enrolled in a Malaysian university and identifying as Chinese. Respondents who were not enrolled in a Malaysian university, did not self-identify as Chinese, or who provided incomplete or inconsistent responses were excluded from the final dataset. This targeted selection was deemed appropriate for the study's objectives, as it allowed the research to focus on a specific demographic group relevant to the research problem.

To further ensure rigour in data collection, the survey instrument was pre-tested with a small group to refine clarity and wording. During analysis, consistency ratios were calculated for each set of pairwise comparisons, and responses exceeding the acceptable threshold were reviewed to maintain methodological reliability. These procedures enhanced the validity and reliability of the findings and ensured that the data adhered to the methodological standards expected in AHP studies.

Questionnaire Development

The survey was designed to capture perceptions of happiness determinants based on a literature review and expert consultation. Participants were asked to compare different factors using Saaty's (1981) pairwise comparison scale (Table 1). A Likert-type scale from 1 to 9 was used to quantify the relative importance of each factor, where 1 indicates equal importance and 9 indicates extreme importance. However, due to the limitations of Google Forms, which does not support two-sided preference scales as typically used in AHP surveys, the scale was modified. Instead of presenting a symmetrical 1–9 scale, the survey utilised an adjusted approach, as Figure 2.

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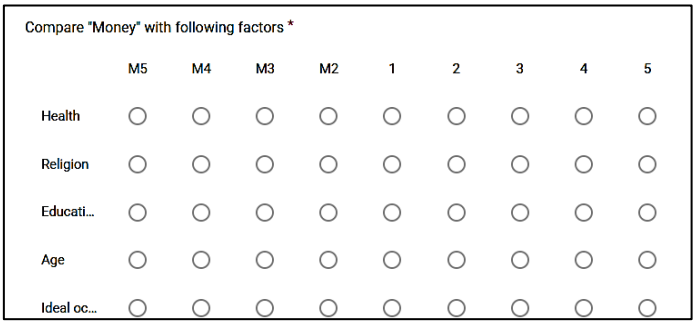

Fig. 2. Modified AHP pairwise comparison scale in Google form

i. *M2* to *M5* represented preferences toward 'money'
ii. 2 to 5 represented preferences toward the alternative factor being compared (e.g., health, religion, education, age, marital status, family, political stability, friends, and freedom).

A neutral option (*1*) indicated equal importance between the two factors compared. If a participant strongly believed that 'money' was significantly more important than 'health' in determining happiness, they would select *M5*. Conversely, if 'health' was deemed far more important than 'money', they would select 5. This modified scale ensured usability within Google form while maintaining the integrity of AHP comparisons.

Sampling Procedure

A purposive sampling method was adopted to ensure participants were both knowledgeable and directly relevant to the research focus. The sample consisted of 25 individuals: (i) Chinese students currently enrolled in Malaysian higher education institutions, and (ii) experts from the Chinese Buddhist Association who provided cultural and contextual insights. This combination of respondents was chosen because they represent those most directly situated to evaluate the factors influencing happiness in this demographic. The sample size was considered sufficient for an exploratory AHP application, where the emphasis lies on the quality and coherence of judgments rather than large-scale generalisation. The inclusion criteria were being a Chinese student in a Malaysian university and an expert affiliated with the Chinese Buddhist Association. No additional inclusion or exclusion criteria were applied. The sample size was considered sufficient for an exploratory AHP application, where the emphasis lies on the quality and coherence of judgements rather than large-scale generalisation.

Pilot Study

To ensure the clarity, reliability, and consistency of the survey instrument, a pilot study was conducted with five students before the main data collection. This preliminary phase aimed to assess the comprehensibility of the questionnaire, ensuring that respondents could effectively interpret the pairwise comparison tasks. Additionally, the Consistency Ratio (CR) was evaluated to determine the logical coherence of responses, ensuring that participants' judgments in the pairwise comparisons were structured and reliable.

Main Data Collection

Following the pilot study, necessary adjustments were made to refine the questionnaire based on the feedback received. The finalized version was then distributed through Google forms and direct invitations to ensure accessibility and ease of participation. Alongside the pairwise comparison data, demographic

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information, including age, gender, and academic level, was collected to facilitate and provide contextual insights into the sample characteristics.

AHP Implementation

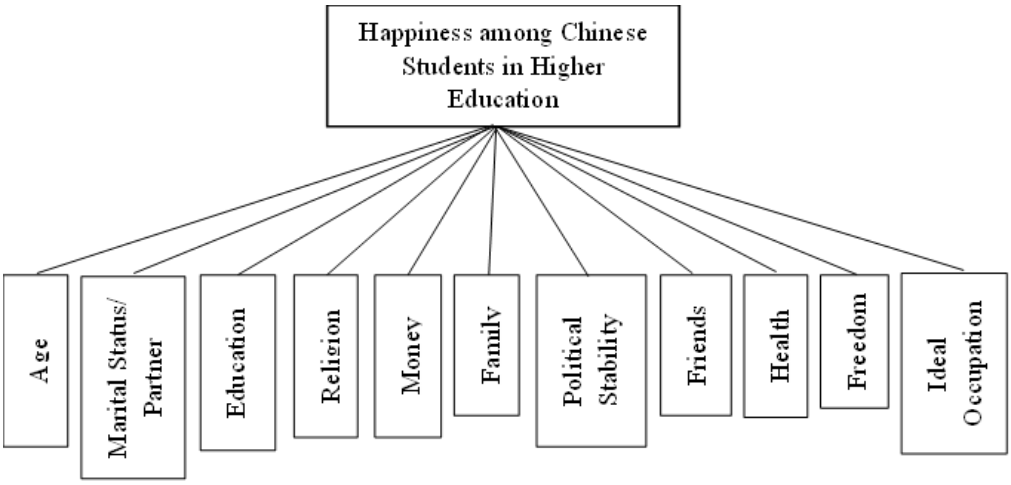

Fig. 3. Factors that influence the happiness of Chinese higher education students

Figure 3 presents various factors influencing happiness. The factors included age, marital status, education, religion, money, family, political stability, friends, health, freedom, and ideal occupation.

Table 1. Saaty's pairwise comparison scale

Level of Importance	Definition	Explanation
M5 / 5	Extreme importance	One criterion is extremely more important than the other.
M4 / 4	Very strong importance	One criterion is very strongly more important than the other.
M3 / 3	Strong importance	One criterion is strongly more important than the other.
M2 / 2	Moderate importance	One criterion is moderately more important than the other.
1	Equal importance	Both criteria have equal importance to the goal.
2 / M2	Moderate importance	One criterion is moderately more important than the other.
3 / M3	Strong importance	One criterion is strongly more important than the other.
4 / M4	Very strong importance	One criterion is very strongly more important than the other.
5 / M5	Extreme importance	One criterion is extremely more important than the other.

Table 1 shows the modified AHP scale accommodates Google Forms' constraints while maintaining pairwise comparison integrity. The scale ranges from $M5/5$ (extreme importance) to $M2/2$ (moderate importance), with *1* signifying equal importance. Due to platform limitations, the standard 1–9 AHP scale was adapted into a symmetrical format, where $M2 - M5$ favour 'money' and 2–5 favour the alternative factor.

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The factors are organised in M matrix format. The geometric mean is determined using the GEOMEAN function, as illustrated below:

$$M = \begin{bmatrix} 1 & m_{12} & \dots & m_{1n} \\ m_{21} & 1 & \dots & m_{2n} \\ \vdots & \vdots & \vdots & \vdots \\ m_{n1} & m_{n2} & \dots & m_{nn} \end{bmatrix} \quad (1)$$

The matrix M represents the judgements or relative importance of alternatives as a $n \times n$ matrix, where n is the number of items is being evaluated. The Consistency Ratio (CR) of AHP is then assessed, with its acceptable value closely linked to the optimal course of action in pairwise comparisons. This step serves as a foundation for examining the consistency and potential irregularities in the decision matrix. The maximum eigenvalue, consistency index (CI), consistency ratio (CR), and normalised values are computed for each condition. If the maximum eigenvalue, CI, and CR fall within the acceptable range, the decision is based on the normalised values; otherwise, the process is repeated until the values meet the required threshold.

The consistency index formula is shown below:

$$Consistency\ index, CI = \frac{\lambda_{max} - n}{n-1}, \quad (2)$$

$$\lambda_{max} = \sum \left(\frac{MMULT(array1, array2)}{Row\ average\ for\ each\ row} \right) \div n, \quad (3)$$

Where:

$n = Number\ of\ variables$
$\lambda_{max} = Maximum\ Eigen\ value$

The *MMULT* function in Microsoft Excel calculates the matrix products of two arrays. By multiplying each row by the row average column and then dividing by each row average, the matrix products are calculated. The random index (RI) is a fixed value established by Saaty (1981). The Random Index and its corresponding matrix size are shown in Table 2. The number of variables in a matrix can be used to represent its size.

Table 2. Random index table

n	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
RI	0.00	0.00	0.58	0.90	1.12	1.24	1.32	1.41	1.45	1.49	1.51	1.48	1.56	1.57	1.58

Therefore, after getting the consistency index and random index, the consistency ratio can be calculated by using the formula,

$$Consistency\ ratio, CR = \frac{Consistency\ Index}{Random\ Index} \quad (4)$$

The system is considered acceptable if the Consistency Ratio (CR) does not exceed 0.1, indicating a reasonable level of consistency in the pairwise comparisons (Saaty, 1981).

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RESULTS AND FINDINGS

After collecting the data from 25 respondents, the geomean was computed and transformed into a pairwise comparison matrix as shown in Table 3.

To improve readability and optimise space within the tables, abbreviations were used for factor names in the pairwise comparison matrix. The full names of the factors are money (Mny), health (Hth), religion (Rlg), educational level (Edu), age (Age), employment status (Ems), marital status (Mss), family (Fam), political stability (Pcs), friends (Frd), and freedom (Fdm). These abbreviations allowed for a more compact representation of data while maintaining clarity and accuracy in the analysis.

Table 3. Pairwise comparison matrix

Factors	Mny	Hth	Rlg	Edu	Age	Ems	Mss	Fam	Pcs	Frd	Fdm
Mny	1.00	0.80	0.90	0.85	0.95	0.88	0.93	0.90	0.88	0.93	0.95
Hth	1.25	1.00	1.10	1.05	1.15	1.08	1.13	1.10	1.08	1.13	1.15
Rlg	1.11	0.91	1.00	0.96	1.05	0.98	1.02	1.00	0.98	1.02	1.05
Edu	1.18	0.95	1.05	1.00	1.10	1.02	1.07	1.05	1.02	1.07	1.10
Age	1.05	0.87	0.96	0.91	1.00	0.93	0.97	0.96	0.93	0.97	1.00
Ems	1.14	0.94	1.05	1.00	1.08	1.00	1.05	1.02	1.00	1.05	1.08
Mss	1.08	0.89	0.99	0.94	1.03	0.96	1.00	0.99	0.96	1.00	1.03
Fam	1.11	0.91	1.00	0.96	1.05	0.98	1.02	1.00	0.98	1.02	1.05
Pcs	1.14	0.94	1.05	1.00	1.08	1.00	1.05	1.02	1.00	1.05	1.08
Frd	1.08	0.89	0.99	0.94	1.03	0.96	1.00	0.99	0.96	1.00	1.03
Fdm	1.05	0.87	0.96	0.91	1.00	0.93	0.97	0.96	0.93	0.97	1.00

Subsequently, the pairwise comparison was normalized by dividing the values in the matrix with the summation of the column to obtain the row average which is used to rank all the factors as shown in Table 4.

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Table 4. Normalised pairwise comparison matrix

Factors	Mny	Hth	Rlg	Edu	Age	Ems	Mss	Fam	Pcs	Frd	Fdm
Mny	0.089	0.083	0.088	0.088	0.087	0.088	0.089	0.088	0.088	0.089	0.089
Hth	0.111	0.104	0.107	0.108	0.106	0.108	0.108	0.107	0.108	0.108	0.108
Rlg	0.099	0.095	0.097	0.098	0.097	0.098	0.098	0.097	0.097	0.098	0.098
Edu	0.105	0.099	0.102	0.103	0.102	0.103	0.103	0.102	0.103	0.103	0.103
Age	0.094	0.09	0.093	0.094	0.093	0.094	0.093	0.093	0.093	0.093	0.093
Ems	0.102	0.098	0.102	0.103	0.102	0.103	0.103	0.102	0.103	0.103	0.103
Mss	0.096	0.093	0.096	0.097	0.096	0.097	0.097	0.096	0.097	0.097	0.097
Fam	0.099	0.095	0.097	0.098	0.097	0.098	0.098	0.097	0.097	0.098	0.098
Pcs	0.102	0.098	0.102	0.103	0.102	0.103	0.103	0.102	0.103	0.103	0.103
Frd	0.096	0.093	0.096	0.097	0.096	0.097	0.097	0.096	0.097	0.097	0.097
Fdm	0.094	0.09	0.093	0.094	0.093	0.094	0.093	0.093	0.093	0.093	0.093

Table 5. Priority vector of factors

Factor	Priority
Hth	0.123
Fam	0.118
Frd	0.115
Fdm	0.112
Edu	0.109
Ems	0.107
Mny	0.105
Pcs	0.104
Rlg	0.103
Age	0.102
Mss	0.101

Table 5 presented the priority vector, ranking the relative importance of various factors influencing happiness among Chinese higher education students. The results revealed that health (0.123) was the most significant determinant, highlighting the importance of physical and mental well-being. This suggested that students prioritised maintaining good health and managing stress over other aspects of life, possibly due to increasing awareness of mental health issues and academic-related stress. The emphasis on health underscored the need for accessible healthcare services, wellness programmes, and mental health support systems to enhance student well-being.

Following health, family (0.118) and friends (0.115) ranked as the second and third most important factors, reinforcing the role of social support systems in happiness. The cultural significance of family bonds within the Malaysian Chinese community explained why students valued family relationships for emotional, financial, and psychological support. Similarly, friendships provided a sense of belonging, companionship, and emotional stability, which were crucial for navigating university life. These findings suggested that universities should focus on community-building activities, student clubs, and family engagement initiatives to strengthen students' social networks and overall happiness. Freedom (0.112) was also highly valued, indicating that students appreciated autonomy and independence in decision-making. The ability to choose their own academic and career paths, express their opinions freely, and maintain

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personal control over their lives contributed significantly to their happiness. This result might have been influenced by societal expectations and past restrictions, such as movement control orders during the COVID-19 pandemic, which limited personal freedom. Encouraging student-led initiatives, flexible learning structures, and open communication policies could have further enhanced their sense of autonomy. Besides that, education (0.109) and employment status (0.107) held moderate importance, reflecting students' concerns about academic success and future career prospects. Academic achievements were often associated with future financial stability and career progression, making education a crucial aspect of happiness. Likewise, employment status signified financial independence and job security, indicating that students valued professional growth and career preparedness. These findings suggested that universities should have enhanced career development programs, internships, academic counselling, and skills-based training to better equip students for their future careers. While money (0.105) was a relevant factor, it was not as highly prioritised as health, family, and education. This suggested that students did not see financial wealth as the sole determinant of happiness, but rather as a tool that supported other aspects of well-being. While financial stability was important, students might have believed that personal fulfilment, relationships, and self-improvement had a greater impact on happiness. Lower-ranked factors such as political stability (0.104) and religion (0.103) suggested that students did not feel significantly affected by political changes or religious beliefs in their day-to-day happiness. Political conditions might have had indirect effects on the economy and job opportunities, but they were not immediate concerns for students who were focused on academic and social life. Religion, while a source of spiritual fulfilment for some, was not a dominant factor in shaping happiness, possibly due to shifting attitudes among younger generations toward more secular or diverse lifestyles. Age (0.102) and marital status (0.101) were the least influential factors, suggesting that students did not perceive age differences or romantic relationships as key determinants of happiness. Since most respondents were within a similar age group, age did not create significant variations in well-being. Likewise, marital status ranked the lowest, reflecting that university students were more focused on education, career growth, and social experiences rather than marriage or family planning at this stage of life.

To ensure the validity of the pairwise comparisons, the Analytic Hierarchy Process (AHP) required a consistency check. This step ensured that the judgements made in the pairwise comparison matrix were logically sound. The consistency check was conducted by calculating the Consistency Index (CI) and the Consistency Ratio (CR), which determined whether the comparisons were reliable or needed revision. For this study, $n = 11$, so $RI = 1.51$.

The maximum eigenvalue of the pairwise comparison matrix is 11.234.

$$CI = \frac{11.234-11}{10} = 0.0234$$

$$CR = \frac{0.0234}{1.51} = 0.0155$$

The Consistency Index (CI) of 0.0234 suggested that the pairwise comparisons exhibited only a slight deviation from perfect consistency. This low CI value indicated that the judgements made by respondents are well-aligned and reasonable to ensure that the priority weights derived from the AHP process accurately reflect their perceptions.

Furthermore, the Consistency Ratio (CR) of 0.0155, which was well below the accepted threshold of 0.10, confirms that the pairwise comparisons were highly consistent and reliable. A CR value this low signified that respondents' judgments are coherent, logically structured, and free from significant inconsistencies. As a result, the priority vector can be confidently used for decision-making, as it provides a stable and valid representation of the relative importance of the criteria under consideration.

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DISCUSSION

The findings show that health emerged as the most significant determinant of happiness among Chinese higher education students in Malaysia (priority = 0.123). This result aligns with prior Malaysian studies that highlighted the strong association between health and life satisfaction but contrasts with other findings that emphasize income as a more consistent predictor of happiness. The prominence of health may be explained by rising awareness of mental health challenges, compounded by academic stress and uncertainty about future careers. The COVID-19 pandemic likely amplified these concerns, making students more attentive to both physical and psychological well-being compared to material or political factors.

Interestingly, family (priority = 0.118) and friendships (priority = 0.115) ranked immediately after health, but below it. This apparent contradiction, where family is deeply valued in Confucian-influenced cultures yet does not emerge as the top priority, requires contextual interpretation. One explanation is that while family remains a crucial emotional and financial support system, students may perceive health as a necessary foundation to fully benefit from family support and to fulfil cultural expectations. In other words, maintaining good health is not only personally important but also enables them to meet obligations toward their families and communities. Similarly, friendships play a vital role in providing peer-to-peer emotional support and easing academic stress, reinforcing findings from relational goods literature. Thus, while cultural values continue to shape perceptions, the prioritisation of health above family reflects a generational shift where personal well-being is recognised as a precondition for fulfilling relational roles.

Lower-ranked factors such as money and political stability indicate that, at this stage of life, financial concerns are less immediate due to reliance on parental support, while broader governance issues remain distant from students' daily happiness. Religion also ranked lower, which may reflect a more secular orientation among young Malaysians or a tendency to separate spiritual life from academic and social experiences.

Several methodological limitations should be acknowledged. The sample size was relatively small, reflecting the exploratory nature of AHP applications. Although this is consistent with methodological recommendations for AHP, it reduces the generalisability of findings to the broader student population. In addition, purposive sampling limited representativeness, as the study focused on Chinese students and included input from Buddhist association experts. The data collection process also relied on a modified Google forms design that adjusted the traditional AHP scale. While consistency ratio checks ensure reliability, these adjustments may have influenced the precision of pairwise judgments. Future studies could address these limitations by adopting larger and more diverse samples, incorporating qualitative interviews for deeper cultural insights, and employing digital tools better suited to standard AHP formats.

Overall, this study demonstrates that happiness among Malaysian Chinese higher education students is shaped by a combination of health, family, and friendships, reflecting both universal determinants of well-being and culture-specific dynamics. By highlighting the interplay between personal well-being and cultural expectations, the findings extend the literature on student happiness and provide practical guidance for institutions to strengthen health services, mental health initiatives, and social support programmes.

CONCLUSION

This study applied the AHP to examine determinants of happiness among Malaysian Chinese higher education students, an underrepresented group in well-being research. By using structured pairwise comparisons, the study identified health, family, and friendships as the most significant contributors to happiness, offering a novel methodological contribution to happiness studies and enriching understanding of socio-cultural influences in a minority context.

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The findings provide practical implications for higher education institutions and policymakers. Universities should prioritise student health services, strengthen mental health initiatives, and promote social engagement programmes that foster supportive peer and family networks. Policymakers may also consider targeted interventions that address financial strain and career development, thereby improving student well-being more holistically. Several limitations should be acknowledged. The purposive sample was small and not fully representative, which restricts generalisability. Although AHP is valuable for exploring priorities, reliance on a modified Google Form survey may have influenced responses. Future research should build on these findings by adopting larger and more diverse samples, comparing across ethnic groups, and incorporating mixed method approaches to capture deeper cultural and psychological dynamics.

In sum, this study highlights the importance of health and social relationships in shaping student happiness while demonstrating the usefulness of AHP as a rigorous tool for well-being research. It offers both theoretical insights and practical guidance for enhancing the welfare of Malaysian Chinese students in higher education.

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CONFLICT OF INTEREST STATEMENT

The authors agree that this research was conducted in the absence of any self-benefits, commercial or financial conflicts and declare the absence of conflicting interests with the funders.

AUTHORS' CONTRIBUTIONS

The authors confirm that their contributions to this paper were as follows: Ch'ng and Tang were responsible for the study's conception and design. Ch'ng also contributed to data collection, as well as the analysis and interpretation of the results. The initial draft of the manuscript was prepared by Ch'ng and Tang. Finally, all authors reviewed the results and provided their approval for the final version of the manuscript.

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