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EXPLORING COLLEGIATE GYMNASTICS ATHLETES' PARTICIPATION MOTIVATIONS AND HEALTH-RELATED BEHAVIORS

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Abstract:
Utilizing 'self-determination-theory' as a theoretical framework, this study examined: features of collegiate gymnastics athletes' (CGAs) participation motivations, their current health-related behaviors; and those dependent variables relate to their participation motivations. Participants were 163 CGAs (97 Female, 66 Male). The Adapt Questionnaire of Collegiate Gymnastics Athletes' Motivation and Health-related Behaviors (QCGAMHRB) was employed for data collection. The QCGAMHRB containing 54 items (eight invested general information, 19 examined motivation factors (MFs) and 27 examined health-related behaviors). Data analyses were done by descriptive statistics, reliability analysis and a 2 x 2 x 2 x 2 x 3 (Gender, female/male) x (Disciplines, natural-science/social-science) x (Financing support, by-parents/by-school) x (Years in college, 1 & 2 years/3 & 4 years) x (Athlete-grades, Elite-Grade/Major-Grade/Participate-Grade) factorial MANOVA. Key findings included: Top four MFs were: MF1 'Technical content and unique value', MF8 'Shape body', MF17 'Develop a unique sport skill', and MF13 'Establish prestige'. The MANOVA revealed: 'Years in college', and 'Athlete-grades' are not the determination aspects, but 'Gender' and 'Disciplines' are. Female CGAs possess higher participation-motivations than that of male CGAs. Who are major in 'Social-science' possess higher participation-motivations than those who are major in 'Natural-science'. As to the health-related behaviors, the mean score of the participants' health-related behaviors for all 27 items was 2.73, therefore, their current healthy-related behavior status is between 'Very-good' [3] and 'Good' [2] using a four points assessment scale. Results of the present investigation added a set of new data and information regarding the essential MFs in their

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gymnastics practices and competitions; many precious features about these CGAs' health-related behaviors are also added. These findings provided lively examples and meaningful evidence for the coaches, teachers, and administers who want to reform their gymnastics programs.

Keywords: disciplines; gender; financing-support; years in college; athlete-grade

1. Introduction

According to the researchers who focused on the collegiate athletes (CAs) domain, the benefits of CAs can be summarized as the following 10 aspects: 1) higher education; 2) academic success; 3) scholarships; 4) academic and others support services; 5) medical care; 6) elite training opportunities; 8) healthy living; 9) exposure and experiences; and 10) preparation for Life. In brief, a number of psychomotor, cognitive, affective and social inter-actions benefits can be acquired from the collegiate sports participation; however, those multidimensional benefits of the collegiate sports are not just through participation by self-experiences. Researchers also indicated that the qualification/qualities of educators' role model and leadership (e.g., Coaches/faculty representatives, and administrators) are also important factors that can maximize those anticipate benefits (e.g., Weiss & Smith, 2002; Malina & Cumming, 2003; Hansen, Larson & Dworkin, 2003; Kilpatrick, Hebert, & Bartholomew, 2010; Jeffery Deal & Camiré, 2016).

People have perceived the above substantial benefits, however, participate in collegiate sports has their own problems as well. Concerns have been voiced regarding the highly competitive nature of collegiate sports and it is often argued that young athletes become injured or burnout as a result of excessive stress and pressure. Still, some others are thought to learn inappropriate behaviors such as aggression or poor sportsmanship from their involvement (Malina & Cumming, 2003; Kilpatrick, Hebert, & Bartholomew, 2010; Jeffery Deal & Camiré, 2016).

Additionally, Researchers based on their research findings pointed out that: over the years, youth and collegiate sports research has failed to address the influential role of socialization agents in shaping CAs' motivation processes in sports. They recommended that collegiate sport researchers should integrate socialization influences, identifies the influence on participates' socialization patterns upon the athletes' self-perception characteristics, orientations toward achievement (both in athletics and academic success), and the patterns of motivated behavior (Brustad, 1992; Kilpatrick, Hebert, & Bartholomew, 2010; Jeffery, & Camiré, 2016).

In the USA, the National Collegiate Athletic Association (NCAA) is "*a member-led organization dedicated to the well-being and lifelong success of college athletes*". Members in this organization included 1,117 colleges and universities, 100 conference and 40 affiliated sports organizations. There are about 52,500 participants that makeup about 19,500 teams to compete each year in the NCAA's 90 championships in 24 sports across

three divisions [(NCAA, 2018); http://www.ncaa.org/about/resources/media-center/ncaa-101/what-ncaa2018]. To ensure this largest sports organization on the earth become successful and have a strong appeal organization, thousands and thousands professionals from colleges/universities presidents, athletics directors, coaches, to academic advisors, athletics representatives, to relative officers, health and safety personnel have to do their best and provided the most careful service for this enormous sport organization (NCAA, 2018). A general perception for the highest mission of NCAA is to represent the USA attending the International Universiade organized by the International University Sports Federation [(IUSF, 2018)]. According to IUSF (2018) and the United States at the Universiade (2018), the USA CAs have won 1,300 medals in 25 appearances at the Summer Universiade and is in first place on the all-time Summer Universiade medal table.

In contrast, to the People's Republic of China (PRC), with regard to its university sport, although their collegiate athletics started later (38 years ago) and not as highly developed and advanced as those sports in the USA. The collegiate sports in the PRC, however, have made incredible progress in its 19 appearances (since 1979) at the Summer Universiade; the Chinese collegiate athletes have won 963 medals; ranked second among all participated countries, next to the USA.

With respect to what factors motivate the collegiate to involve sports and physical activities, Kilpatrick, Hebert, and Bartholomew (2010) indicated that although active lifestyles have many obvious benefits, lack of physical activity is still a major health problem in the collegiate population. A key point for solving this issue is to develop an understanding of participation-motivations in physical activity. Based on their assumptions, they conducted a study "College Students' Motivation for Physical Activity: Differentiating Men's and Women's Motives for Sport Participation and Exercise", their findings described that: major reports from the participants were: 1) for the sport engagement, they are most likely motivated by those intrinsic factors, such as enjoyment and challenge; and 2) for the physical exercise or activities, they tend to motivate by more extrinsic factors, such as appearance, weight control and reduce life stress, etc.

Furthermore, issues and problems facing on the CAs have been found, such as: leaders of team (e.g., coaches and managers); policymakers (e.g., program directors or representatives of college president) lack of first hand information on what factors or reasons that really motivated the collegiate athlete keep involved the sport they like; and lack of the relative scientific knowledge or theories that explain why the collegiate athletes can or cannot continually engaged in the sports he/she choose. However, little study has covered the CAs' participation motivations and their health-related behaviors especially in the sports of gymnastics, hence conducting a study to address the above issues appear to be necessary and important.

2. Research Purposes and Questions

The purposes of this study were: (1) to find out the evidence that motivated the collegiate gymnastics athletes (CGAs) took part in their practices and competitions and whether or not they would continually take in the sports they have chosen for years, and (2) examine the health-related behaviors in 'Eating habits'; 'Nutrition Knowledge & Status'; 'Risk Behaviors'; and 'Hygiene Behaviors' four sub-categories of the participants.

The following specific research questions guided the present study: (1) do differences exist on the motivation factors between the gender (male or female) the CGAs? (2) Do differences exist in the motivation factors between the disciplines (natural science or social science) of the CGAs? (3) Do differences exist in the motivation factors between the financing supports (by parents or by school) of the CGAs? (4) Do differences exist found on the motivation factors among the CGAs who's years in the college/university (1 & 2 years, 3 & 4 years)? (5) Do differences exist in the motivation factors among the CGAs whose 'Athlete-grades' (Elite-Grade, Major-Grade, and Participate-Grade)? (6) What would be the current state of health-related behaviors of the CGAs?

3. Literature Review

3.1 Theoretical Framework

To fulfill the above purposes and find out the above answers, a comprehensive theoretical framework called the Self-Determination Theory' (SDT, Ryan & Deci, 2000) was employed. The SDT is comprised of intrinsic motivation theory and extrinsic motivation theory. SDT proposed that people typically possess multiple motivations, both intrinsic and extrinsic, that are simultaneously in play and must together be assumed to determine the overall quality of motivation (Ryan & Connell, 1989, Ryan & Deci, 2000; Stellion & Sinclair, 2013). Researchers further indicated that: humans are motivated by three basic psychological needs: competence, relatedness, and autonomy (Deci & Ryan, 1985; Harter, 1981; Ryan, Frederick, Lepes, Rubio, & Sheldon, 1997; Stellion & Sinclair, 2013). The competence needs in the SDT model is called effectiveness motivation; the relatedness need refers to people's needs to belong and to feel accepted by others; however, the autonomy needs refer to people's need to feel self-determined that is the source of people's own action (Deci & Ryan, 1985; Harter, 1981; Ryan, Frederick, Lepes, Rubio, & Sheldon, 1997; Ryan & Deci, 2000; Stellion & Sinclair, 2013). The organismic needs energize intrinsic and extrinsic motivations, the concept of need in itself, however, is too general and vague to illustrate the engagement in particular behaviors; it is hard to guide empirical research (Harter, 1981; Ryan & Connell, 1989; Kaplan, 2010; Pintrich & Schunk, 2002; Stellion & Sinclair, 2013). Therefore, a few models describing how different motivations triggered by need manifest in intrinsic and extrinsic motivation in specific aspects or activities were developed (Deci & Ryan,

1985; Ryan & Connell, 1989; Kaplan, 2010; Ryan & Deci, 2000; Pintrich & Schunk, 2002; Stellion & Sinclair, 2013).

Stipek (1996) indicated that the research literature is quite consistent with regard to the benefits of intrinsic motivation (IM) to learning and development. That is, engagement based on IM does not need external incentives/rewards and is able to enhance the motivations necessary to engage in the same activity again and again in the future. Other researchers also indicated that engagement based on IMs, are connected with enhanced comprehension, creativity, cognitive flexibility, accomplishment (Harter, 1981; Kaplan, 2010; Smith, Balagurer, & Duda, 2006; Zeng, Meng, Sun, & Xie 2019). Specifically, Breese (1998) illustrated that athletics' initial motivation should be defined as IM (participating in a sport for enjoyment) or extrinsic motivation (participating in a sport to gain rewards). And, athletes' initial motivation usually predicts athletes' attendance and adherence to a particular sport (Cox, 2011; Deci & Ryan, 1985; Ryan & Connell, 1989). In the present study, the CGAs, who are intrinsically motivated, would be those who go to play or practice their skills and team-work every other day for fun; whereas those CGAs who are extrinsically motivated would be those who go to practice their gymnastics skills to become a better athlete(s) in a competition so they can compete for a medal (Cox, 2011; Kaplan, 2010). It is interesting to know that intrinsic and extrinsic motivation have different effects on youth players and may able to predict whether or not they will continue to play the sport they had chosen.

Likewise, Ryan, Frederick, Lepes, Rubio, and Sheldon (1997) explained that individuals who were mainly motivated by gaining competence (engaging in practices to improve skills) and enjoyment (desire to have fun) could be primarily defined as being motivated intrinsically. In contrast, extrinsically motivated individuals are those behaviors performed in competitions aimed at obtaining rewards or consequences that are unconnected from the behavior itself. Breese (1998) also explained that when athletes begin to participate in a particular sport, they are motivated not only by IMs but also by extrinsic motivations (Ems). Some particular sports, however, may be more dependent on IMs than EMs (Cox, 2011). The reasons are: different types of sports need different types of motivations (Cox, 2011; Deci & Ryan, 1985; Ryan & Deci, 2000; Stellion & Sinclair, 2013; Zeng, Cynarski, Baatz, & Shawn, 2015; Zeng, 2019). In the present study, the researchers were trying to find the evidence and factors that motivated the CGAs who participated in the sport of gymnastics for years.

Additionally, the authors wanted to explore how educators (coaches, teachers, program managers) apply the SDT to enhance their coaching, teaching, and administration. Kaplan (2010) in his review of the literature summarized: how important variation exists, and there seems to be a widespread consensus among researchers and educators that enhancing IMs among athletes or students is beneficial (Kaplan, 2010). The CGAs' IMs will be enhanced when practices promote their sense of personal autonomy, when teamwork is challenging and relevant to all team members when social relationships are supportive, and when the environments are physically and psychologically safe (Kaplan, 2010; Lippitt, 2012). Kaplan (2010) and Lippitt (2012)

further illustrated, how practices that promote these environmental characteristics include providing athletes with choices among activities and between ways of completing tasks, encouraging athletes to explore and pursue their ambition, based on their backgrounds and prior experiences developing their tasks, encouraging them to collaborate, incorporating fantasy in activities, providing feedback that is informative and frequent, and reducing external rewards.

In many cases, athletes are required to participate in tasks that they are not motivated to do or do not understand why they have to do the tasks. Under these situations, EMs should be implemented for executing those tasks. However, coaches/teachers should pursue the internalization of players' IMs for these tasks as well. Such internalization can be promoted by employing as many as necessary to illustrations to the athletes prior to execute those tasks. Additionally, coaches/teachers should make the value of the activity/tasks explicit and clear. These can be done most effectively through modeling and by providing a clear and age-appropriate rationale for youth athletes (Kaplan, 2010; Ryan & Connell, 1989; Lippitt, 2012; Stellion & Sinclair, 2013).

4. Material and Methods

4.1 Measurements and Instrumentation

The Adapt Questionnaire of Collegiate Gymnastics Athletes' Motivation and Health-related Behaviors (QCGAMHRB; Zeng, 2019) was employed for data collection. The reasons for using the QCGAMHRB were: a) an existing questionnaire with similar purposes is available; b) to develop a new questionnaire, time and funding are needed; c) specialists in collegiate athletes' motivations and health-related behaviors study are available to revise the wordings to fit in using for collegiate athletes; and d) research assistants and collegiate athletes gymnastics coaches are available for distributing and collecting the questionnaires.

4.2 Reliability and Validity of the Instrument

According to Child (1990), in order to explore the possible underlying factor of the structure for a set of measured variables without imposing any preconceived structure on the outcome, the exploratory factor analysis (EFA) is the best solution; therefore, the EFA was executed for the QCGAMHRB. The results revealed: the analysis extracted six factors with perfect correspondence to the 19 items with eigenvalues for the reasons or factors ranging from 2.72 to 8.64 and structure coefficients from .77 to .91 and the majority of the fitted residuals reached the pre-set-up significant difference ($P < .05$) level. Besides, the validation was also through a pilot study process by reviewing the content or items. These processes confirmed the following concerns: (a) the readability and writing skills of the collegiate athletes (with the consideration of translate from English version to Chinese version); (b) whether or not those participants can truly understand and respond to the questions in the questionnaire correctly; (c) it may result

in re-wording on some questions or statements to improve the understanding for those collegiate athletes; (d) it may result in cutting or adding numbers of the questions or statements in the questionnaire, and (e) whether or not the questions or statements have covered all the possible motivation factors/reasons for the collegiate gymnastics athletes' engaged in their practices and competitions.

As a result, the QCGAMHRB (Zeng, 2019) contained three parts: Part I asked 'General Information', containing eight questions. Part II asked, "What reasons/factors motivated you to take part in gymnastics practices and competitions continually" with 19 motivation factors (MFs) provided. In each MF the participant responds in a 5-points Likert type scale (5-points represents "Strongly agree ", 4-points represents "Agree", 3-points represents "Somewhat-agree", 2-points represents "Little-agree", and 1-point represents "Disagree"). Part III asked 27 health-related questions or behaviors under the following four sub-categories: 'Eating Habits', 'Nutrition Knowledge and Status', 'Risk Behavior', and 'Hygiene Behaviours'. To better reflect the 27 health-related behaviors in Part III, we utilized frequency and percentage only.

In summary, Part II of the questionnaire contains 10 intrinsic motivation factors (items 1, 2, 4, 7, 8, 10, 13, 14, 15, and 17) and nine extrinsic motivation factors (items 3, 5, 6, 9, 11, 12, 16, 18, and 19). In other words, it included the three basic psychological needs (competence, relatedness, and autonomy) described by Ryan and Deci (2000). Part III contains 27 health-related questions to investigate these collegiate athletes' health-related behaviors during their practices and competitions. All questions and items in the QCGAMHRB (Zeng, 2019) can be found in Appendix A*. (*Be deleted because of the length limitation).

4.3 Participants and Procedures of data collection

The Collegiate Gymnastics Athletes (CGAs) in the present study included four different types of gymnastics branches that the participants practiced and competed. These four branches are commonly called "Aerobics, Cheerleading, Rhythmic-gymnastics, and Athletic-gymnasts". These four gymnastics braches have one thing in common that is they all practice fundamental gymnastics skills (i. e., the flooring exercises). The procedures of recruiting the participant were: (1) obtained approval for conducting this survey study from the Institutional Review Board (IRB) of the target colleges/universities; (2) followed the proposal guidelines for conducting survey study within the Federation of University Sport of China (FUSC, 2018); (3) provided all the necessary documentation to the colleges / universities administrator(s); (4) contact the participants and have the "Inform Consent" to be signed; (5) recruited 200 participants from 12 teams; (6) delivering the "Questionnaire" to the participants. As a result, 163 athletes filled out the questionnaire, (97 females, 66 males) answered correctly and returned the questionnaire to their coaches; it was about 81.5% return rate. Of which the CGAs from the four branches of gymnastics are: Aerobics = 59 / 36.20%, Cheerleading = 33 / 20.24%, Rhythmic-gymnastics = 32 / 19.63, and Athletic-gymnastics = 39 / 23.93. All

selected colleges/universities in the current study are under the administration of the FUSC and the tasks of the FUSC (2018) are:

To popularize national sports policy among college students; to seek supports to the university sports; to approve the establishment of FUSC branches and their activities; to assist organizing all kinds of national collegiate sports events; to promote exchanges with university sports associations all over the world; to assist participating in international collegiate sports event and sports exchanges (p. 1).

Gymnastics is one of the 15 branches, but called the 'Aerobic and Eurhythmics' branch. All national and international collegiate gymnastics competitions and championships held in China were governed by this organization.

4.4 Data analyses

To answer the above research questions, the questionnaire survey method was employed. Data analyses included descriptive statistics, reliability analysis and a 2 x 2 x 2 x 2 x 3 [Gender (female or male) x disciplines (natural science or social science) x financing supported (by parents or by school) x Years in college (1 & 2 years, or 3 & 4 years) x athletics-grades (Elite-Grade, Major-Grade, Participate-Grade) factorial multivariate analysis of variance (MANOVA)]. The questionnaire can be found in Appendix A (omitted here).

4.5 Significance

Based on an overall literature review in the present topic, it is believed that this study would be the first official survey study involving the Chinese collegiate gymnastics athletes' motivations and health-related behaviors. The review of the literature, the findings and the analyses of this study would enable the professionals (leaders, coaches, administrators, and staffers) to re-define the values of their work. As a whole, the results of this study would enable the Chinese Collegiate Gymnastics Association to develop more effective coaching strategies approaches; meaningful management methodologies; and improve their programs to better satisfy the needs of their athletes/students; therefore, the present study aim at (1) Examining the motivation factors between their gender (male or female), disciplines (natural science or social science), financing supported (by parents or by school) and their years in college (1 & 2 years, 3 & 4 years). (2) Exploring the differences in the motivation factors among the collegiate athletes' athletics-grades (Elite-Grade, Major-Grade, and Participate-Grade). 3) Examining the current statuses of the CGAs' health-related behaviors that voluntarily participated in the present study.

5. Results

All the results were summarized in Table 1 to Table 5. The goals are to reveal what reasons or factors actually motivated these CGAs to engage in the sport and reveal their status of health-related behaviors. Of the 200 questionnaires distributed, 163 were

completed correctly and returned to the research coordinators. This represented a good return rate of 81.5%. Data in Table 1 reflected "General Information of the participants". Such as 87.70% of them reported that they have been officially engaged in gymnastics practicing and competitions for 2-4 years. Their height range for males was from 165–182 CM, for females, was from 151 – 173 CM. Their weight range for males was 61 KG (± 9.5); for females, it was 52 KG (± 6.4). Or their BMI for male: Mean = 19.78 (± 1.21); for female: Mean = 19.89 (± 1.26). Currently, they were studying in a collegiate/university in the PRC; the specific year distribution for he/she is the college/university were: Freshmen = 50 / 30.67%, sophomore = 52 / 31.90%, Junior = 31 / 19.02%, Senior = 30 / 18.40%.

What worth to mention about these participants were: 1) based on the frequency of these CGAs attending competition, we have re-group them into 1 & 2 years' as a group and '3 & 4 years' as another group; and 2) for the Elite/master athletes (18 / 6.36%) and the 'First-class athletes' (91/32.15%) we have re-grouped them into the 'Elite-group'; and for the 'Second-class' (135/47.70%) we have renamed into 'Major group' and for the 'Third-class '(39/13.78%) we have renamed them as 'Participate-group'. This way can better illustrate the reality of how these CGAs practices and competitions under the FUSC (2018) administration in the PRC. Table 1 reflected the 'General information about the Gymnastics athletes in this study:

Table 1: General Information about the Participants (*N* = 163, 66 Male, 97 Female)

Number	Questions	Answers	Frequency	Percentage
1.	What is your gender?	Male	66	40.50%
		Female	97	59.50%
2.	What is your BMI?[note]	Answer for male: Mean BMI	19.78 (± 1.21)	
		Answer for female: Mean BMI	19.89 (± 1.26)	
3.	What is your year in college / university?	Freshmen	50	30.67%
		Sophomore	52	31.90%
		Junior	31	19.02%
		Senior	30	18.40%
4.	How long have you officially engage in gymnastics practiced?	One year	20	12.27%
		Two years	39	23.93%
		Three year	67	41.10%
		Four or more years	37	22.70%
5.	What is your Athletics-class?	Elite/master	18	6.36%
		First-class	91	32.15%
		Second-class	135	47.70%
		Third-class	39	13.78%
6.	Financially, who supported you engaged in gymnastics practices and competitions	My parents	81	49.69%
		My school / team	82	50.31%
7.	Which science your major in?	Natural science	42	25.77%
		Social science	121	74.23%
8.	What reason or factor originally motivated you participate in gymnastics	For become a professional athletes	26	15.95%

	competition?	For extra credits get in a college / university	69	42.33%
		For become a non-professional athletes	23	14.11%
		For others reasons	45	27.61%

Note: The BMI were calculated using the formula of kg/m^2

The mean scores and the standard deviations of motivation factors / reasons (MF) that actually motivated these collegiate gymnastics athletes are presented in Table 2:

Table 2: Motivation factors (MF) that motivated the collegiate gymnastics athletes: Means score and standard deviations (*N* = 163, 97 Female, 66 Male)

Motivation Factors (MF)	Mean ± S.D.	Sum	Rank
MF 1: Because gymnastics high technical content and unique value	4.049 ± .961	659.99	1
MF 2: For the fun and get rid of boredom	2.258 ± .953	368.05	15
MF 3: For getting healthier whole body	2.024 ± .895	329.91	19
MF 4: For the enjoyment and have happiness	2.496 ± .914	406.85	11
MF 5: In order to meet my friends	2.718 ±1.062	443.03	6
MF 6: In order to make new friends	2.331 ±1.024	379.95	14
MF 7: In order to contest winners	2.147 ± .970	349.96	16
MF 8: In order to shape the body	3.816 ±1.031	622.01	2
MF 9: In order to improve physical health	2.118 ± .895	345.23	18
MF 10: For the near future may become a professional athlete	2.589 ±1.058	422.01	7
MF 11: In order to foster self-esteem	2.460 ±1.594	400.98	12
MF 12: In order to improve my own reputation	2.135 ±1.317	348.00	17
MF 13: In order to establish prestige among my friends	3.497 ± .812	570.01	4
MF 14: In order to get the recognition from my teacher / coach	2.423 ±1.088	394.95	13
MF 15: In order to reduce the learning / working pressure	2.558 ±1.006	416.95	9
MF 16: In order to reduce the troubles from learning / work	2.564 ±1.048	417.98	8
MF 17: In order to develop a unique sport skill	3.810 ± .906	621.03	3
MF 18: Hope to become a gymnastics coach in the future.	2.521 ±1.107	410.92	10
MF 19: In order to satisfy the will of family	2.865 ±1.063	466.99	5

Note: a) Standard deviations (SD) b) the Motivation Factors (MF) 1, 2, 4, 7, 8, 10, 13, 14, 15, and 17 are 'Intrinsic motivation factors'; c) the MF 3, 5, 6, 9, 11, 12, 16, 18, and 19 are 'Extrinsic motivation factors'.

As showed in Table 2, the top six MFs were MF 1 'high technical content and unique value' (M = 4.049 ± .961); MF 8 'to shape the body' (M = 3.816 ±1.031); MF 17 'to develop a unique sport skill' (M = 3.810 ± .906); MF 13 'to establish prestige among my friends' (M = 3.497 ± .812); MF 19 'to satisfy the will of family' (M = 2.865 ±1.063); and MF 5 'to meet my friends (M = 2.718 ±1.062), these six factors possessed the highest impact power on these collegiate athletes' motivation. The middle six factors' mean score was in the medium level. These MFs were: MF 10 'to become a professional athlete'; MF 16 'to reduce the troubles from learning / work'; MF 15 'to reduce the learning / working pressure', MF 18 'to become a gymnastics coach'; MF 4 'for enjoyment and happiness'; and MF 11 'to foster self-esteem'. The mean scores and deviations of these six MSs were from 2.460 ±1.594 to 2.589 ±1.058. These six factors possess a medium impact power on these collegiate athletes' motivation. While the bottom seven MFs were MF 14 'to get

the recognition from my teacher/coach', MF 6 'to make new friends', MF 2 'for the fun and not boredom', MF 7 'to contest winners', MF 12 'to improve reputation', MF 9 'to improve physical health', and MF 3 'for healthier whole body'; the mean scores and deviations of these six MSs were from 2.024 ± .895 to 2.423 ±1.088. These seven factors possessed less or lowest impact power on these collegiate athletes' motivation.

The results of the 2 x 2 x 2 x 2 x 3 ANOVA for comparing the motivational factors for the collegiate gymnastics athletes are presented in Table 3:

Table 3: The 2 (*Gender*: male or female) x 2 (*Disciplines:* natural science or social science) x 2 (*Financing-support:* by parents or by school) x 2 (*Year-in-College:* 1&2 years, 3&4 years) x 3 (*Athletic-Grades: Elite-grade, Major-grade, Participate-grade*) factorial MANOVA Tests for the participants' motivation factors (N = 163, 97 Female, 66 Male)

Source	**Wilks' Lambda**	***F***	**Hypo *df***	**Error *df***	***P***
Gender	.381	3.949[b]	19.000	122.000	.000**
Disciplines	.792	1.683[b]	19.000	122.000	.048*
Financing support	.905	.673[b]	19.000	122.000	.839
Years in college	.828	1.330[b]	19.000	122.000	.177
Athletics-Grades	.251	.929[b]	38.000	246.000	.593

Note. b. Exact statistic; c. Computed using alpha = .05, * = $p < .05$, ** = $p < .01$.

The results of the 2 x 2 x 2 x 2 x 3 MANOVA in Table 3 showed that: no significant differences in the 'Financing support' ($p > .05$), $\Lambda = .905$, $F = .673$; the 'Years in college' ($p > .05$), $\Lambda = .828$, $F = 1.330$; and in the 'Athlete-Grades' ($p > .05$), $\Lambda = .251$, $F = .929$; however, significant differences effects were found in the 'Gender' ($p < .000$), $\Lambda = .381$, $F = 3.949$; and in the 'Disciplines' ($p < .048$), $\Lambda = .792$, $F = 1.683$. According to the research design, after the effects of the significant differences are found, the follow-up MANOVA would be conducted. This post hoc test determined where and what factors or reasons that truly motivated these collegiate gymnastics athletes to participate in their practices and competitions. Data presenting in Table 4 was from the follow-up MANOVA, it determined what Motivation Factors (MFs) really had differences and reflected the factors that truly motivated these CGAs to continually engage in gymnastics practices and competitions.

Table 4: Descriptive statistics of the collegiate gymnastics athletes' motivation factors after significant differences showed in *Gender and Disciplines* (N = 163)

	Gender Mean (SD)		**Disciplines Mean (SD)**	
Motivations Factors (MF)	**Female (n = 97)**	**Male (n = 66)**	**Social-science (n =121**	**Natural-science (n =42)**
MF1	4.546 ± .736*	3.318 ± .767	4.000 ± .974	4.190 ± .917*
MF2	2.257 ± .949	2.257 ± .965	2.281 ± .924*	2.190 ± .890
MF3	1.969 ± .929	2.106 ± .843*	2.496 ± .915*	1.785 ± .870
MF4	2.453 ± .968	2.409 ± .927	2.496 ± .914*	2.262 ±1.037
MF5	2.825 ± 1.089*	2.561 ± 1.009	2.793 ± 1.056*	2.500 ±1.064
MF6	2.350 ± 1.041	2.303 ± 1.007	2.372 ± 1.033*	2.214 ±1.000

MF7	2.123 ± .981*	2.181 ± .895	2.115 ± .976	2.238 ± .957
MF8	4.288 ± .763*	3.121 ± .984	3.818 ± 1.040	3.809 ± 1.017
MF9	2.268 ± .907*	2.045 ± .867	2.248 ± .868*	1.976 ± .949
MF10	2.691 ± 1.083*	2.439 ± 1.009	2.529 ± 1.065	2.762 ± 1.031*
MF11	2.701 ± 1.089	2.106 ± .930	2.578 ± 1.072*	2.119 ± .967
MF12	2.103 ± .929	2.181 ± 1.144	2.165 ± 1.427	2.047 ± .935
MF13	3.515 ± .805	3.469 ± .826	3.512 ± .797	3.452 ± .861
MF14	2.350 ± 1.071	2.530 ± 1.112*	2.462 ± 1.140	2.309 ± .923
MF15	2.639 ± 1.052*	2.439 ± .930	2.628 ± 1.033*	2.357 ± .905
MF16	2.608 ± 1.095*	2.500 ± .980	2.611 ± 1.067*	2.428 ± .991
MF17	3.886 ± .934*	3.697 ± .858	3.810 ± .888	3.809 ± .968
MF18	2.567 ± 1.206	2.454 ± .947	2.570 ± 1.131*	2.381 ± 1.034
MF19	2.866 ± 1.076	2.863 ± 1.050	2.859 ± 1.082	2.881 ± 1.017

Note: These are the results from the follow-up test: a) In '*Gender*' aspect, 11 out of 19 comparisons showed significant differences at $p < .05$*level with female scored higher than those of male in 9 comparisons but male scored higher than female in two comparisons; b) In '*Disciplines*' aspect, there were 12 out of 19 comparisons reached significant differences at $p < .05$*level with Social-science scored higher than those of natural-science but the Natural science scored higher than the Social science in two comparisons.

The findings from the Part III of the QCGAMHRB (Zeng, 2019) including 'Eating Habits', Nutrition Knowledge and Status', 'Risk Behaviours', and 'Hygiene Behaviors' four sub-categories, involved a total of 27 health-related behaviors as presented in Table 5:

Table 5: Summarize of CGAs' health-related behaviors in Part III of the QCGAMHRB (N = 163, 97 Female, 66 Male)

Behavior categories	Answers	Frequency and Percentage
Sub-category one. The 'Eating habits' (6)		
1. Do you eat regularly?	a. My eating is very regular.	(13 / 7.98%)
	b. My eating is regular.	(9 / 5.52%)
	c. My eating is unregularly.	(89 / 54.60%)
	d. My eating is very unregularly.	(52 / 31.90%)
2. How many meals do you eat a day?	a. Less than 3 times per day.	(0 / 0 %)
	b. 3 times per day.	(53 / 32.51%)
	c. 4-5 times per day.	(86 / 52.76%)
	d. Others.	(24 / 14.72%)
3. Do you add salt to your dishes?	a. Yes, always.	(17 / 10.43%)
	b. Sometimes, yes.	(26 / 15.95%)
	c. Sometimes – no.	(78 / 47.85%)
	d. No, I never.	(42 / 25.77%)
4. Do you try to cut down on the amount of sugars you eat?	a. Yes.	(39 / 23.93%)
	b. Sometimes – no.	(43 / 26.38%)
	c. Sometimes – yes.	(81 / 49.69%)

	d. No, I don't.	(0 / 0%)
5. How many glasses of milk or dairy products (yoghurt, juice) do you drink per day?	a. 1-2 cups.	(67 / 41.10%)
	b. 3-4 cups.	(17 / 10.43%)
	c. More than 5 cups.	(8 / 4.91%)
	d. I don' drink milk but yoghurt.	(71 / 43.56%)
6. Do you dine before and after strenuous exercise?	a. Yes.	(0 / 0%)
	b. Sometimes I do.	(0 / 0%)
	c. I occasionally do.	(6 / 3.68%)
	d. I never do so	(157/ 96.32%)
Sub-category two. 'Nutrition knowledge and status' (8)		
7. How is your knowledge status about nutrition?	a. Very good	(77 / 47.24%)
	b. Good	(9 / 5.52%)
	c. Ordinary	(58 / 35.58%)
	d. Not so good	(19 / 11.66%)
8. How often do you eat fruit?	a. Once per day	(67 / 41.10%)
	b. Twice per day	(89 / 54.60%)
	c. More than three times per day	(0 / 0%)
	d. Once every other day	(7 / 4.29%)
9. How often do you eat vegetables?	a. Once per day	(79 / 48.47%)
	b. Twice per day	(56 / 34.36%)
	c. Three times per day	(28 / 17.18%)
	d. Once every other day	(0/ 0%)
10. How often do you eat fish?	a. Once per day	(8 / 4.91%)
	b. Twice per day	(5 / 3.07%)
	c. Three times per day	(0 / 0%)
	d. Twice per week	(150 / 92.02%)
11. Do you eat whole meal bread? Yes:	a. Once per day	(66 / 40.49%)
	b. Twice per day	(6 / 3.68%)
	c. Once every other day	(34 / 20.86%)
	d. I don't eat whole meal bread	(57 / 34.97%)
12. How many times do you eat dinner with meat in a week?	a. 1-2 times	(0 / 0%)
	b. 3-4 times	(0 / 0%)
	c. More than 4 times	(145 / 88.96%)
	d. Every day in a week	(18 / 11.04%)
13. What is your favorite meat?	a. Chicken	(46 / 28.22%)
	b. Pork	(29 / 17.79%)
	c. Veal / Calf	(65 / 39.88%)
	d. Mutton / Lamb	(23 / 14.11%)
14. Do you eat fried foods?	a. Occasionally eat	(8 / 4.91%)
	b. Sometimes eat	(59 / 36.20%)
	c. Yes I like eat fried foods	(5 / 3.07%)
	d. No, I do not eat fried food	(91 / 55.83%)

Sub-category three. 'Risk behavior' (5)		
15. How often do you drink alcohol?	a. Never	(57 / 34.97%)
	b. Seldom	(9 / 5.52%)
	c. Once in a while	(61 / 37.42%)
	d. Whenever have a reason	(36 / 22.08%)
16. Do you smoke cigarettes?	a. Never	(88 / 53.99%)
	b. Seldom	(49 / 30.06%)
	c. Once in a while	(26 / 15.95%)
	d. Whenever have a reason	(0 / 0%)
17. Do you use any psychoactive substances?	a. Never	(163/ 100%)
	b. Seldom	(0 / 0%)
	c. Once in a while	(0 / 0)
	d. Whenever have a reason	(0 / 0%)
18. Did you use anabolic steroid?	a. Never	(163 / 100%)
	b. Seldom	(0 / 0%)
	c. Once in a while	(0 / 0%)
	d. Whenever have a reason	(0 / 0%)
20. Do you know what health consequences to applying prohibited anabolic steroid or different kind of doping substances?	a. Yes, I know them well	(136 / 83.44%)
	b. Yes, I know some of them	(27 / 16.56%)
	c. No, I am not sure	(0 / 0%)
	d. No, I don't know them at all	(0 / 0%)
Sub-category four. 'Hygiene behaviors' (8)		
21. Do you use sun cream when you practice in Gymnastics?	a. Never	(115 / 70.55%)
	b. Seldom	(7 / 4.29%)
	c. Once in a while	(19 / 11.66%)
	d. Whenever have a reason	(22 / 13.50%)
22. Do you take a shower after practicing or competition?	a. Yes, of cause I do	(128 / 78.53%)
	b. No, just want to back to my dorm	(35 / 21.47%)
	c. Most of time I do	(0 / 0%)
	d. No, because I do not want to	(0 / 0%)
23. How often do you wash your hands daily?	a. One time	(0 / 0%)
	b. Two to three times	(0 / 0%)
	c. Before every meal	(148 / 90.80 %)
	d. Whenever it is need to	(15 / 9.20%)
24. How often do you brush your teeth daily?	a. Once per day	(0 / 0%)
	b. Twice per day	(139 / 85.28%)
	c. Three times per day	(24 / 14.72)
	d. Never	(0 / %)
25. Do you use extra hygiene mouth? (If a 'Yes' circle the	a. Dentist's threads	(12 / 7.36%)

things you used):	b. Teeth Liquids to rinsing	(51 / 31.29%)
	c. Dental floss	(68 / 41.72%)
	d. I use teeth pick hygiene mouth	(32 / 19.63%)
26. After an intensive practice, how was the quality of your sleep?	a. Very good	(19 / 11.66%)
	b. Good	(29 / 17.79%)
	c. Normal	(61 / 37.42%)
	d. Not so good	(54 / 33.13%)
27. After an intensive competition, how is the quality of your sleep?	a. Very good	(9 / 5.52%)
	b. Good	(6 / 3.68%)
	c. Normal	(8 / 4.91%)
	d. Not so good	(140 / 85.89%)
28. When sweating, do you drink water or beverages immediately?	a. Yes, I drink water immediately	(47 / 28.83%)
	b. I don't drink any of them immediately	(19 / 11.66%)
	c. I drink beverages immediately	(6 / 3.68%)
	d. I drink water but not immediately	(91 / 55.83%)

Data presented in Table 5 reflected the precious features and current status of these CGAs' health-related behaviors. The researchers believe that these four sub-categories of health-related behaviors are very important to these collegiate gymnastics athletes and possess a positive relationship with their successful rate during their collegiate athletes period. That is, the better their health-related behaviors, the higher the success rate for them to become elite collegiate gymnastics athletes. Additionally, these findings worth coaches, trainers, teachers, and administrators who have been worked for the collegiate athletes to pay closer attention, and really figure out the ways to educate and reinforce their collegiate athletes students to gradually develop positive health-related behaviors, so that the athletes from the day one of she/he represent her/his college/university clearly know that gradually develop a positive participation motivations and health-related behaviors are two very important factors during they compete in the collegiate athletics level.

The following are the most significant findings highlighted from Table 5: 1) about 86.5% of their 'Eating habits' were in the categories of un-regularly and very un-regularly. 2) 85% of them eat three-five times per day. 3) About 73% of them did not add salt to their dishes. 4) About 74% of them did try to reduce the number of sugars they eat. 5) Only 56% of them drink one to five cups of milk/yogurt/juice per day. 6) 96% of them reported they never eat before and after strenuous exercise. 7) 86% of them reported they possess good to very good nutrition knowledge. 8) 96% of them claimed they eat fruit every day. 9) 100% of them reported they eat vegetables every day. 10) 100% of them reported they eat fish but only 5% of them ate fish once per day and 92% of them said they eat fish twice per week. 11) 35% of them reported they did not eat

whole meal bread; 12) 100% of them reported they eat dinner with meat. 13) 28% of them in favor eat chicken, 18% in favor eat pork, 40% in favor eat Veal / Calf, and 14% in favor eat Mutton / Lamb. 14) 56% of them reported they did not eat fried foods. 15) About 50% of them reported they did not drink alcohol; 16) 84% of them reported they did not smoke cigarettes, but about 16% of them admitted they smoke cigarettes occasionally. 17) 100% of them said they never use any psychoactive substances. 18) 100% of them said they never use anabolic steroids; 19) 83% of them reported they know the health consequences well about using the prohibited anabolic steroid. 20) Only about 25% of them claimed they use sun cream during their practice/performing. 21) 79% of them said they take a shower after practicing or competition. 22) 100% of them reported they wash their hands before eating or whenever it is needed. 23) 100% of them claimed they brush teeth 2 -3 times per day. 24) 100% of them said they use extra hygiene mouth. 25) About 67% of them claimed they had normal to a good sleep after an intensive practice. 26) But about 86% of them claimed they did not have good sleep after an intensive competition. 27) 12% of them said that when they sweat they did not drink water or beverages immediately but 56% of them said they claimed: "I drink water but not immediately" (for more detail see Table 5).

5. Discussion

The present study was designed for (1) exploring the current status and features of the collegiate gymnastics athletes' participation motivations from a selected regional conference of 'CCGA'; (2) examining whether or not differences exist in the MFs among the participants' 'Gender', 'Disciplines' 'Financing support'. 'Year in College', and 'Athletics-grades' aspects; and (3) investigating the current status of health-related behaviors of these collegiate gymnastics athletes.

First, according to the data exhibited in Table 2, the scores placements can be divided into three groups: The high impact factors group, containing MF1, MF8, MF17, F 13, MF 19, and MF 5, and these six FMs possessed the highest score and impact power on this collegiate gymnastics athletes' motivation. Interestingly, among these six MFs, the MF1, MF 8 FM 17, and MF13 are in the 'Intrinsic factors' category, while the MF19 and MF 5 are in 'Extrinsic factors' category. Second, the medium impact MFs group with medium-high scores, containing MF10, MF 16, MF 15, MF 18, MF 4 and MF 11, possessed medium impact power on these collegiate athletes' motivation. Unlike the first group, this group has three MFs (that are MFs 10, 15 and 4) belong to the 'Intrinsic factors' category; the other three MFs (that are MFs 16, 18, 6, and 11) belong to the 'Extrinsic factors' category. Third, the lower impact MFs group, consisting of MF 14, MF 6, MF 2, MF 7, MF 12, MF 9, and MF 3, possessed significantly lower impact power on these participants' motivations. Incredibly, there are three MFs belong to the 'Intrinsic factors' category (MFs 14, 2, and 7); but containing four MFs from the ''Extrinsic factors' category (MFs 6, 12, 9, and 3) see Table 2 for detail.

In summary, with regard to these collegiate gymnastics athletes' participation motivation features, both 'Intrinsic factors' and 'Extrinsic factors' possess a quite similar impact power on their motivations; but with the 'Intrinsic factors' possess slightly stronger impact power than those of the 'Extrinsic factors'. It can be concluded that: the ten 'Intrinsic factors' in the QCGAMHRB (Zeng, 2019) were the core motivation factors for these collegiate athletes. There are some factors or reasons that possessed a higher impact power than the other factors, and some factors or reasons possessed less impact power than the other factors as well. Based on the findings from the present study, the collegiate athletes' coaches, trainers or administrators should diagnose and analyze their athletes' specific situation and implement the findings accordingly.

Furthermore, the after significant findings follow up MANOVA test revealed that: 11 out of 19 comparisons in the 'Gender' aspect showed significant differences at $p < .05$ level. First, females scored significantly higher than male in the following nine MFs: MF1 'high technical content and unique value', MF5 'to meet my friends', MF7 'to contest winners', MF8 'to shape the body', MF9 'to improve physical health', MF10 'for become a professional athlete', MF15 'to reduce pressure', MF16 'to reduce the troubles from learning/work', and MF17 'to develop a unique sport skill', These nine MFs exactly reflected the characteristics of the female athletes. Second, there were two MFs reached $p < .05$ level with male scored significantly higher than that of female: MF3 ''for getting healthier whole body' and MF14 'to get the recognition'; It is understandable that when these male athletes were facing these two MFs, their reaction or responses were different from their female teammates. These male athletes who were motivated by 'become a professional' and 'become a gymnastics coach' were lots of more exciting, because these athletes possessed more competition experience, maybe higher athletics-grade, and stronger feelings, and that were true motivation factors have driven them to involve gymnastics practices and competitions for years. Moreover, these athletes might also serious about 'getting extra credit' for their future, because in the near future their athletics achievement might beneficial for them to get into their ideal company or job (see Table 4 for detail).

On the other hand, with regard to the 12 out of 19 comparisons reached significant differences at $p < .05$ level in 'Disciplines', A common believed was that athletes from the Social-science group are more outward in personality, this type of individuals are prefer attend activities or / and through performance express themselves. In compare to the athletes from the Nature-science group, they are tend to more inward in personality, good at thinking, logical reasoning and make things clear; this is why they scored significantly higher in FM1 'high technical content and unique value' and FM10 'for near future become a professional athlete' (see Table 5 for detail).

Jeffery Deal, C., and Camiré, M. (2016) indicated that student-athletes engaged in the sports they like have response: first is to satisfy their needs for autonomy, competence, and relatedness. Second, motivations to participate in a sport for certain periods of time are a complex combination of intrinsic and extrinsic motivations and not a simple type of motivation. Participation in sports practices and competition

during the college/university years helped the student-athletes gain the knowledge and understanding the need for their future career decisions and able to develop a willingness for long-term participation. First, that is highly consistent with the findings on the three needs (1) autonomy, (2) competence, and (3) relatedness. Second, the present study also indicated that the selected collegiate gymnastics athletes were motivated by both intrinsic and extrinsic motivations. Moreover, the findings of the present study also confirmed and supported the points of view that different gender and 'Athlete-grades' need different motivation factors to drive or stimulate them to continually participate in their gymnastics practice and competitions.

Kilpatrick and Bartholomew (2010) stated that college-students participant in sports was more likely to relate to intrinsic motivations, such as enjoyment and challenge; while for physical exercises were more tend to be extrinsic motivations such as focused on appearance and weight and stress management. The researchers suggest that for motivating collegiate athletes' participation, the coachers or athletics advisers need to do more in deeper understand their needs that may generate more appropriate recommendations or pieces of advice.

As presented above, although our study and their study were conducted in different sports and counties, the findings have many similarities. Specifically, the top to medium impact power factors or reasons for the collegiate-athletes keeping engaged in the sports they like were similar. Meanwhile, when contrasting the factors or reasons of 'feeling important and popular', 'earning rewards', 'team atmosphere' and 'good relationship with coach' from the previous studies with the factors of 'technical content and unique value', 'unique skills', 'for fun', 'for establish prestige', 'become a professional athlete', 'for self-esteem', 'to contest winners', and 'become a coach' from the present study, many differences did exist between their studies and our study.

Regard to athletes' health-related behaviors, Diehl et al. (2012) conducted a profound review of literature, in athletes' eating behaviors the researcher summarized that: many studies reported that the eating behavior of athletes was healthier in some respects than those of non-athletes or less athletic young peoples, and several large studies demonstrated that athletes self-reported they were in favor eating fruit and vegetable. The researcher also summarized that both high-involved athletes and low-involved athletes had macro- and micronutrient intakes below recommended levels for essential minerals, carbohydrates, and overall caloric intake. As to the 'performance-enhancing drug use', the research stated that performance-enhancing drug use was discussed in 16 articles. The prevalence of ever having used anabolic steroids ranged between 2% and 6% with a combined prevalence of 4%, and the researchers further indicated that the prevalence increased by the level of competition. Young adolescents in particular engaged in strength training, football, and weight-dependent sports were more likely to use anabolic steroids than athletes engaged in other kinds of sport (Diehl et al., 2012). The researchers concluded that: 1) athletes were more likely to consume alcohol, smokeless tobacco, and steroids than non-athletes; and 2) athletes were less likely to smoke and to use marihuana than non-athletes.

Our study did an exploring investigation in the area of athletes' health-related behaviors; because this an initial try, its design, data collection and analyses are far from perfection. However, it should be a good start for notifying researchers to pay attention to health-related behaviors study in the domain of collegiate athletics research. To the results presented in Table 5, we cannot accurately make an assessment on how good or not about their 'Health-Related Behaviors', but the findings in Table 5 did reflect the current status of 'Health-Related Behaviors' of the participants. Generally speaking, this is a set of qualitative data. If its description was based on four points of "Excellent [4], Very-good [3], Good [2], and Not so good [1], then, their overall status should be on the position between 'Very-good' to 'Good of the scale. However, there is one area that has to be pointed out is: in the 'Eating habits' sub-behaviors, there were about 86.5% of these athletes were falling in the categories of un-regularly and very un-regularly. This result was consistent with the finding of the previous study (Lyons, 2017; Thompson, 2018) but the professionals who work for the collegiate gymnastics athletes need to pay closer attention to this issue.

It means (1) in general, during their practices and competitions these collegiate-athletes had obtained positive and corrective education in 'Eating habits', 'Nutrition knowledge', 'Risk behaviors', and 'Hygiene behaviors' from their coaches, academic advisers, and administrators. (2) There are rooms for improvement regarding these collegiate-athletes, especially in the 'Eating habits' sub-behaviors. (3) The results of the assessments have also indirectly reflected these collegiate-athletes teams/colleges/universities have pretty positive regulations or legislation to manage their athletes' daily life, but some of the rules may need to make even more strictly so that the athlete can form healthier habits. From the health education perspective, we believe that is a beautiful and meaningful thing that deserves to recommend to the other collegiate-athletes. With this consideration, this point is consistent with the point of a literature review article by Geidne, Quennerstedt, and Eriksson (2013); the researchers indicated that with regard to building healthy public policy, youth sports teams/schools should recognize and match up with the changes in regulations or legislation at a central level, and then carry out these regulations or legislation to different types of teams or schools. All of these changes in legislation, organization, or policies there is one thing in common: that is put health on the agenda (Geidne et al 2013).

6. Recommendations

The present study explored the collegiate gymnastics athletes' participation motivations and health-related behaviors from the PRC. The top 10 MFs for these collegiate gymnastics athletes' engaged in their practices and competitions are: MF 1 'high technical content and unique value'; MF 8 'shape the body'); MF 17 'develop a unique sport skill'; MF 13 'establish prestige among my friends'; MF 19 'satisfy family's will'; and MF 5 'meet my friends, MF 10 'become a professional athlete'; MF 16 'reduce the

troubles from learning/work'; MF 15 'reduce the learning/working pressure', MF 18 'become a gymnastics coach'; MF 4 'enjoyment and happiness'. These 10 MFs have been found as the core value of these collegiate athletics' participation motivations. Other than that, team atmosphere and good relationship between coaches and athletes also influenced these collegiate athletes' participation motivations. Moreover, although the values of collegiate athletes' participation motivations have been recognized by those previous sports researchers (e.g., Malina & Cumming, 2003; Kilpatrick, Hebert, & Bartholomew, 2010; Jeffery Deal & Camiré, 2016; Lyons, 2017; Thompson, 2018). Further studies, however, are definitely needed, especially in the area of how intrinsic motivation and extrinsic motivation work differently on different types of collegiate athletes; for example, a) athletes who competed in different branch of gymnastics; b) athletes who financing support by their parent or by their team od club, etc. Additionally, the health-related behaviors were explored in the present study might be another topic for researchers who are interest in collegiate athletics to pay closer attention, because only those athletes who have developed their positive health-related behaviors during their college/university years have a chance to become elite athletes od make their athletics dream come true. To more effectively and accurately employ the findings of this investigation for the purpose of better service their collegiate athletics, coaches and educators need to base on a profound diagnosis and analysis to their athletes' situations.

6.1 Application in sports

The findings of the present investigation added a set of new data and information regarding the essential factors or reasons that truly motivated the collegiate gymnastics athletes to participate in their practices and competitions; and the precious features about these athletes' health-related behaviors. These findings provided examples and meaningful pieces of evidence for the coaches, teachers, and administers who want to reform or reinforce their athletic programs. If this can be done, it might lead to better coaching strategies and training programs, more effective academic instruction and management strategies that are really needed in the field of collegiate gymnastics athletics.

7. Conclusion

With respect to the research questions that guided this study, the findings revealed that: "No significant differences exist on the motivation factors between the 'Financing supports', 'Years in college' and 'Athletics-Grades' (p > .05) three aspects"; but significant differences exist on the motivation factors between the 'Gender' (p <. 000) and the 'Disciplines' (p <. 048). See Table 3 for detail.

In conclusion, 1) the findings of this investigation exposed: 'Financing supported', 'Year in college', and 'Athletics-grades' are not the determination aspects; but the 'Gender' and 'Disciplines' aspects are. 2) Female collegiate gymnastics athletes

(CGAs) possess higher participation motivations than that of male CGAs; the CGAs who are major in Social-science possess higher participation motivations than that of CGAs who's major in Natural-science. 3) As to the types of motivations, those 'Intrinsic factors' possess slightly higher impact power than those of the 'Extrinsic factors'. (See Table 2 and Table 4 for details). 4) With regard to the health-related behaviors, a qualitatively conclude can be made: the mean score of the participants' health-related behaviors for all 27 items were 2.73 - between the position of and 'Very good' [3] and 'Good' [2] by using a four points assessment scale; means that this sample's CGAs' healthy-related behaviors have rooms for improvement.

7.1 Limitations

The following are the limitations of the current study. 1) To a country, the size of sampling is not large enough for better reflecting the collegiate gymnastics athletes' current motivations status and health-related behaviors; the sample size needs to be increased. 2) Coaches and academic advisers of the collegiate gymnastics athletes might have impact or influence on their participation motivations, such as Mageau and Vallerand (2003) described that along with the athletics training processes through which coachers behaviors may have generated a positive influence on athletes' intrinsic and self-determined extrinsic Motivation (Mageau & Vallerand, 2003). But coachers' behaviors were not being included in the present study. 3) The participants in the current study were selected from only 12 teams. Future studies can be improved on the above limitations by enlarging the sampling size, extend to more collegiate gymnastics athletics teams; and involving coaches and academic advisers to the objects of study, this can be done by using some open-ended questions.

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