



ISSN: 2785-2997

Journal of Human, Earth, and Future

Vol. 4, No. 3, September, 2023



Exercise Motivation among Fitness Center Members: A Combined Qualitative and Q-Sorting Approach

Truong Thanh Nam^{1, 2, 3}, Charuai Suwanbamrung^{1, 2}, Omid Dadras⁴, Xiang-Yu Hou⁵,
Doan Hoang Phu⁶, Pham Trung Tin^{1, 3}, Huynh Khai Quang³, Thai Thi Ngoc Thuy⁷, Temesgen
A. Ageru^{1, 8}, Saifon Aekwarankoon^{9, 10}, Sang-arun Isaramalai¹¹, Cua Ngoc Le^{1, 2*}

¹ Public Health Research Program, School of Public Health, Walailak University, Nakhon Si Thammarat, 80160, Thailand.

² Excellent Center for Dengue and Community Public Health (EC for DACH), Walailak University, Nakhon Si Thammarat, 80160, Thailand.

³ Faculty of Public Health, Can Tho University of Medicine and Pharmacy, Can Tho City, Vietnam.

⁴ Department of Global Public Health and Primary Care, University of Bergen, Bergen, Norway.

⁵ Poche Centre for Indigenous Health, The University of Queensland, Brisbane, Australia

⁶ Doctoral Program in Health Sciences, College of Graduate Studies, Walailak University, Nakhon Si Thammarat, 80160, Thailand.

⁷ Faculty of Medicine, Can Tho University of Medicine and Pharmacy, Can Tho City, Vietnam.

⁸ Department of Medical Laboratory, Wolaita Sodo University Teaching and Referral Hospital, Wolaita Sodo, Ethiopia.

⁹ School of Nursing, Walailak University, Nakhon Si Thammarat, 80160, Thailand.

¹⁰ Excellence Center of Community Health Promotion, Walailak University, Nakhon Si Thammarat, 80160, Thailand.

¹¹ Faculty of Nursing, Prince of Songkla University, Songkla 90110, Thailand.

Received 09 May 2023; Revised 11 August 2023; Accepted 19 August 2023; Published 01 September 2023

Abstract

This study aimed to explore the components of Exercise Maintenance Motivation (EMM) and identify its consensus and distinguishing aspects among members of fitness centers (FCs) in Vietnam. The study incorporated both qualitative and Q-sorting methodologies across two stages. The first stage involved conducting ten in-depth and four focus-group interviews with 39 members of six different FCs in Vietnam, resulting in the generation of 40 EMM statements. In the second stage, these statements were subjected to Q-sorting by 39 participants. The KADE application for the Q method was used for data analysis, and Principal Component Analysis was employed to determine the optimal number of factors. The analysis yielded four factors, encompassing 34 statements and accounting for 86% of the variance in EMM components among participants. These components, labeled “F1. Exercise achievements”, “F2. Exercise environments”, “F3. Exercise enjoyment”, and “F4. Workout-aholic”, achieved consensus among 17 (37%), 14 (30%), 5 (12%), and 3 (7%) participants, respectively. The leading motivational expressions were “get to be healthier”, “a better-looking appearance”, and “get a fit body appearance”. These were followed by FC-based supportive exercise conditions, positive feelings, and exercise addiction. There were five consensus statements that spanned all four factors. The numbers of distinguishing statements varied across factors, with F1, F3, and F4 each contributing 11 (28.2%) and F2 contributing 15 (38.5%). This study contributed to the four central drivers of EMM. To facilitate the development of a comprehensive EMM scale, future research should incorporate larger samples, allowing for a dissection of motivational paradigms.

Keywords: Exercise Maintenance; Motivation; Fitness Center; Q-Sorting; Vietnam.

* Corresponding author: cua.le@wu.ac.th

 <http://dx.doi.org/10.28991/HEF-2023-04-03-07>

➤ This is an open access article under the CC-BY license (<https://creativecommons.org/licenses/by/4.0/>).

© Authors retain all copyrights.

1. Introduction

Regular physical activity, specifically through sustained exercise routines, has been empirically linked to numerous health benefits [1, 2]. Conversely, a lack of physical activity is associated with increased morbidity and mortality due to non-communicable diseases [3]. This is particularly pertinent in the context of Vietnam, where diminishing levels of physical activity among the populace contribute to pressing public health challenges, negatively impacting overall health and well-being [4]. Recent trends indicate a propensity for individuals to engage in exercise routines within fitness center (FC) environments, primarily motivated by health benefits [5]. According to the 2020 report by the Global Health and Fitness Association, 2.36% of the worldwide population are FC members [6]. In urban Vietnam, 28% of males and 21% of females report participation in FC activities [7]. Engaging in sustained exercise within an FC setting is posited as a strategy to counteract sedentary lifestyle consequences [8]. Nevertheless, empirical data reveal a concerning trend, as between 40% and 65% of individuals who commence exercise routines in fitness settings discontinue their participation within the first 12 months, a pattern that persists across diverse demographic groups, regardless of age, gender, or perceived guidance of the exercisers [9–11].

Prior research on FC patrons has highlighted the diverse motivations for joining and maintaining membership [5, 12–14]. The main motivational components for those initially engaged in exercise were related to health benefits and enhancement in physical appearance, with factors such as tangible physical transformations and a heightened sense of autonomy boosting commitment levels [14]. Similarly, long-standing FC members exhibit a tendency toward realizing desired health outcomes and improved physical appearance [5]. Motivational dimensions such as “weight loss”, “health”, “aesthetics”, and “hypertrophy” are mainly associated with participants’ continuing exercise at FCs [15]. From demographical aspects, young and middle-aged individuals exhibited more concerns about physical appearance, with women being more concerned than men. Middle-aged people valued the sense of being in control the most, with women appreciating it more than men. Older adults valued FC attributes less than their younger counterparts (convenience, extra amenities, and time-related issues), while women valued these qualities more than men [14]. Besides, regular exercise has been associated with higher levels of motivation for enjoyment and challenge within the first year of membership in an FC [13]. Engaging in diverse activities within the fitness environment, coupled with commitment-building strategies and bolstering encouragement from both staff and fellow members, serves to enhance the overall exercise experience, thereby nurturing a conducive atmosphere for sustained participation [5]. Interestingly, findings of a recent systematic review indicated that FC members reported higher motivation levels compared to those who exercised in other settings [16], such as public areas [17], academic institutions [18], and healthcare facilities [19, 20].

Given the multifaceted nature of human motivation in exercise, studies are recommended to identify and support a variety of motivational styles [21, 22]. Self-determination theory (SDT) serves as a robust framework to describe various types of self-determined motivation, playing a critical role in predicting the sustainability of exercise practices among FC members [23, 24]. The SDT indicates three forms of motivation, including amotivation, extrinsic motivation, and intrinsic motivation [23, 25]. While intrinsic motivation more strongly predicts long-term exercise adherence, extrinsic motivation more strongly predicts initial exercise adoption [26]. Both amotivation and extrinsic motivation have been identified as contributors to increased discontinuation rates in exercise routines, illustrating a negative trajectory [26]. This implies that external pressures may instigate a transient change in exercise habits; however, they fall short of facilitating enduring alterations in long-term exercise behaviors. In contrast, intrinsically motivated individuals, perceiving exercise as an indispensable part of their lifestyle, are more likely to maintain regular exercise over extended periods [27].

Previous studies have described the factors that drive the initiation and sustained adherence to exercise in fitness settings, predominantly focusing on English-speaking populations [11, 13, 26, 28]. However, there is a significant research gap in understanding these phenomena within various global contexts, particularly within Vietnam. Despite the substantial proportion of FC members in the population, there is a noticeable absence of comprehensive research exploring their exercise habits, with existing studies often being limited in scope and methodological rigor, such as mixed-methods approaches [28, 29]. Furthermore, they represent a particularly intriguing demographic, as their motivations for exercise may change from the initial stages of engagement to the maintenance phase [5, 12]. Thus, the present study has employed a mixed-methods approach to delve into the motivations underpinning regular exercise maintenance within the fitness setting, extending beyond the initial weeks of membership to encompass sustained engagement over several months. Assuming that the motivation for exercising varies from person to person, FC patrons have contrasting and consensual views about what drives them to engage in consistent exercise routines. The primary objectives of this study are to identify various components of Exercise Maintenance Motivation (EMM) and to ascertain the levels of consensus and variation related to EMM among FC members in Vietnam. Hence, the study seeks to answer the following research questions to achieve these objectives: (1) What constitute the motivational components among FC members for maintaining regular exercise? (2) How do these individuals quantitatively vary in their consensus and disagreement regarding statements related to EMM?

2. Research Methodology

2.1. Study Protocol

To ensure the comprehensiveness and rigorousness of this study, adherence to established methodological standards was prioritized. Specifically, the Critical Appraisal Skills Programme (CASP) checklist for appraisal of qualitative research (version 2018) was utilized to guide the evaluation process, serving the needs of information professionals and researchers [30, 31]. Additionally, established guidelines for the implementation of the Q-Sorting methodology were rigorously followed [32–35].

2.2. Study Design

This study employed a hybrid approach, integrating both qualitative research and Q-Sorting techniques, structured in two distinct stages (see Figure 1). The first stage was to qualitatively explore the components of EMM, achieved through conducting ten Individual Depth Interviews [36] and four Focus Group Discussions (FGDs) with FC members, personal trainers (PTs), and managers at FCs. Based on the results of the qualitative method, statements were generated within the dimensions of EMM. The second step of the study leveraged the Q-Sorting approach, engaging 39 FC members to quantitatively assess the levels of consensus and distinguish between the various EMM statements.

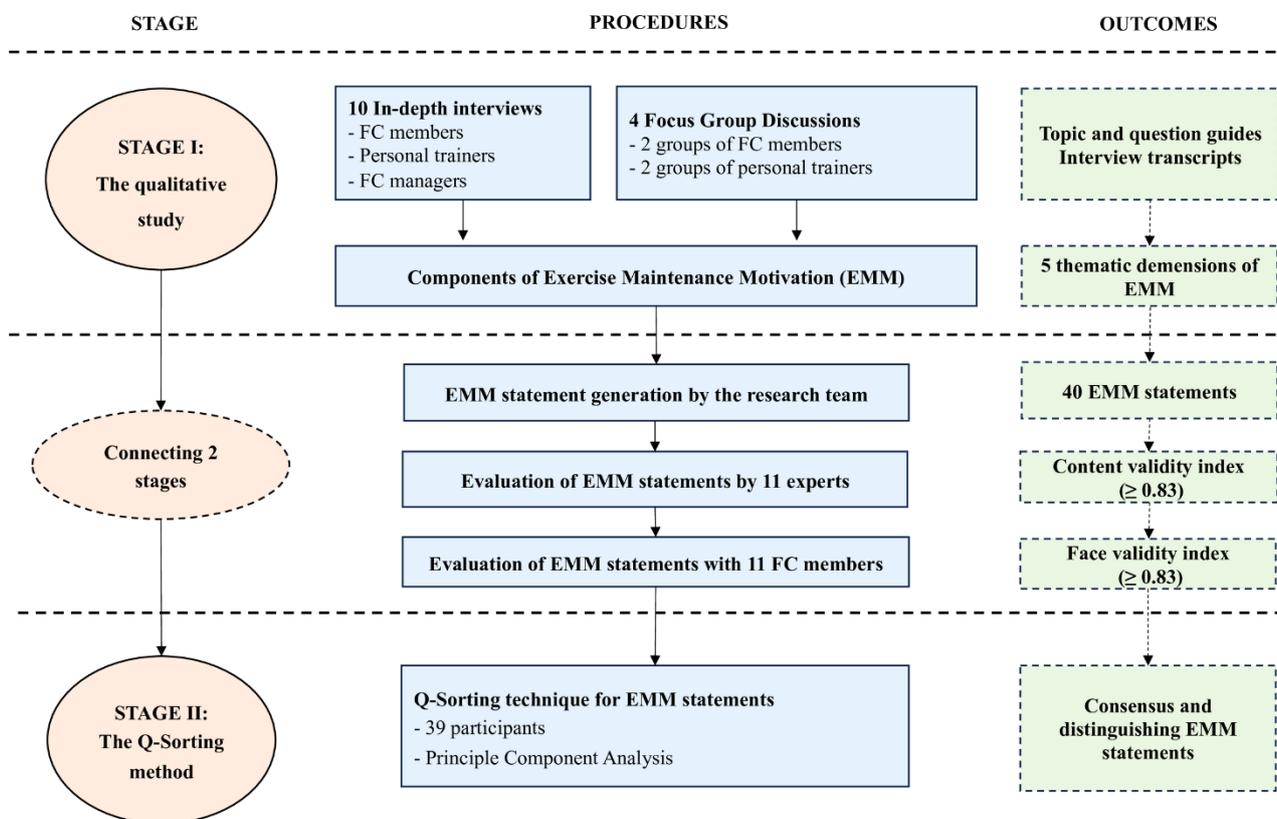


Figure 1. Study process for a combined qualitative and Q-Sorting approach

Stage I. The Qualitative Study

Purposive sampling was utilized to set the study areas based on high-density numbers of FCs in Can Tho City, Vietnam, and then select and recruit FC members [37]. Six FCs were purposely selected for data collection in two districts. A convenience sample of ten individuals, including two FC managers, two PTs, and six FC members, were recruited. In addition, four FGDs were arranged, involving two groups of FC members and two groups of PTs with prior experience working with FC members. Each FGD comprised a convenience sample of 8–10 participants. Full considerations were made to ensure that participants engaged in IDIs did not overlap with those in FGDs, maintaining an equal distribution across the six selected FCs. The inclusion criteria were as follows: 1) A minimum age of 18 years; 2) Owners/managers of FCs, running the present FCs for at least a year; 3) A minimum of one year’s experience for PTs in guiding FC patrons; and 4) A minimum of six months of exercise engagement in FCs for FC members. Individuals aiming for a bodybuilding competition or becoming a professional athlete, those engaged in physical exercises outside of FC workouts, and those with any chronic physical and/or psychological conditions or on any form of medication were excluded from the study.

In the data collection process, researchers approached six selected FCs and obtained voluntary and informed consent from FC owners/managers and PTs to join the study. This was followed by an invitation extended to FC members to participate in the qualitative study, with the completion of the survey being deemed consent for participation. All IDIs and FGDs were conducted in private rooms within the FCs, each session lasting approximately one hour, scheduled at convenient times for participants meeting the eligibility criteria. Following the initial three IDIs and two FGDs, the research team meticulously reviewed field notes, evaluating the contributions of each participant's insights to the overarching narrative of the study. This iterative process not only refined the data collection procedure but also facilitated the identification of the point of data saturation, marking the completion of the data collection phase.

Topic and question guides for IDIs and FGDs were developed, drawing upon extensive reviews of self-determined motivation and incorporating elements of both intrinsic and extrinsic motivations [22, 23, 38]. There were four main questions: 1) What motivates FC members to integrate exercise into their daily routines at FCs?, 2) What factors contribute to the sustained regular exercise habits among FC members?, 3) What are the barriers to maintaining regular exercise?, and 4) What strategies or motivations enable regular exercise maintenance?. Further techniques for IDIs [39–41] and FGDs [42–43] are described in Table A1. All materials related to the IDIs and FGDs, including fieldwork diaries, session minutes in hard copy, and audio recordings, were securely stored by the investigators in a locked cabinet and on a personal laptop to ensure the security of the data. Moreover, a comprehensive coding system was employed to anonymize the data from each IDI and FGD, ensuring the confidentiality of the information provided by the participants.

Content analysis was employed to analyze the qualitative data, consisting of five main steps: 1) Selecting the pertinent content for analysis; 2) Defining the units and categories of analysis; 3) Developing a set of coding rules; 4) Coding the text according to the rules; and 5) Analyzing the results and drawing conclusions [44]. The line-by-line coding of each participant's interview responses was informed by key terms of EMM. The two researchers independently coded each interview, entering all codes manually into an Excel matrix of qualitative data. The IDIs and FGDs were conducted in Vietnamese and then analyzed in the native language, ensuring a thorough comprehension of the meanings within the appropriate cultural and contextual frameworks. Sequentially, the English translation of the main findings was performed to allow discussion with the non-Vietnamese collaborators.

The qualitative study ensured its credibility, dependability, transferability, and confirmability through triangulation processes to establish trustworthiness [45, 46]. Fourteen IDIs and FGDs conducted among FC members, PTs, and FC owners/managers by four investigators added credibility to the study. The purposive selection of key informants, encompassing a diverse range of experiences, substantially increased the probability of garnering multifaceted insights into the research questions, as emphasized in prior studies [46]. This methodological rigor ensured a holistic understanding and interpretation of the phenomena under investigation, aligning with the established qualitative research protocols.

Stage II. The Q-Sorting Method

The first stage was followed by the connecting step (see Figure 1), where raw data derived from the qualitative study were used to generate a list of statements reflecting the EMM of FC members. This process involved data screening, data summarization, statement generation, and subsequent modification, ensuring alignment with the perspectives of the research team [47]. Following this, a panel of 11 domain experts conducted an evaluation to ascertain the content validity of the statements, ensuring an acceptable content validity index of a minimum of 0.83. Parallely, 11 FC members were engaged to appraise the face validity of the statements, aiming for a face validity index of >0.83 . This dual-phase validation process was meticulously undertaken to rigorously assess both the relevance and comprehensibility of the EMM statements, adhering to the methodological guidelines provided by Yusoff [48, 49].

Sequentially, the Q-Sorting approach, a quotative technique, was employed in the second stage. Thirty-nine participants in the qualitative study were re-invited to participate in the Q-Sorting step by conducting individual interviews. The number of participants and the process of interviews were based on the sampling criteria and guidance [35, 47]. Participants were invited to read, score, and allocate statements into a quasi-normal grid of cards according to their opinions. The statements were subject to a seven-point scoring scale, extending from -3 for strongly disagreeing to +3 for strongly agreeing. All four facilitators involved in this process had undergone comprehensive training in the Q-sorting technique before the study. Each interview session lasted for roughly an hour. A digital voice recorder was used to gather information throughout the conversations. Before enrolling in each interview, all participants provided written, informed consent.

Participants were instructed to express their level of agreement with each statement, and these rankings were subsequently converted into scores. The compiled dataset from Q-Sorting interviews was analyzed by the Principal Component Analysis (PCA), where the correlation matrix included EMM statements as observations and participants

as variables [33, 50]. The optimal number of factors that best characterized groups of participants were identified by using Varimax rotation, contingent on the heterogeneity of participant views as subjectively evaluated by the researchers [33, 50]. Factors that constituted a minimum of 5% of the total Q-Sorting and exhibited significant loadings were retained, with the most advantageous combination of factors elucidating over 40% of the cumulative percentage of variation [33]. Participants designated as confounders were those aligned with more than one factor. Distinguishing and consensus statements were identified based on the Q-Sort and Z-score values, indicating the relationship between statements and factors when the difference between the scores attained in any pair of factors was statistically significant ($p < 0.05$). Datasets from the Q-sorting interviews were stored and extracted using the KADE – a desktop application specifically designed for Q methodology [50].

3. Results and Discussion

3.1. Study Population

In the first stage, 50 individuals were totally invited for the qualitative study. However, three FC members and eight PTs could not attend the schedule due to personal commitments. As a result, the participant pool was comprised of 39 individuals, encompassing six FC members, two PTs, and two FC managers who participated in 10 IDIs, as well as 17 FC members and 12 PTs who took part in 4 FGDs. In the second stage, 39 participants were re-invited to participate in the Q-Sorting interviews. The average age (in years) and length of exercise (in months) of participants were 24.8 ± 4.1 and 47.3 ± 29.7 , respectively. The prevalence of male FC members was more than female (84.6% vs. 15.4%). Students accounted for the highest number of participants (38.5%), followed by personal trainers (35.9%), businessmen (7.7%), and others. Participants with undergraduate degrees made up 92.3%.

3.2. Themes of Exercise Maintenance Motivation from the Qualitative Study

The qualitative component of the study elucidates the EMM, drawing on the perspectives of key informants and categorizing their viewpoints into five thematic dimensions: (1) EMM by social effects, (2) EMM by personal exercise achievements, (3) EMM by exercise integration with life goals, (4) EMM by exercise interests and enjoyment, and (5) EMM by workout-aholic. Each thematic dimension was supported by participant quotes, selectively chosen for their representativeness and depth of insight. A summary of all quotes can be found in the Table A2.

EMM by Social Effects

It was predominantly driven by external stimuli, encompassing support from peers, familial encouragement, and conducive exercise environments. External evaluations concerning body image and health status from family, friends, physicians, and others play a pivotal role in maintaining exercise regimes. Some participants highlighted the significant impact of spiritual and financial support in facilitating critical decisions regarding their exercise commitment.

"I think that for FC members, to be able to spend that time exercising every day, their families must also provide spiritual and financial assistance. I think that their family must provide support." (male, 32 years old, IDI_FC member_3).

Within the fitness environments, individuals draw inspiration and guidance from FC managers, PTs, and admired public figures. Additionally, the interviewees emphasized the importance of the accessibility and convenience provided by the FCs' facilities and policies in shaping their exercise habits. They valued a diverse range of modern and up-to-date exercise equipment, proximity, indoor cleanliness, spaciousness, and financial feasibility, while in their opinion, affordability of exercise-related costs through promotional packages, legislation, and extended operational hours also played a crucial role. Conversely, the persistence of exercise routines was hindered by negative external influences, inadequate exercise conditions, and unforeseen disruptions in the FCs.

"In my opinion, EMM can come from FCs. Specifically, I like the FC to be empty, but the fact that too many people come to exercise will affect my exercise. For example, when I exercise with a large number of people, there will not be enough machines and tools to exercise, leading to boredom. I have to arrange another time so that the FC is less crowded. In addition, a variety of exercise equipment or the close distance to the FC also motivate to maintain a workout routine easily" (male, 22 years old, FGD_FC member_2).

EMM by Personal Exercise Achievements

Motivated FC patrons maintained their exercise routines through personal achievements derived from regular exercise habits. These achievements encompass a range of benefits, including enhanced health, building social relationships, knowledge acquisition, and a positive self-perception of exercise benefits, particularly within the FC setting compared to other exercise environments. The long-term members reported utilizing these facilities to attain the desired health benefits. It was commonly observed during interviews that these long-term members expressed a desire to sustain positive alterations in their physical appearance and body composition. This was motivated by a fear

of weight gain, an aspiration to fit into previously worn clothing, a reduction in abdominal circumference, an increase in muscle mass, a decrease in fat tissue, and, interestingly, an enhancement in sexual health. Furthermore, members of FCs commonly reported experiencing holistic health benefits, including stress relief, improved overall health with fewer illnesses, and an enhanced ability to concentrate accompanied by feelings of positivity, strength, and vitality. Consequently, improved quality of life was observed, manifested through healthier eating habits and improved sleep patterns. However, it is imperative to note that neglecting exercise sessions may result in adverse effects on one's health, eating habits, and sleep quality.

"The common exercise motive is the health advantages of working out. Actually, when I initially started exercising, I frequently had sinusitis and headaches. I noticed that after being an FC member for about a 3-month duration of regular exercising, my sinusitis had subsided. I was more comfortable with the benefits of good health that I had, to work well, eat well, and sleep well. I feel my body is healthier, and I feel more positive energy" (Male, 27 years old, FGD_FC member_2).

Additional benefits of exercise are observed when participants acquire knowledge about a healthy diet and the appropriate modalities of physical activity, subsequently enhancing employment prospects and fostering social connections. Individuals with prior experience in various sports often engage in comparative analyses, evaluating the merits of fitness-oriented exercise associated with other physical activities. They particularly emphasize the convenience of fitness exercise in achieving specific exercise objectives, establishing a precise exercise regimen, and effectively managing their time dedicated to physical activity.

"I realize that regular exercise in the FC is to communicate with more people and expand relationships. For example, some friends who accompany us or some other friends share knowledge, make questions and exchange exercise lessons" (female, 23 years old, FGD_FC member_1).

"For other kinds of sports, such as volleyball, I used to play with my friends in the afternoon, so it depended on the time of my friends. I will get bored playing alone if nobody has time to go with me. Therefore, I go to exercise in the FC to control my time positively." (male, 30 years old, FGD_PT_2).

EMM by Exercise Integration with Life Goals

Participants were motivated to work out in the FCs driven by a determination to cultivate consistent exercise routines aimed at modifying their body weight, enhancing physical appearance, and bolstering both physical and mental health as a part of their life goals. Some emphasized the crucial role that exercise plays in achieving their objectives.

"The top two goals of my life are weight and appearance, followed by physical and mental wellness." (male, 23 years old, IDI_FC member_1).

EMM by Exercise Interests and Enjoyment

The interviewees characterized the pleasurable sensations associated with engaging in physical activity in terms of enjoyment, tranquility, contentment, and a sense of well-being, whether undertaken individually or in a social context. Participants exhibited a sustained commitment to regular exercise, perceiving it as a voluntary duty and demonstrating resilience and perseverance in their pursuit of physical activity. Nevertheless, a discernible decrease in motivation for regular exercise was observed when participants experienced a diminishing interest in and enjoyment of the activity.

"When I get used to going to the FC, I am very delighted because I could exercise with friends. Currently, going to the FC is like a usual habit, which I have to do as fun. I find that most FC members quit exercise because they don't have enough interest to keep going. First, FC members must have the discipline to go to the enough number and time of exercise sessions weekly. Second, everyone considers going to exercise in the FC as a non-responsibility. Otherwise, regular exercise is too difficult for themselves. It is just to exercise for health." (male, 23 years old, IDI_FC member_1).

EMM by Workout-aholic

Fitness enthusiasts agreed that consistent daily exercise contributed to the formation of a habitual routine, while the omission of workout sessions could result in adverse emotional impacts.

"A person will feel addicted to exercise after engaging in it for a long time. My clients used to exercise regularly. However, they were forced to cease exercising due to their daily workload. I got to urge them to get back into working out for a while. They honestly admitted that they felt worn out and weak because of skipping exercise" (male, 29 years old, IDI_PT_1).

"They felt uncomfortable if they skipped a workout session. They experienced the same kind of fatigue. Some claimed that something was lost" (male, 27 years old, FGD_PT_2).

3.3. Components of EMM of FC Members from the Q-Sorting Method

3.3.1. Descriptions of the Principal Component Factor Analysis

Following the qualitative study, 40 final EMM statements were generated based on the list of opinions from different key informants. These statements underwent a rigorous validation process to ensure their relevance and appropriateness. Specifically, content validity was assessed by a panel of 11 experts in the field, resulting in acceptable content validity indices of ≥ 0.83 , confirming the statements' adequacy in capturing the intended constructs [48, 49]. Comprehensive details of the statements, categorized across five distinct themes of EMM, are provided in Table A3.

From 8 factors in unrotated factor matrix of the Principle Component Analysis (PCA), four factors (F1 – F4) were identified, each with an Eigenvalue of >1 [33, 50]. These factors cumulatively elucidated 86% of the total variance, with individual contributions of 37%, 30%, 12%, and 7%, respectively, as revealed by post-Varimax rotation. The Pearson correlation coefficients (r) calculated between these 4 factors were < 0.3 , showing a low association level and hence affirming their distinctiveness. The composite reliability of each factor was above average (0.8), which indicated its consistency and reliability. It is important to note, however, that due to the prioritization of participant subjectivity inherent in the Q-Sorting approach, issues of validity and reliability were not primary concerns in this study [47]. In addition, Figure 2 illustrates groups of participants without confounders contributing to 4 factors with their factor loadings.

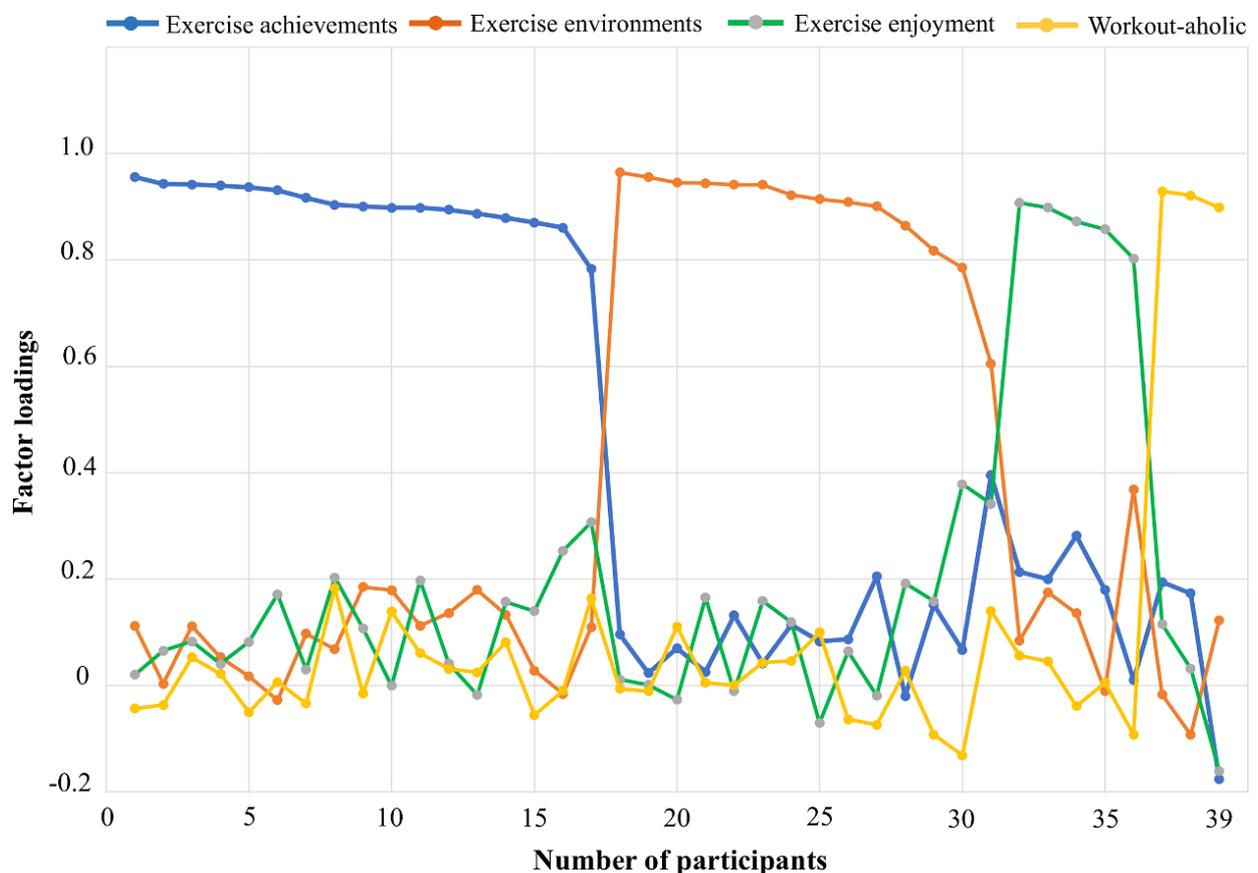


Figure 2. The group of participants contributing to 4 factors with its factor loadings. Each scatter plot uses dots to represent participants

Utilizing the Q-Sort analytical method, 34 statements related to EMM were extracted and subsequently interpreted across four distinct factors, derived from the initial pool of 40 statements (see Table 1). The assignment of descriptive labels to each factor was meticulously carried out based on the synthesis of results from various relevant statements, in conjunction with their respective Z-score values. It is imperative to note that the most pronounced Z-score values utilized for factor interpretation are those progressively approximating the extremities of the Q-Sort distribution table.

Table 1. The Q-Sort table for 4 factors

No	EMM statements	Factor 1		Factor 2		Factor 3		Factor 4	
		Z-score	Q Sort Value	Z score	Q Sort Value	Z score	Q Sort Value	Z score	Q Sort Value
1	EMM 13. I maintain exercise because I get more muscular body physique	1.799	3						
2	EMM 12. I maintain exercise because I get a fit body appearance	1.728	3						
3	EMM 11. I maintain exercise because I get a better-looking appearance	1.47	3						
4	EMM 18. I maintain exercise because I recognise positive changes in me	1.252	2						
5	EMM 7. I maintain exercise because I get to be healthier	1.221	2						
6	EMM 19. I maintain exercise because I get opportunities to socialized	1.207	2						
7	EMM 20. I maintain exercise because I get opportunities facilitating the connection with others	1.201	2						
8	EMM 8. I maintain exercise because I feel more energetic	1.137	2						
9	EMM 9. I maintain exercise because I get stronger	1.048	2						
10	EMM 14. I maintain exercise because I get weight balance	0.938	1						
11	EMM 15. I maintain exercise because I want to prevent illnesses	0.799	1						
12	EMM 17. I maintain exercise because I am aware of routine exercise habit	0.626	1						
13	EMM 16. I maintain exercise because I get relieved from daily life stress	0.576	1						
14	EMM 10. I maintain exercise because I get to eat well	0.422	1						
15	EMM 6. I maintain exercise because the fitness center is affordable			1.791	3				
16	EMM 4. I maintain exercise because the fitness center has complete exercise facilities			1.624	3				
17	EMM 3. I maintain exercise because I have support from others around			1.402	3				
18	EMM 5. I maintain exercise because the fitness center is closed to my living location			1.38	2				
19	EMM 1. I maintain exercise because others around ask me to exercise			1.228	2				
20	EMM 2. I maintain exercise because I try to have the similar body image of my favorite fitness idols			1.228	2				
21	EMM 30. I maintain exercise because I feel fun as doing exercise					1.901	3		
22	EMM 26. I maintain exercise because I feel more comfortable as doing exercise					1.499	3		
23	EMM 25. I maintain exercise because I feel more pleasure as doing exercise					1.418	3		
24	EMM 27. I maintain exercise because I feel relax as doing exercise					1.268	2		
25	EMM 29. I maintain exercise because I feel refresh as doing exercise					1.268	2		
26	EMM 31. I maintain exercise because I feel happy as doing exercise					1.268	2		
27	EMM 33. I maintain exercise because I am passionate to exercise							1.879	3
28	EMM 35. I maintain exercise because I do not want to give up exercise							1.879	3
29	EMM 36. I maintain exercise because I am addicted to exercise							1.879	3
30	EMM 34. I maintain exercise because I am patient to exercise							1.253	2
31	EMM 38. I maintain exercise because I feel frustrated if miss exercise sessions							1.253	2
32	EMM 39. I maintain exercise because I feel upset if miss exercise sessions							1.253	2
33	EMM 40. I maintain exercise because I am uneasy if miss exercise sessions							0.793	2
34	EMM 37. I maintain exercise because I regret if miss exercise sessions							0.768	2

3.3.2. Descriptions of Four Factors for EMM Components

In the following, descriptions of each factor, the EMM statement ordinal numbers, and the Q-Sort values are displayed with short descriptions in brackets. For example, statement number 1 (“EMM 1. I maintain exercise because others around ask me to exercise”) with its Q-Sort value of (+3) is presented as “others around ask to exercise” (1, +3).

Factor F1: “Exercise Achievements”

Factor F1 represented the majority of participants who were primarily focused on the beneficial outcomes achieved in the fitness exercise settings. Of the 39 interviewees, 17 FC members (43.6%) contributed to the F1. These participants highlighted that they were motivated to maintain exercise because of getting “a fit body appearance” (12, +3), “more muscular body physique” (13, +3), and “a better-looking appearance” (11, +3). They also stated being “healthier” (7, +2) as the health-related motive for FC members.

Factor F2: “Exercise Environments”

Factor F2 encompasses responses from 14 participants (35.9%), highlighting the influence of external environments on the exercise behaviors of FC members. This includes the impact of external encouragement and support, as well as conditions related to the FC itself. A predominant concern for these respondents centered around the financial feasibility of exercising, with emphasis on cost affordability (6, +3). Moreover, the availability of adequate exercise facilities at the FCs was acknowledged as a motivational factor for maintaining a regular exercise routine (4, +3). Similarly, the highest agreement was expressed regarding the effects of external support by surrounding people for fostering consistent exercise habits (3, +3). In addition, “others around ask to exercise” (1, +2) and “try to have the similar body image of favorite idols” (2, +2) were noted as contributing factors to sustaining exercise commitment.

Factor F3: “Exercise Enjoyment”

Five respondents (12.8%) were allocated to factor F3, demonstrating positive joyful experiences as doing workouts in FCs. Specifically, they confirmed that exercise sessions at the FC brought a feeling of “fun” (30, +3), “convenience” (26, +3), “pleasure” (25, +3), “relaxation” (27, +2), “refresh” (29, +2), and “happiness” (31, +2). Contrary to these positive sentiments, this subgroup expressed disagreement with the notion of discontinuing exercise due to “losing exercise enjoyment” (32, -2). Furthermore, they remained neutral in their response to associating exercise with a feeling of “joy” as doing exercise (28, 0).

Factor F4: “Workout-aholic”

The responses from three participants (7.7%) aligned with factor F4, highlighting the self-cognition of FC members about exercise passion and patience to maintain exercise, while also acknowledging the adverse psychological impacts associated with missed workout sessions. This group confirmed being “passionate to exercise” (33, +3), “addicted to exercise” (36, +3), “patient to exercise” (34, +2), and “reluctant to give up exercise” (35, +3) as motivators. Furthermore, participants also acknowledged negative feelings, such as “frustrated” (38, +2), “upset” (39, +2), and “uneasy” (40, +2), and even “regretful” status (37, +2) due to missing exercise sessions, contributed to the long-term exercise commitment.

3.3.3. Consensus and Distinguishing EMM Statements

Utilizing consensus EMM statements enables the elucidation of perspectives unanimously agreed upon by all participants. This methodology not only unveils the participants’ interpretations of the pertinent issues but also provides insight into the rationale behind their positions and contextualizes the central topics at hand. By proactively engaging individuals with divergent viewpoints, this approach serves as a strategic mechanism to bridge the significant knowledge gap in the field [34].

There were five consensus EMM statements expressed by all participants across four factors. They concurred that EMM 14, “get weight balance” and EMM 10 “get to eat well” served as pivotal motives for sustaining exercise, with ratings ranging from “(+1) to (+2). In contrast, they disagreed with EMM 32 “I will not maintain exercise if I lose exercise enjoyment”, and EMM 22 “maintaining exercise for appearance is a goal of life” to be strong motivators, with ratings ranging from (-1) to (-3). The neutral opinion (level 0) was given for the EMM 28 “I maintain exercise because I feel joyful as doing exercise” by all respondents. On the other hand, factor 2 exhibited 15 distinguishing statements, accounting for 38.5% of the responses, while the remaining factors (F1, F3, F4) each presented 11 statements, making up 28.2% of the responses. These EMM statements achieved statistical significance, with p-values falling below 0.05. Figure 3 provides a visual representation of participant opinions, showcasing the numbers of both consensus and distinguishing statements. Details of these statements are provided in Table A4.

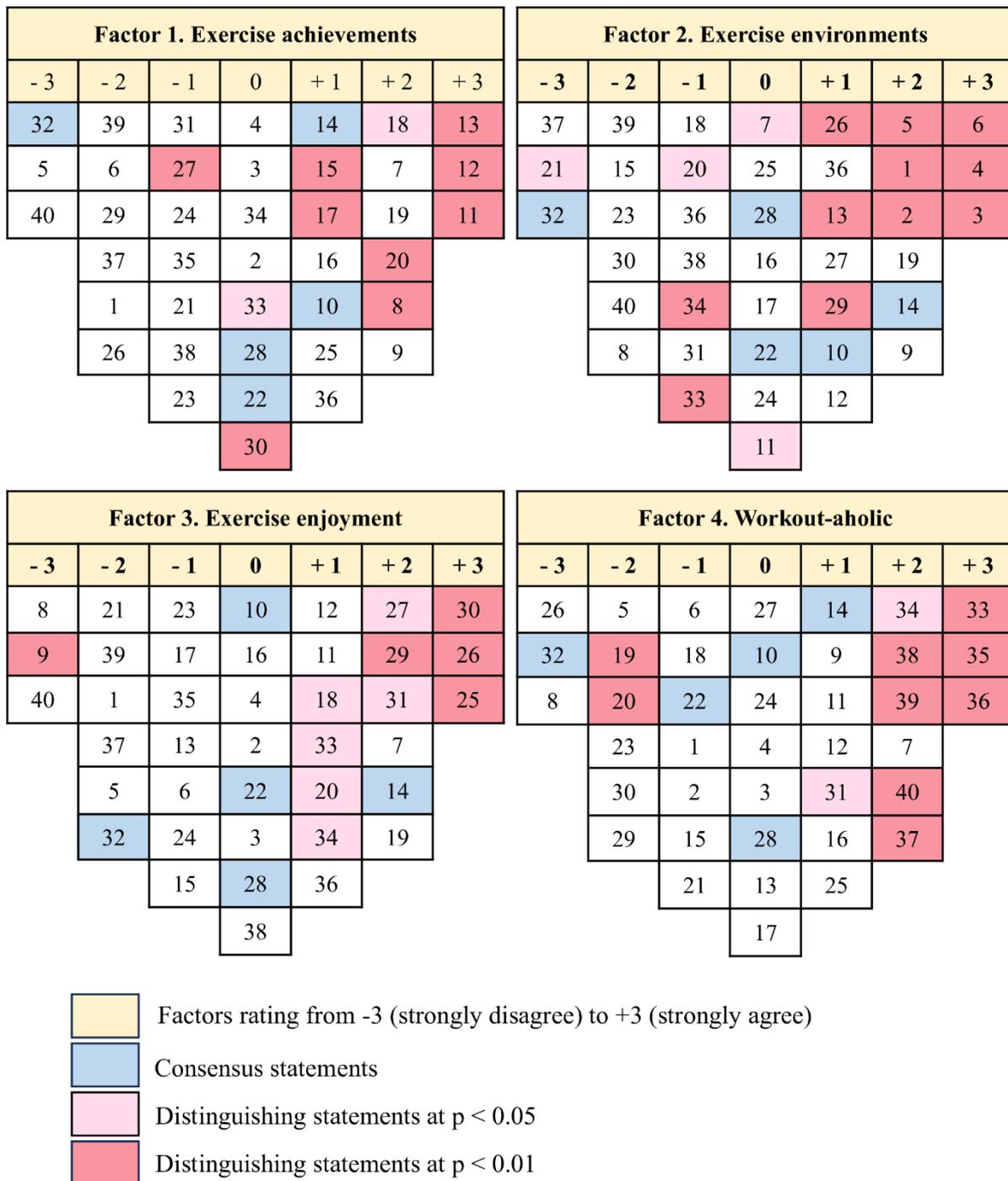


Figure 3. Consensus and distinguishing EMM statements for factors (F1 – F4)

3.4. Discussion

This study adapted the criteria for a combined qualitative and Q-Sorting approach conducted in previous studies [32–35], allowing respondents to participate and express their ideas and perceptions actively. In the Q-sorting interviews, actual knowledge regarding concrete EMM statements was generated from IDIs and FGDs, which were then evaluated by the experience and knowledge of the researchers and experts. Moreover, open-ended questions were used to triangulate the acquired data both within and between interviews. As a result, 40 statements were obtained, encapsulating four factors that collectively defined the components of EMM. The EMM label of “exercise enjoyment” reflected the intrinsic motivation of the SDT, defined as FC members maintaining exercise because of their interests and enjoyment rather than other secondary benefits [23–25]. The three remaining categories of “exercise achievements”, “exercise environments”, and “workout-aholic” represented motivational styles of identified regulation, external regulation, and introjected regulation as extrinsic motivation [23–25]. These EMM components collectively depicted how FC members sustained their exercise practices in pursuit of diverse outcomes, acknowledging the multifaceted impacts—both positive and negative—on exercise maintenance.

Exercise Achievements

In examining the "exercise achievements" dimension of the EMM, the majority of statements predominantly discussed the personal benefits associated with sustained physical activity within FC settings. This encompasses advantages relevant to both overall well-being and the enhancement of physical appearance, culminating in an improved body image. In a parallel qualitative investigation conducted by Riseth et al., physical appearance emerged as a secondary motivational factor following health benefits as articulated by FC members [5]. These observations are consistent with the findings from a prospective longitudinal study undertaken by Gjestvang et al., wherein 37.0% of consistent exercisers during their initial year of FC membership cited positive health outcomes and augmented physical fitness as primary exercise motivators [13]. Participants in the present study also expressed "the desire to get a fit body appearance" as a motive to maintain exercise. Interestingly, a similar study delineated a preference among FC members for articulating their motivation in terms of maintaining a fit body shape rather than a pursuit of aesthetic appeal [51]. Furthermore, our results indicate that participants emphasized the desire for increased muscularity and enhanced health. A pivotal factor for the continuation of exercise activities, as highlighted by participants, was the acknowledgment of positive bodily transformations over time. Whaley et al. similarly identified that individuals frequenting FCs, irrespective of age or gender, predominantly cited motivations such as "becoming stronger" and "observing improvements in physical appearance" as driving factors for engagement in exercise [14]. These elements generally constitute central motivations for individuals opting to participate in physical activities within a FC context, corroborating findings from previous studies [5, 13, 14, 51].

The prioritization of body fitness among FC attendees is significantly influenced by social media exposure, necessitating an examination of whether FCs should underscore these motivational factors in their advertising and promotional activities [52]. Historically, the FC industry has predominantly marketed fitness-setting-based exercises, emphasizing outcomes such as physical fitness, body composition, and weight loss [7, 53, 54]. However, there has been a recent shift in FCs' focus, with a growing trend towards promoting exercise services that enhance positive body image and health-related outcomes, as opposed to purely aesthetic appearances [55]. This shift is partly due to concerns that an overemphasis on appearance could potentially lead to adverse outcomes, including eating disorders and excessive exercise [56-58]. Ensuring a balanced approach in promotional content could, therefore, contribute to healthier motivations and outcomes among fitness-goers.

Exercise Environments

The current study also underscores the pivotal role of supportive exercise environments, emphasizing the availability of comprehensive fitness facilities and their cost-effectiveness in motivating participants. The geographical proximity of FCs further fosters consistent exercise habits among FC members, facilitating easy access and contributing to a conducive and comfortable setting for physical activity. Consequently, these elements collectively influence FC utilization for exercise purposes [5]. Furthermore, fitness environments extend beyond physical workouts, fostering social interactions. Critical players in this domain include FC managers, PTs, and fellow exercisers, all of whom play a significant role in externally supporting FC memberships. Empirical evidence establishes a robust correlation between such social interactions, exercise commitment [59, 60], and physical activity levels [61-63]. While measures such as pre-booking services and payment consensus contracts may exert pressure on FC members, integrating personal commitments with reward-based utilization of exercise equipment has demonstrated efficacy in altering exercise habits [60, 64]. The creation and maintenance of social interaction networks were valuable for engagement in physical exercise [5, 60, 65]. Therefore, amplifying opportunities for social support could potentially serve as a catalyst, fostering regular exercise practices not only among FC members but also within the broader population.

Exercise Enjoyment

In the present investigation, participants reported that engaging in exercise sessions within fitness facilities fostered positive affective responses, primarily associated with opportunities for relaxation and social interaction. However, it is noteworthy that while the expression of comfort and enjoyment was prevalent, it did not unequivocally translate to a cessation of exercise activities in the absence of enjoyment. Contrarily, existing literature delineates a significant correlation between heightened levels of motivational factors, specifically enjoyment and challenge, and the maintenance of regular exercise routines among facility members across a 12-month membership duration [13]. Individuals who exercised regularly assigned a greater value to the elements of enjoyment and challenge compared to their less active counterparts [13]. Notably, frequent fitness-goers demonstrated a lower propensity to cite enjoyment as a primary motivator for exercise engagement than individuals partaking in physical activities in alternative settings, such as sports clubs and public venues [66].

Workout-aholic

Our study showed that participants manifested intrinsic motivation and resilience in adhering to their exercise regimens. According to Gjestvang et al., FC-based exercise is likely to meet the current physical activity

recommendation by increasing the prevalence of reaching the weekly requirement of 150 minutes of moderate-intensity physical exercise from 37.7% at onset to 45.9% after 12 months of FC memberships [67]. While a few cases claimed they did not use the FC as regularly as they planned, the majority of FC patrons had worked out more frequently as being a workout-aholic. In fact, the incidence rates of exercise addiction across diverse fitness exercisers, ranged from 3% to 9% globally [68, 69]. Excessive and compulsive exercise behaviors that may inevitably result in emotional distress are the characteristic features of exercise addiction [68-70]. However, the present study did not confirm negative psychological issues, such as missing exercise sessions, to be motives for participants.

Strengths and Limitations

The study was the first to explore the motivation of FC members who maintained exercise for long-term in Vietnam. Previous studies reporting on motivation in the fitness setting have used qualitative and quantitative methods separately, and these studies were predominantly conducted over five years ago. The novel design of this investigation, integrating qualitative techniques with the Q-Sorting methodology, has preliminarily enriched the empirical knowledge base concerning exercise motivation within fitness settings. A further strength of this study lies in the direct interviews utilized to facilitate the elicitation of motivation-related insights from a heterogeneous sample across various FCs.

Nevertheless, the study had some limitations, which require consideration. First, the study's geographical scope was restricted to a specific southern city in Vietnam, and data collection was situated within authentic natural settings. Second, despite the study's intention to include a substantial number of participants, the actual number of interviewees fell short of the target, concerning the number of FC members invited to participate. Third, comparisons between regular and irregular exercisers were not performed to determine the impact of workout commitment, although such comparisons could have provided valuable insights [71]. Additionally, the study only focused on long-term participants, excluding those who continued their exercise routines for other reasons. This selection criterion might have introduced a potential bias, as those who opted not to participate could possess differing characteristics and motivations from those who did engage in the study [26]. Gender disparity existed among the participants since the overwhelming majority of the included participants were male. In fact, men self-reported with the higher rate of fitness exercise participation in Vietnam [7]. This imbalance might have influenced the results, failing to fully represent the motivation of female fitness center members [72]. While the study acknowledged the absence of older participants, with potentially distinct life experiences and motivations for exercising in FCs, the alignment of the findings with previous studies on exercise maintenance suggests that this limitation might not have significantly skewed the results [73, 74].

4. Conclusion

This study described the four main drivers of EMM components among FC members in Vietnam. The "F1. Exercise achievements" factor emerged as pivotal for sustaining long-term engagement in fitness-related physical activities, underscored by a consensus on the perceived benefits for physical health and aesthetic enhancement. Additional factors, including "F2. Exercise environments", "F3. Exercise enjoyment", and "F4. Workout-aholic", were identified as critical components of EMM. "Getting to be healthier," "a better-looking appearance," and "getting a fit body appearance" were the top three motivating statements of study participants. Other statements related to positive exercise emotions, exercise addiction, and FC-based supportive exercise situations emerged afterward. Five statements that represented all four factors were in agreement. Different factors contributed various amounts of distinguishing statements of FC members: F1, F3, F4, and F2 contributed 11 (28.2%), whereas F2 contributed 15 (38.5%). To explain complicated perspectives of motivation, future studies with larger samples are recommended to develop and validate a comprehensive scale to measure EMM, ensuring rigorous assessment of its psychometric properties to establish reliability and validity.

5. Declarations

5.1. Author Contributions

Conceptualization, T.T.N., C.S., C.N.L., O.D., X.Y.H., and S.A.; methodology, T.T.N., C.S., C.N.L., O.D., S.I., X.Y.H., and S.A.; formal analysis, T.T.N., D.H.P., T.T.N.T., P.T.T., and T.A.A.; resources, C.S.; data curation, T.T.N., P.T.T., T.T.N.T., and H.K.Q.; writing—original draft preparation, T.T.N., O.D., and C.N.L.; writing—review and editing, T.T.N. and C.N.L.; visualization, T.T.N., T.A.A., and D.H.P.; supervision, C.S., C.N.L., O.D., S.I., X.Y.H., and S.A.; project administration, C.S. All authors have read and agreed to the published version of the manuscript.

5.2. Data Availability Statement

The data presented in the study are available in Appendix I.

Table A1. Techniques of FGDs and IDIs

Table A2. Summary of concepts, definitions and quotes of EMM

Table A3. Forty EMM statements for the Q-Sorting

Table A4. Distinguishing statements from the Q-Sorting method

5.3. Funding

This work has been funded by Walailak University Graduate Studies Research Fund (No. CGS-RF-2023/08).

5.4. Acknowledgements

The author would like to extend the heartfelt appreciation to the support by Walailak University PhD scholarships for High Potential Candidates to Enroll in Doctoral Programs (Contract No. HP015/2021); Walailak University Graduate Studies Research Fund; Public Health Research Program, School of Public Health, Walailak University; and Can Tho University of Medicine and Pharmacy.

5.5. Institutional Review Board Statement

The research ethics application was submitted and approved by the Ethics Committee in Human Research of Walailak University (WUEC-23-029-01).

5.6. Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

5.7. Declaration of Competing Interest

The authors declare that there is no conflict of interests regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies have been completely observed by the authors.

6. References

- [1] Rhodes, R. E., Janssen, I., Bredin, S. S. D., Warburton, D. E. R., & Bauman, A. (2017). Physical activity: Health impact, prevalence, correlates and interventions. *Psychology and Health*, 32(8), 942–975. doi:10.1080/08870446.2017.1325486.
- [2] WHO. (2018). Global action plan on physical activity 2018–2030: More active people for a healthier world. World Health Organization, Genève, Switzerland. Available online: <https://apps.who.int/iris/bitstream/handle/10665/272722/9789241514187-eng.pdf> (accessed on May 2023).
- [3] WHO. (2009). Global Health Risks: Mortality and burden of disease attributable to selected major risks. World Health Organization, Genève, Switzerland. Available online: <https://www.who.int/publications/i/item/9789241563871> (accessed on May 2023).
- [4] Lee, I. M., Shiroma, E. J., Lobelo, F., Puska, P., Blair, S. N., Katzmarzyk, P. T., Alkandari, J. R., Andersen, L. B., Bauman, A. E., Brownson, R. C., Bull, F. C., Craig, C. L., Ekelund, U., Goenka, S., Guthold, R., Hallal, P. C., Haskell, W. L., Heath, G. W., Inoue, S., ... Wells, J. C. (2012). Effect of physical inactivity on major non-communicable diseases worldwide: An analysis of burden of disease and life expectancy. *The Lancet*, 380(9838), 219–229. doi:10.1016/S0140-6736(12)61031-9.
- [5] Riseth, L., Nøst, T. H., Nilsen, T. I. L., & Steinsbekk, A. (2019). Long-term members' use of fitness centers: A qualitative study. *BMC Sports Science, Medicine and Rehabilitation*, 11(1), 9. doi:10.1186/s13102-019-0114-z.
- [6] IHRSA (2020). The 2020 IHRSA Health Club Consumer Report. Advocating for the Health & Fitness Industry (IHRSA), Massachusetts, United States. Available online: <https://www.ihrsa.org/publications/the-2020-ihrsa-health-club-consumer-report/> (accessed on May 2023).
- [7] Nguyen, M. N. (2017). Participation and interest level in going to the gym in Vietnam 2017, by gender. *Sports and Recreation*, 2020. Available online: <https://www.statista.com/statistics/1096401/vietnam-level-of-gym-training-participation-by-gender/> (accessed on May 2023).
- [8] Chen, P., Mao, L., Nassis, G. P., Harmer, P., Ainsworth, B. E., & Li, F. (2020). Coronavirus disease (COVID-19): The need to maintain regular physical activity while taking precautions. *Journal of Sport and Health Science*, 9(2), 103–104. doi:10.1016/j.jshs.2020.02.001.
- [9] Middelkamp, J., van Rooijen, M., Wolfhagen, P., & Steenbergen, B. (2017). The effects of a self-efficacy intervention on exercise behavior of fitness club members in 52 weeks and long-term relationships of transtheoretical model constructs. *Journal of Sports Science and Medicine*, 16(2), 163–171.

- [10] Annesi, J. J. (2003). Effects of a cognitive behavioral treatment package on exercise attendance and drop out in fitness centers. *European Journal of Sport Science*, 3(2), 1–16. doi:10.1080/17461390300073206.
- [11] Rand, M., Goyder, E., Norman, P., & Womack, R. (2020). Why do new members stop attending health and fitness venues? The importance of developing frequent and stable attendance behaviour. *Psychology of Sport and Exercise*, 51, 101771. doi:10.1016/j.psychsport.2020.101771.
- [12] MacIntosh, E., & Law, B. (2015). Should I stay or should I go? Exploring the decision to join, maintain, or cancel a fitness membership. *Managing Sport and Leisure*, 20(3), 191–210. doi:10.1080/23750472.2015.1025093.
- [13] Gjestvang, C., Abrahamsen, F., Stensrud, T., & Haakstad, L. A. H. (2020). Motives and barriers to initiation and sustained exercise adherence in a fitness club setting-A one-year follow-up study. *Scandinavian Journal of Medicine and Science in Sports*, 30(9), 1796–1805. doi:10.1111/sms.13736.
- [14] Mullen, S. P., & Whaley, D. E. (2010). Age, gender, and fitness club membership: Factors related to initial involvement and sustained participation. *International Journal of Sport and Exercise Psychology*, 8(1), 24–35. doi:10.1080/1612197X.2010.9671931.
- [15] Sperandei, S., Vieira, M. C., & Reis, A. C. (2016). Adherence to physical activity in an unsupervised setting: Explanatory variables for high attrition rates among fitness center members. *Journal of Science and Medicine in Sport*, 19(11), 916–920. doi:10.1016/j.jsams.2015.12.522.
- [16] Nam, T. T., Le, C. N., Phu, D. H., Stanikzai, M. H., Shohaimi, S., Dadras, O., Isaramalai, S. A., & Suwanbamrung, C. (2023). Assessment of Self-Determined Motivation in Exercise: A Systematic Review and Meta-analysis. *Journal of Human, Earth, and Future*, 4(2), 241–256. doi:10.28991/HEF-2023-04-02-08.
- [17] Cavicchiolo, E., Sibilio, M., Lucidi, F., Cozzolino, M., Chirico, A., ..., & Alivernini, F. (2022). The Psychometric Properties of the Behavioural Regulation in Exercise Questionnaire (BREQ-3): Factorial Structure, Invariance and Validity in the Italian Context. *International Journal of Environmental Research and Public Health*, 19(4), 1937. doi:10.3390/ijerph19041937.
- [18] Durán-Vinagre, M. Á., Ibáñez, S. J., Feu, S., & Sánchez-Herrera, S. (2023). Analysis of the motivational processes involved in university physical activity. *Frontiers in Psychology*, 13, 1080162. doi:10.3389/fpsyg.2022.1080162.
- [19] Fresno-Alba, S., Leyton-Román, M., Mesquita da Silva, S., & Jiménez-Castuera, R. (2023). Predicting Quality of Life in Women with Breast Cancer Who Engage in Physical Exercise: The Role of Psychological Variables. *Healthcare (Switzerland)*, 11(14), 2088. doi:10.3390/healthcare11142088.
- [20] Jenkins, M. (2023). The association between motivation and physical activity among forensic and rehabilitation inpatients in Aotearoa New Zealand. *The Journal of Sport and Exercise Science*, 7(2), 9–17. doi:10.36905/jses.2023.02.02.
- [21] Wininger, S. R. (2007). Self-determination theory and exercise behavior: An examination of the psychometric properties of the exercise motivation scale. *Journal of Applied Sport Psychology*, 19(4), 471–486. doi:10.1080/10413200701601466.
- [22] Ryan, R. M., & Deci, E. L. (2000). Intrinsic and Extrinsic Motivations: Classic Definitions and New Directions. *Contemporary Educational Psychology*, 25(1), 54–67. doi:10.1006/ceps.1999.1020.
- [23] Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68–78. doi:10.1037/0003-066X.55.1.68.
- [24] Wilson, P. M., Mack, D. E., & Grattan, K. P. (2008). Understanding motivation for exercise: A self-determination theory perspective. *Canadian Psychology*, 49(3), 250–256. doi:10.1037/a0012762.
- [25] Ng, J. Y. Y., Ntoumanis, N., Thøgersen-Ntoumani, C., Deci, E. L., Ryan, R. M., Duda, J. L., & Williams, G. C. (2012). Self-Determination Theory Applied to Health Contexts: A Meta-Analysis. *Perspectives on Psychological Science*, 7(4), 325–340. doi:10.1177/1745691612447309.
- [26] Teixeira, P. J., Carraça, E. V., Markland, D., Silva, M. N., & Ryan, R. M. (2012). Exercise, physical activity, and self-determination theory: A systematic review. *International Journal of Behavioral Nutrition and Physical Activity*, 9, 78. doi:10.1186/1479-5868-9-78.
- [27] Matsumoto, H., & Takenaka, K. (2004). Motivational Profiles and Stages of Exercise Behavior Change. *International Journal of Sport and Health Science*, 2, 89–96. doi:10.5432/ijshs.2.89.
- [28] Knittle, K., Nurmi, J., Crutzen, R., Hankonen, N., Beattie, M., & Dombrowski, S. U. (2018). How can interventions increase motivation for physical activity? A systematic review and meta-analysis. *Health Psychology Review*, 12(3), 211–230. doi:10.1080/17437199.2018.1435299.
- [29] Middelkamp, J., & Steenbergen, B. (2015). The Transtheoretical Model and Exercise Behaviour of Members in Fitness Clubs. *Journal of Fitness Research*, 4(2), 43–54.
- [30] CASP Checklists (2023). Critical Appraisal Checklists. CASP qualitative checklists, Oxford, United Kingdom. Available online: <https://casp-uk.net/casp-tools-checklists/> (accessed on May 2023).

- [31] Hong, Q. N., Fàbregues, S., Bartlett, G., Boardman, F., Cargo, M., Dagenais, P., Gagnon, M. P., Griffiths, F., Nicolau, B., O’Cathain, A., Rousseau, M. C., Vedel, I., & Pluye, P. (2018). The Mixed Methods Appraisal Tool (MMAT) version 2018 for information professionals and researchers. *Education for Information*, 34(4), 285–291. doi:10.3233/EFI-180221.
- [32] Catley, A., Alders, R. G., & Wood, J. L. N. (2012). Participatory epidemiology: Approaches, methods, experiences. *Veterinary Journal*, 191(2), 151–160. doi:10.1016/j.tvjl.2011.03.010.
- [33] Truong, D. B., Doan, H. P., Tran, V. K. D., Nguyen, V. C., Bach, T. K., Rueanghiran, C., Binot, A., Goutard, F. L., Thwaites, G., Carrique-Mas, J., & Rushton, J. (2019). Assessment of drivers of antimicrobial usage in poultry farms in the Mekong Delta of Vietnam: A combined participatory epidemiology and Q-sorting approach. *Frontiers in Veterinary Science*, 6(MAR), 84. doi:10.3389/fvets.2019.00084.
- [34] Rahma, A., Mardiatno, D., & Rahmawati Hizbaron, D. (2020). Q methodology to determine distinguishing and consensus factors (a case study of university students’ ecoliteracy on disaster risk reduction). *E3S Web of Conferences*, 200. doi:10.1051/e3sconf/202020001003.
- [35] Karafil, A. Y. (2023). Examination of the Factors That Encourage University Students to Sports Betting. A Q-Method Study. *Journal of Gambling Studies*, 1-13. doi:10.1007/s10899-023-10192-4.
- [36] Zarotis, G., Athanailidis, I., Arvanitidou, V., & Mourtziou, C. (2017). Age-specific reasons for dropping out of the fitness-sport. *Journal of Physical Education and Sport*, 17(2), 916–924. doi:10.7752/jpes.2017.02140.
- [37] Stannard, D. (2012). *Essentials of Nursing Research: Appraising Evidence for Nursing Practice*. AORN Journal (9th ed.), 95(2), 1-2. doi:10.1016/j.aorn.2011.10.009.
- [38] Brand, R., & Cheval, B. (2019). Theories to explain exercise motivation and physical inactivity: Ways of expanding our current theoretical perspective. *Frontiers in Psychology*, 10(May), 1-4. doi:10.3389/fpsyg.2019.01147.
- [39] Simister, N. (2019). *Complex M&E Systems: Raising standards, lowering the bar*. Praxis Series Paper No.6. Oxford, United Kingdom.
- [40] Hall, T. G. K., & Lubman, D. I. (2012). Motivational Interviewing Techniques. *Peripheral Brain for the Pharmacist*, 41, 660–667. Available online: <https://www.racgp.org.au/afp/2012/september/motivational-interviewing-techniques> (accessed on May 2023).
- [41] Mears, J., & Kilpatrick, M. (2008). Motivation for exercise: Applying theory to make a difference in adoption and adherence. *ACSM’s Health and Fitness Journal*, 12(1), 20–26. doi:10.1249/01.FIT.0000298460.30006.00.
- [42] USAID. (1996). *Conducting Focus Group Interviews: Performance Monitoring and Evaluation Tips*, 10. Available online: https://pdf.usaid.gov/pdf_docs/pnadw110.pdf (accessed on May 2023).
- [43] Hennink, M. M. (2017). Cross-cultural focus group discussions. *A New Era in Focus Group Research: Challenges, Innovation and Practice*, 59-82. doi:10.1057/978-1-137-58614-8_4.
- [44] Luo, A. (2023). *Content Analysis | Guide, Methods & Examples*. Scribbr, Amsterdam, The Netherlands Available online: <https://www.scribbr.com/methodology/content-analysis/> (accessed on May 2023).
- [45] Stahl, N., & King, J. (2020). Expanding Approaches for Research: Understanding and Using Trustworthiness in Qualitative Research. In *Journal of Developmental Education*, 44(1), 26–28.
- [46] Graneheim, U. H., & Lundman, B. (2004). Qualitative content analysis in nursing research: Concepts, procedures and measures to achieve trustworthiness. *Nurse Education Today*, 24(2), 105–112. doi:10.1016/j.nedt.2003.10.001.
- [47] Senapati, R., Prusty, A., & Padhy, C. (2020). An Overview of Q Methodology: Process, Application and Challenges. *Indian Journal of Natural Sciences*, 10(60), 24772-24778.
- [48] Yusoff, M. S. B. (2019). ABC of Response Process Validation and Face Validity Index Calculation. *Education in Medicine Journal*, 11(3), 55–61. doi:10.21315/eimj2019.11.3.6.
- [49] Yusoff, M. S. B. (2019). ABC of Content Validation and Content Validity Index Calculation. *Education in Medicine Journal*, 11(2), 49–54. doi:10.21315/eimj2019.11.2.6.
- [50] Banasick, S. (2019). KADE: A desktop application for Q methodology. *Journal of Open Source Software*, 4(36), 1360. doi:10.21105/joss.01360.
- [51] Jakobsen, A. M., & Evjen, E. (2018). Gender differences in motives for participation in sports and exercise among Norwegian adolescents. *Baltic Journal of Health and Physical Activity*, 10(2), 92–101. doi:10.29359/bjhp.10.2.10.
- [52] Schlegel, P., & Fialová, L. (2015). Body Image and Sensation Seeking In Gym-Goers. *Proceedings of the Faculty of Physics Education of the Comenius University*, 55(1), 54–63. doi:10.1515/afepuc-2015-0007.

- [53] Gjestvang, C., Stensrud, T., & Haakstad, L. A. H. (2019). Are changes in physical fitness, body composition and weight associated with exercise attendance and dropout among fitness club members? Longitudinal prospective study. *BMJ Open*, 9(4), 27987. doi:10.1136/bmjopen-2018-027987.
- [54] Vu, M. T., & Pham, T. T. T. (2023). Still in the shadow of Confucianism? Gender bias in contemporary English textbooks in Vietnam. *Pedagogy, Culture & Society*, 31(3), 477-497. doi:10.1080/14681366.2021.1924239.
- [55] Andreasson, J., & Johansson, T. (2018). Glocalised fitness: the franchising of a physical movement, fitness professionalism and gender. *Leisure/ Loisir*, 42(3), 301-321. doi:10.1080/14927713.2018.1535910.
- [56] Lichtenstein, M. B., Griffiths, M. D., Hemmingsen, S. D., & Støving, R. K. (2018). Exercise addiction in adolescents and emerging adults - Validation of a youth version of the Exercise Addiction Inventory. *Journal of Behavioral Addictions*, 7(1), 117-125. doi:10.1556/2006.7.2018.01.
- [57] Eriksson, L., Baigi, A., Marklund, B., & Lindgren, E. C. (2008). Social physique anxiety and sociocultural attitudes toward appearance impact on orthorexia test in fitness participants. *Scandinavian Journal of Medicine and Science in Sports*, 18(3), 389-394. doi:10.1111/j.1600-0838.2007.00723.x.
- [58] Bratland-Sanda, S., & Sundgot-Borgen, J. (2015). "I'm concerned - What Do I Do?" recognition and management of disordered eating in fitness center settings. *International Journal of Eating Disorders* 48(4), 415-423. doi:10.1002/eat.22297.
- [59] Mendonça, G., Cheng, L. A., Mélo, E. N., & De Farias Júnior, J. C. (2014). Physical activity and social support in adolescents: A systematic review. *Health Education Research*, 29(5), 822-839. doi:10.1093/her/cyu017.
- [60] Riseth, L., Ivar Lund Nilssen, T., Mittet, Ø., & Steinsbekk, A. (2021). The effect of initial support on fitness center use in new fitness center members. A randomized controlled trial. *Preventive Medicine Reports*, 24(24), 7. doi:10.1016/j.pmedr.2021.101605.
- [61] Humpel, N., Owen, N., & Leslie, E. (2002). Environmental factors associated with adults' participation in physical activity. A review. *American Journal of Preventive Medicine*, 22(3), 188-199. doi:10.1016/S0749-3797(01)00426-3.
- [62] Powell, L. M., Chaloupka, F. J., Slater, S. J., Johnston, L. D., & O'Malley, P. M. (2007). The Availability of Local-Area Commercial Physical Activity-Related Facilities and Physical Activity among Adolescents. *American Journal of Preventive Medicine*, 33(4), 292-300. doi:10.1016/j.amepre.2007.07.002.
- [63] Eriksson, U., Arvidsson, D., & Sundquist, K. (2012). Availability of exercise facilities and physical activity in 2,037 adults: Cross-sectional results from the Swedish neighborhood and physical activity (SNAP) study. *BMC Public Health*, 12(1), 607. doi:10.1186/1471-2458-12-607.
- [64] Rogers, T., Milkman, K. L., & Volpp, K. G. (2014). Commitment devices: Using initiatives to change behavior. *JAMA*, 311(20), 2065-2066. doi:10.1001/jama.2014.3485.
- [65] Allender, S., Cowburn, G., & Foster, C. (2006). Understanding participation in sport and physical activity among children and adults: A review of qualitative studies. *Health Education Research*, 21(6), 826-835. doi:10.1093/her/cyl063.
- [66] Deelen, I., Ettema, D., & Kamphuis, C. B. M. (2018). Sports participation in sport clubs, gyms or public spaces: How users of different sports settings differ in their motivations, goals, and sports frequency. *PLoS ONE*, 13(10), 205198. doi:10.1371/journal.pone.0205198.
- [67] Gjestvang, C., Stensrud, T., Hansen, B. H., Kolle, E., & Haakstad, L. A. H. (2020). Are fitness club members likely to meet the current physical activity recommendations? *Translational Sports Medicine*, 3(2), 75-83. doi:10.1002/tsm2.120.
- [68] Lindwall, M., & Palmeira, A. (2009). Factorial validity and invariance testing of the exercise dependence scale-revised in Swedish and Portuguese exercisers. *Measurement in Physical Education and Exercise Science*, 13(3), 166-179. doi:10.1080/10913670903050313.
- [69] Griffiths, M. D., Szabo, A., & Terry, A. (2005). The exercise addiction inventory: a quick and easy screening tool for health practitioners. *British Journal of Sports Medicine*, 39(6), 30. doi:10.1136/bjism.2004.017020.
- [70] Adams, J. (2009). Understanding exercise dependence. *Journal of Contemporary Psychotherapy*, 39(4), 231-240. doi:10.1007/s10879-009-9117-5.
- [71] Karoly, P., Ruehlman, L. S., Okun, M. A., Lutz, R. S., Newton, C., & Fairholme, C. (2005). Perceived self-regulation of exercise goals and interfering goals among regular and irregular exercisers: A life space analysis. *Psychology of Sport and Exercise*, 6(4), 427-442. doi:10.1016/j.psychsport.2004.03.004.
- [72] Elijah, G. R., & Eric, D. K. N. (2012). Motivational gender differences in sport and exercise participation among university sport science students. *Journal of Physical Education and Sport*, 12(2), 180-187.
- [73] Stehr, P., Luetke Lanfer, H., & Rossmann, C. (2021). Beliefs and motivation regarding physical activity among older adults in Germany: results of a qualitative study. *International Journal of Qualitative Studies on Health and Well-being*, 16(1), 1932025. doi:10.1080/17482631.2021.1932025.
- [74] Schutzer, K. A., & Graves, B. S. (2004). Barriers and motivations to exercise in older adults. *Preventive Medicine*, 39(5), 1056-1061. doi:10.1016/j.ypmed.2004.04.003.

Appendix I

Table A1. Technique of Focus Group Discussions and In-Depth Interviews

Steps	Focus group discussions	In-depth interviews
Preparation	<p>The moderator, a member of the research team, leads the investigation. The secretary, also part of the team, is responsible for documenting the session's minutes and has a comprehensive understanding of the content, culture, and knowledge pertinent to the research topics. Groups consisting of 8 to 10 FC members or personal trainers are selected to participate in discussions, which last between 60 and 90 minutes and take place at a convenient location. The discussions follow a Focus Group Discussion (FGD) manual and are recorded using a voice recorder or mobile phone. Additional materials provided include batteries, colored pens, poster papers, an FGD manual, and a fieldwork diary.</p>	<p>The interviewer is a member of the research team, conducting investigations. Participants in the interview may be a FC member, owner, manager, or personal trainer, all of whom have scheduled a 60-minute interview session at a location that is convenient for them. The interviews are conducted following an in-depth interview manual (IDI) and are recorded using a voice recorder or mobile phone. Additional materials used during the interview include batteries, pens, papers, and a hard copy of the in-depth interview manual.</p>
Introduction	<p>The moderator begins by presenting a brief three-minute overview, outlining the objectives of the study and the focus group discussion (FGD) session's purpose. Following this, the moderator requests permission to use a voice recorder during the session and opens the floor to any questions or concerns from the participants. Additionally, the process of obtaining informed consent is conducted at this stage.</p>	<p>The interviewer begins by outlining the purposes and objectives of the study, as well as explaining the in-depth interview (IDI) process. They then request the participant's permission to use a voice recorder during the session and encourage them to ask any questions or voice any concerns they may have. Additionally, the interviewer ensures that the step of obtaining informed consent from the participant is completed.</p>
Implementation	<p>The moderator uses a topic guide for FGD involving FC members and personal trainers, aiming to stimulate conversation and encourage participants to share their thoughts. During the session, all participants are actively encouraged to answer questions positively and engage in meaningful interactions with one another. Moderators summarize and synthesize opinions in accordance with the objectives of the discussion topic. Some essential skills need to be applied such as listening skills, giving feedback, and asking questions. To visually aid the discussion, the moderator writes down the most important points for everyone to review. Meanwhile, a designated secretary diligently records the proceedings in a fieldwork diary, capturing the nuances of the conversation. Using a ten-seed technique, which has been found to increase participation and build group consensus, participants are given the opportunity to identify intrinsic and extrinsic motivation and influencing factors for exercise motivation as the session comes to a close.</p>	<p>The interviewer uses the question guide for IDIs with members and FC personal trainers and FC owners or managers. During the meeting, the participant is encouraged to respond questions positively. The interviewer summarizes and synthesizes opinions in accordance with objectives of the topic observing and taking field notes that could be applied to inform the analysis while an audio device records the interview. Some essential skills need to be applied such as listening skills, giving feedback, and asking questions. General questions include "What's else", "Can you tell me about your experience of...", "You mentioned [...], can we talk more about that?", "What was your view on that", "How did you feel". Going deeper questions consist of "Could you please give me an example?", "Can you be more specific?", "In what way?", "Why do you say that?", and "Can you tell me more about that?".</p>
Back up	<p>The secretary emphasizes key information in the minutes of the session. The moderator concludes the meeting, expressing gratitude to the participants for their time and involvement. Once travel expenses have been disbursed to the participants, and their contact addresses noted if required, the session is officially adjourned.</p>	<p>The interviewer concludes the session, expressing gratitude to the participant for their time and contribution. Following this, the meeting is deemed complete once a travel reimbursement is issued to the participant, and their contact address is recorded, if required.</p>

Table A2. Summary of concepts, definitions and quotes of exercise maintenance motivation

Domain	Sub-domain	Example quotes
Domain 1. EMM by social effects FC members who maintain exercise at the fitness center are motivated by external demands and supports from other people and supportive exercise environments	Sub-Domain 1.1. External demands External demands of EMM from other people means requirements and encouragements of family, friends, doctors, and others are given for maintaining exercise in the fitness centers regarding to external judges to the body image and health status of FC members	Quote 1: "My parents always encourages me to play more sports. Additionally, I have received advice from friends and colleagues to exercise so that I can stay healthy, having bright mind, and doing well at work." (male, 28 year olds, IDI_FC member_6)
	Sub-Domain 1.2. External support External support of EMM from other people and supportive FC environments means FC members are motivated to maintain exercise in the fitness centers by supports from family, friends, FC owners, personal trainers, ideal patterns, and others outside	Quote 2: "FC members connect with others, forming good habits together, such as family, friends, colleagues as going to the FC together. They spread positive energy to each other. Going to the FC together is less embarrassing, more fun. Talking with friends get motivated than exercise alone. I feel more positive when exercising with friends." (male, 23 years old, IDI_FC member_1)
	Sub-Domain 1.3. Supportive exercise environments Supportive exercise environment of EMM means FC members are motivated by supports from exercise conditions inside and outside the fitness centers regarding to FC facilities, FC policies, and unexpected contexts of exercise.	Quote 3: "Some FCs offer the exercise package that if you go to exercise for how many weeks a month, FC members will be given a coupon to receive small gifts. Otherwise, when members sign up for a monthly workout, the FC will introduce to a 3-month package, the price will be cheaper. Since FC members spent money to buy a 3-month episode, they spent a lot of money there. If FC members don't participate to exercise, they will waste all 3-month fee." (male, 23 years old, IDI_FC member_1)
Domain 2. EMM by personal exercise achievements FC members who maintain exercise are motivated by personal achievements identified from regular exercise habits in terms of health benefits, building social relationships, learning knowledge, self-perception of exercise benefits, and advantages of FC exercise compared to other settings	Sub-Domain 2.1. Health benefits Health benefits mean FC members are motivated to maintain exercise in the fitness centers because of being healthy, positive changes in physical health, mental health, preventing illnesses, and healing injuries	Quote 4: "I want to change my body appearance and get healthier. My wearing did not fit my body at the time since I had gained weight. My relatives advised me to visit a FC. I used to work out at home by myself, but after my friends rebuked me, I went out to work out because I wanted a better body and to be healthy." (male, 24 years old, IDI_FC member_5) Quote 5: "In my opinion, body appearance is driving motivation for FC members. For women, the most common desire was to be thinner and slimmer. For men, what they expect, is to gain muscle, tighten muscle and reduce fat." (male, 23 years old, IDI_FC member_1)
	Sub-domain 2.2. Knowledge benefits Knowledge benefits mean FC members are motivated to maintain exercise in the fitness centers by understanding healthy diet and proper forms of exercise	Quote 6: "The understanding of healthy nutrition, the knowledge of the proper form of exercise." (male, 28 years old, IDI_FC member_6)
	Sub-domain 2.3. Self-perception for exercise benefits Self-perception for exercise benefits mean FC members are motivated to maintain exercise in the fitness centers by self-perception of planning goals and schedules, the benefits of exercise and recognizing their positive changes	Quote 7: "Forming habits in mind and lifestyle of the exerciser, each person who goes to exercise must form a habit of thinking and living. They have a ascertain view of the exercise. They feel that exercise is a favorable thing and routine. Exercise sessions cannot be skipped." (male 24 years old, FGD_PT_2)
	Sub-domain 2.4. Socializing benefits Socializing benefits mean FC members are motivated to maintain exercise in the fitness centers by making more opportunities to have jobs and social relationships	Quote 8: "Exercise also helps me in supporting communication with others. I really realize that since I started exercise in the FC, I also have more friends who are outside the FC, not in the FC, and when people outside the FC have sympathy for me. I was quiet but I was both fat and ugly, and no one talked to me in the previous time. However, I'm beautiful now. I exercise well. I wear a nice shirt and pants, resulting more opportunities of communication which are more crucial." (male, 24 years old, IDI_FC member_4)
	Sub-domain 2.5. Advantages of FC exercise compared to other settings Advantages of FC exercise in comparison with other settings mean FC members are motivated to maintain exercise in the fitness centers because its conveniences and facilitating the following goals: targeting the sufficient goals of exercise, setting specific exercise schedule, controlling time for exercise.	Quote 9: "For other kinds of sports such as volleyball, I used to play with my friends together in the afternoon, depending on the time of my friends. I could get bored to play alone if nobody has time to go with me. Therefore, I go to exercise in a FC to positively control my time." (male, 23 years old, IDI_FC member_1)

<p>Domain 3. EMM Integration with life goals FC members who maintain exercise are motivated in the fitness centers by considering regular exercise habits to change their weight, appearance, physical and mental health as a part of life goals.</p>		<p>Quote 10: "The top two goals of my life are changes of my weight and appearance, followed by physical and mental wellness." (male, 23 years old, IDI_FC member_1)</p>
<p>Domain 4. EMM Interests and enjoyments FC members who maintain exercise are motivated in the fitness centers because of the enjoyable feeling even being alone or with others. Regular exercise habits are considered in the FC as their passions, non-responsibility with patience and never give up.</p>	<p>Sub-domain 4.1. Enjoyable feelings of doing exercise Enjoyable feelings of doing exercise mean FC members are motivated to maintain exercise in the fitness centers because the feeling of fun, relaxation, comfort, happiness even being alone or with friends. In addition, regular exercise habits are negatively impacted by losing of exercise interests and enjoyments.</p>	<p>Quote 11: "I want to be healthier, more comfortable, and change my physical appearance. I want to maintain exercise more often" (male, 24 years old, IDI_FC member_5)</p> <p>Quote 12: "Most people lose interest in exercising. Folks are slackers. After explaining the advantages of joining a FC to my pals, who initially looked forward to exercise for two weeks, they gradually became weary of it." (male, 24 years old, IDI_FC member_5)</p>
	<p>Sub-domain 4.2. Passions with exercise Passions with exercise mean FC members are motivated to maintain exercise in the fitness centers because their own passions. Regular exercise habits are considered a non-mandatory responsibility with persistence and never giving up.</p>	<p>Quote 13: "I find that most of FC members quit exercise because they don't have motives to keep going. First, FC members must have the discipline to go to the enough number and time of exercise sessions weekly. Second, everyone considers going to exercise in the FC as a non-responsibility which is easy for themselves. Exercise is just helpful for health." (male, 23 years old, IDI_FC member_1)</p>
<p>Domain 5. EMM workout-aholic FC members who maintain exercise are motivated in the fitness centers because regular exercise habits become routine as workout-aholic and missing exercise sessions may lead to negative feelings.</p>	<p>Sub-domain 5.1. Workout-aholic Workout-aholic means FC members are motivated to maintain exercise in the fitness centers because going to the FC has become a routine habit</p> <p>Sub-domain 5.2. Negative feelings of missing exercise Negative feelings of missing exercise mean FC members are motivated to maintain exercise in the fitness centers because missing exercise sessions may lead to negative feelings</p>	<p>Quote 14: "A person will feel addicted to exercise after engaging in it for a long time. I myself used to regularly exercise. Due to my daily workload, I am forced to cease exercising. I will get the urge to go for a run. I will feel worn out and weak" (male, 29 years old, IDI_PT_1)</p> <p>Quote 15: "Exercisers feel uncomfortable if they skip a workout session. They experience a sense of weariness. Some FC members claimed that something was lost if miss exercise sessions." (male, 27 years old, FGD_PT_2)</p>

Legend:

FCs: Fitness centers

IDIs: In-depth interviews

FGDs: Focus group discussions

(i.e. "IDI_FC member_1" means the quote is retrieved from the first in-depth interview of the fitness center member)

Table A3. Forty exercise maintenance motivation statements for the Q-Sorting

EMM	Statements	EMM	Statements
1	I maintain exercise because others around ask me to exercise	21	I maintain exercise because maintaining exercise for weight change is my goal in life
2	I maintain exercise because I try to have the similar body image of my favorite fitness idols	22	I maintain exercise because maintaining exercise for appearance is my goal in life
3	I maintain exercise because I have support from others around	23	I maintain exercise because maintaining exercise for physical wellness is my goal in life
4	I maintain exercise because the fitness center has complete exercise facilities	24	I maintain exercise because maintaining exercise for mental wellness is my goal in life
5	I maintain exercise because the fitness center is closed to my living location	25	I maintain exercise because I feel more pleasure as doing exercise
6	I maintain exercise because the fitness center is affordable	26	I maintain exercise because I feel more comfortable as doing exercise
7	I maintain exercise because I get to be healthier	27	I maintain exercise because I feel relax as doing exercise
8	I maintain exercise because I feel more energetic	28	I maintain exercise because I feel joyful as doing exercise
9	I maintain exercise because I get stronger	29	I maintain exercise because I feel refresh as doing exercise
10	I maintain exercise because I get to eat well	30	I maintain exercise because I feel fun as doing exercise
11	I maintain exercise because I get a better-looking appearance	31	I maintain exercise because I feel happy as doing exercise
12	I maintain exercise because I get a fit body appearance	32	I will not maintain exercise if I lose exercise enjoyments
13	I maintain exercise because I get more muscular body physique	33	I maintain exercise because I am passionate to exercise
14	I maintain exercise because I get weight balance	34	I maintain exercise because I am patient to exercise
15	I maintain exercise because I want to prevent illnesses	35	I maintain exercise because I do not want to give up exercise
16	I maintain exercise because I get relieved from daily life stress	36	I maintain exercise because I am addicted to exercise
17	I maintain exercise because I am aware of routine exercise habit	37	I maintain exercise because I regret if miss exercise sessions
18	I maintain exercise because I recognise positive changes in me	38	I maintain exercise because I feel frustrated if miss exercise sessions
19	I maintain exercise because I I get opportunities to socialized	39	I maintain exercise because I feel upset if miss exercise sessions
20	I maintain exercise because I get get opportunities facilitating the connection with others	40	I maintain exercise because I am uneasy if miss exercise sessions

Table A4. Distinguishing EMM statements from the Q-Sorting method

No	EMM statements	Factor 1		Factor 2		Factor 3		Factor 4	
		Q-Sort value	Z score						
1	EMM 1. I maintain exercise because others around ask me to exercise			2	1.23**				
2	EMM 2. I maintain exercise because I try to have the similar body image of my favorite fitness idols			2	1.23**				
3	EMM 3. I maintain exercise because I have support from others around			3	1.4**				
4	EMM 4. I maintain exercise because the fitness center has complete exercise facilities			3	1.62**				
5	EMM 5. I maintain exercise because the fitness center is closed to my living location			2	1.38**				
6	EMM 6. I maintain exercise because the fitness center is affordable			3	1.79**				
7	EMM 7. I maintain exercise because I get to be healthier			0	0.24*				
8	EMM 8. I maintain exercise because I feel more energetic	2	1.14**						
9	EMM 9. I maintain exercise because I get stronger					-3	-1.64**		
10	EMM 11. I maintain exercise because I get a better-looking appearance	3	1.47**	0	-0.11*				
11	EMM 12. I maintain exercise because I get a fit body appearance	3	1.73**						
12	EMM 13. I maintain exercise because I get more muscular body physique	3	1.8**	1	0.63**				
13	EMM 15. I maintain exercise because I want to prevent illnesses	1	0.8**						
14	EMM 17. I maintain exercise because I am aware of routine exercise habit	1	0.63**						
15	EMM 18. I maintain exercise because I recognise positive changes in me	2	1.25*			1	0.63*		
16	EMM 19. I maintain exercise because I get opportunities to socialized							-2	-0.84**
17	EMM 20. I maintain exercise because I get opportunities facilitating the connection with others	2	1.2**	-1	-0.2*	1	0.38*	-2	-1.03**
18	EMM 21. I maintain exercise because maintaining exercise for weight change is my goal in life			-3	-1.6*	-2	-0.978	-1	-0.626
19	EMM 25. I maintain exercise because I feel more pleasure as doing exercise					3	1.42**		
20	EMM 26. I maintain exercise because I feel more comfortable as doing exercise			1	0.83**	3	1.5**		
21	EMM 27. I maintain exercise because I feel relax as doing exercise	-1	-0.44**			2	1.27*		
22	EMM 29. I maintain exercise because I feel refresh as doing exercise			1	0.48**	2	1.27**		
23	EMM 30. I maintain exercise because I feel fun as doing exercise	0	-0.26**			3	1.9**		
24	EMM 31. I maintain exercise because I feel happy as doing exercise					2	1.27*	1	0.51*
25	EMM 33. I maintain exercise because I am passionate to exercise	0	0.01*	-1	-0.75**	1	0.63*	3	1.88**
26	EMM 34. I maintain exercise because I am patient to exercise			-1	-0.7**			2	1.25*
27	EMM 35. I maintain exercise because I do not want to give up exercise							3	1.88**
28	EMM 36. I maintain exercise because I am addicted to exercise							3	1.88**
29	EMM 37. I maintain exercise because I regret if miss exercise sessions							2	0.77**
30	EMM 38. I maintain exercise because I feel frustrated if miss exercise sessions							2	1.25**
31	EMM 39. I maintain exercise because I feel upset if miss exercise sessions							2	1.25**
32	EMM 40. I maintain exercise because I am uneasy if miss exercise sessions							2	0.79**
Total of distinguishing statements		11		15		11		11	

(*): $p < 0.05$; (**): $p < 0.01$