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Exploring Exercise Behaviors and Health Knowledge in Secondary School Students: A Mixed-Methods Study in One School

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ABSTRACT

The study aimed to: a) determine the exercise stages of change (ESC) and health-related fitness knowledge (HRFK) levels in one secondary school students in 6th, 7th, and 8th grades, and b) investigate how students with varying ESC and HRFK levels apply HRFK in their daily lives and identify the key sources and support systems (such as family, teachers, and peers) that facilitate this process. For the first aim of this mixed-method study, the Exercise Stages of Change Questionnaire and Health-Related Fitness Knowledge Test were applied to all 6th, 7th, and 8th grade students in one school (n= 511, 233 girls, 278 boys). Based on their scores, students were divided into four groups. For the second aim, four focus group interviews were conducted with 30 students (13 girls, 17 boys), selected through purposeful sampling from the four groups. The study found significant differences in the physical activity behaviours of students in the four different groups based on their ESC and HRFK. Students with high HRFK often had support from family and coaches, and they verified their information. In contrast, those with low HRFK needed more support and focused more on sports performance than HRFK. It underscores the importance for educators to implement targeted strategies that address the diverse needs of students, ultimately fostering an inclusive environment that promotes active and healthy lifestyles.

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INTRODUCTION

Regular participation in physical activity has been shown to positively impact health worldwide (Warburton & Spray, 2017). However, the World Health Organization (2018) reports that over 80% of the world's adolescent population does not participate sufficiently in physical activity and exercise. Physical activity includes all physical movements that require energy expenditure, including daily tasks and unstructured activities (walking, housework). At the same time, exercise is defined as planned, structured, and repetitive activities (Dasso, 2018) and is considered a sub-dimension of physical activity (Katsagani et al., 2023). For this reason, it is two closely related concepts. Physical activity and exercise are among the effective strategies to protect public health by reducing the risk of cardiovascular diseases, diabetes, and some types of cancer (Kern & Armstrong, 2022).

Physical education classes are essential to support students' participation in physical activity (Harris & Cale, 2018). Traditional physical education programs have yet to successfully instill lifelong physical activity habits in students (Mahardika et al., 2024). At this point, studies also indicate that physical education lessons should emphasize valuing a physically active life rather than focusing on sports (Bowler et al., 2022). Therefore, alternative approaches and health-related achievements have been added to physical education classes to promote a healthy and active lifestyle (Siedentop, 2009). In Turkey, health-related outcomes were added to the physical education curricula for secondary schools (grades 5-8) in 2006 and for high schools (grades 9-12) in 2010 to encourage students to participate in physical activity (MoNE, 2006; MoNE, 2010). "Maintaining lifelong physical activity" was also added as a learning outcome in both programs. However, studies in Turkey have shown that more than physical education classes are needed to provide students with active and healthy lifestyles (Cengiz et al., 2014; Hunuk et al., 2013).

Health-Related Fitness Knowledge (HRFK) refers to health and well-being-related physical fitness concepts, including the relationship between xercise and health, healthy physical skills, and the importance of exercise in maintaining a healthy lifestyle (Saputra, 2023). HRFK, which is a crucial aspect of physical education curricula, may help support healthy life behavior and lifelong physical activity (Castelli & Williams, 2007; Ferkel et al., 2014). Additionally, studies reveal a significant relationship between HRFK and active and healthy life behaviors (Hannon & Thompson, 2012; Haslem et al., 2016). Physical education classes should provide children between the ages of 5-16 with HRFK to combat physical inactivity (Lloyd et al., 2010). Although it has been stated that having HRFK is practical in

gaining active and healthy life behaviors, more is needed on its own (Placek et al., 2001), having HRFK can be the first step in supporting healthy life behaviors (Ferkel et al., 2014). Even though it is known that having HRFK positively affects participation in active, healthy living, studies on the HRFK level of students show that their HRFK needs to be more accurate and complete (Hannon & Thompson, 2012). In addition, studies have shown that students' physical activity and HRFK levels are far below their physical education learning goals (Keating et al., 2009; Khairuddin et al., 2023). For this reason, intervention studies have been carried out to increase exercise and HRFK levels and improve school health outcomes in Turkey (Akıncı, 2014; Cengiz & İnce, 2014).

HRFK is essential for adolescents as it enables them to make informed decisions about their physical activity and well-being. Also, Exercise Stages of Change (ESC) is a framework to assess an individual's readiness to engage in regular physical activity (Toth et al., 2022). According to the framework, individuals progress through a series of stages. These ESCs can monitor physical activity patterns, evaluate specific interventions that facilitate movement to the following stages, and increase awareness of the importance of regular physical activity (Prochaska et al., 1992). ESC outlines five stages of readiness for adopting regular exercise: Precontemplation, Contemplation, Preparation, Action, and Maintenance. In contemplation, individuals lack the intention to change and show low self-efficacy and intention to participate in physical activity (Oka, 2003; Rosenkranz et al., 2015). Contemplation involves considering change without commitment, with slightly higher intention than pre-contemplation (Rosenkranz et al., 2015). Preparation includes planning and taking small steps, though motivation and social support barriers may arise (Gronmark, 2018). The action reflects active behaviour modification, with individuals striving to meet goals like 10,000 daily steps while facing self-consciousness (Gronmark, 2018; Rosenkranz et al., 2015). Finally, maintenance is characterized by consistent behaviour change over six months, improved self-efficacy, and lower relapse risk to physical inactivity (Oka, 2003; Rosenkranz et al., 2015). This framework provides a structured approach to understanding and supporting physical activity adoption. Those with high HRFK adolescents are more likely to transition from the early stages of inactivity to preparation and action. With a deeper understanding, they are better equipped to maintain long-term healthy habits, fostering lifelong health and fitness. The "Stages of Change", often associated with exercise behaviour modification, outlines individuals' progression when adopting new health behaviours, such as exercise. Research indicates that individuals in advanced stages (Action and Maintenance) exhibit higher self-determined motivation and exercise levels compared to those in earlier stages (Pre-contemplation and

Contemplation; Pope et al., 2021). Barriers to exercise vary by stage; for instance, motivational support is critical during preparation, while self-confidence becomes more significant in the action and maintenance stages (Gronmark, 2018). A study involving adolescents highlighted that health knowledge positively influences progression through the ESC, with males more likely to be in active stages (Ricardo et al., 2015). Furthermore, achieving specific physical activity goals, such as 10,000 steps per day, is more likely among individuals in the action or maintenance stages, emphasizing the importance of readiness in promoting physical activity (Rosenkranz et al., 2015). These findings showed that the need for tailored interventions considering individuals' stages of change to enhance physical activity adherence. For this reason, it is thought that it is important to investigate how secondary school students with varying ESC and HRFK levels apply HRFK in their daily lives. The key sources also identify exercise and HRFK support systems that facilitate this process.

Studies on students' physical activity levels in Turkey showed that students' exercise knowledge, skills, and attitudes toward regular physical activity decreased with age (Kin-Isler et al., 2009; Serbes et al., 2017). When studies on school-based health interventions were examined, it was seen that school-based health interventions could increase students' ESC and HRFK levels (Akıncı, 2014; Cengiz & İnce, 2014). In studies on school-based health interventions in the worldwide and in Turkey, students' knowledge, skills, or level of participation in physical activity were not taken into consideration when they were included in the physical education class (Akıncı, 2014; Cengiz & İnce, 2014; Pritchard et al., 2015; Ward et al., 2017).

In this context, the Theory of Planned Behavior (TPB) offers a valuable framework for addressing these gaps by linking physical education to behavior change in exercise (Ajzen, 1985). In physical education, TPB explains how attitudes, subjective norms, and perceived behavioural control influence students' readiness to engage in physical activity. For example, positive attitudes toward exercise, often shaped by acquiring health-related fitness knowledge (HRFK), are associated with higher intention to participate in physical activity (Park et al., 2009). Similarly, encouragement from teachers, peers, and family (subjective norms) can enhance motivation. At the same time, students' confidence in their ability to perform the exercise (perceived behavioural control) facilitates the transition from intention to action (Kirk & Haegele, 2019). Structured physical education lessons play a crucial role in operationalizing these TPB components. By fostering positive attitudes through HRFK, emphasizing social support, and creating inclusive environments that build confidence, physical education can help students overcome barriers to participation. Research highlights those interventions

aligned with TPB, particularly those addressing these three constructs, effectively promote exercise behaviour across diverse populations (Dermatis et al., 2023).

For students to transfer the HRFK they acquired in the physical education class environment to their daily lives and to increase their physical activity levels, it seems important to first determine the different student needs in the classroom environment and to provide lesson environments according to student needs. Based on this importance, the study aims to: The study aimed to: a) determine the exercise stages of change (ESC) and health-related fitness knowledge (HRFK) levels in one secondary school student in 6th, 7th, and 8th grades, and b) investigate how students with varying ESC and HRFK levels apply HRFK in their daily lives and identify the key sources and support systems (such as family, teachers, and peers) that facilitate this process.

METHODS

Participant

In the study, the researchers selected a secondary school through convenient sampling in one of the primary districts of the Denizli province, which predominantly comprises mid-income families and consistently achieves average academic records. In the first part of the study, all 6th grade (n = 207, 76 girls and 131 boys), 7th grade (n = 152, 83 girls and 69 boys), and 8th grade (n = 152, 74 girls and 78 boys) students in a secondary school were reached (n = 511, 233 girls, 278 boys). The study covered all secondary school students except for 5th-grade students in one school. The reason why 5th-grade students were not included in the study is that the HRFK test and the ESC Questionnaire are not reliable and valid measurement tools for this age group. Both measurement tools were developed when 5th-grade students were still included in primary school classes. Therefore, to ensure the validity and reliability of the measurement tools, the study was conducted with students starting from the 6th grade age group.

In the second part of the study, 30 students (13 girls, 17 boys) were selected using the purposeful sampling method. These students were divided into four groups according to the questionnaire and knowledge test levels. Four different focus group interviews were conducted with these groups.

This study used extreme or deviant case sampling from purposeful sampling (Creswell, 2002). In extreme or deviant case sampling, individuals in a research group are ranked according to their values, and those with very high or low values are deliberately selected. This method can elucidate situations that cannot be obtained from people with

average values (Creswell, 2002). In this study, the purposeful sampling method was used because the students with the highest and lowest levels were reached according to the questionnaire and knowledge test. While the ESC of students in the group with high ESC (1st and 3rd group) is 5, the ESC of students in the group with low ESC (2nd and 4th group) is 1. In terms of their knowledge levels, the students were ranked according to the levels they received from the knowledge test and were selected from those with the highest and lowest knowledge. No value was determined for the knowledge test, and the average values of the groups were calculated based on the student selections. Ethics committee permissions were obtained from Pamukkale University (2018 and 60116787).

Procedures

This study used extreme or deviant case sampling from purposeful sampling (Creswell, 2002). In extreme or deviant case sampling, individuals in a research group are ranked according to their values, and those with very high or low values are deliberately selected. This method can elucidate situations that cannot be obtained from people with average values (Creswell, 2002). In this study, the purposeful sampling method was used because the students with the highest and lowest levels were reached according to the questionnaire and knowledge test. While the ESC of students in the group with high ESC (1st and 3rd group) is 5, the ESC of students in the group with low ESC (2nd and 4th group) is 1. In terms of their knowledge levels, the students were ranked according to the levels they received from the knowledge test and were selected from those with the highest and lowest knowledge. No value was determined for the knowledge test, and the average values of the groups were calculated based on the student selections. Ethics committee permissions were obtained from Pamukkale University (2018 and 60116787).

Data Collection Tools

Data were collected through the Exercise Stages of Change Questionnaire, Health-Related Fitness Knowledge Test, and focus group interviews.

Exercise Stages of Change Questionnaire

The ESC Questionnaire was used to measure the participants' exercise stages of change in the study. The questionnaire was developed in 1992 to measure healthy behavior change (Marcus et al., 1992). In 2014, it was adapted into Turkish by Cengiz, Hunuk, and İnce, and its validity and reliability were ensured for sixth-, seventh-, and 8th-grade students. The questionnaire categorizes individuals' exercise participation level into five categories according to the answers given. Pre-contemplation (1 point), Contemplation (2 points),

Preparation (3 points), Action (4 points), Maintenance (5 points). The questionnaire evaluates the highest level of ESC as 5 points and the lowest level as 1 point. People at level 1 have yet to become aware of participating in exercise, while people at level 5 are considered to participate regularly.

Health-Related Fitness Knowledge Test

In the study, the 36-item Health-Related Fitness Knowledge Test, developed by Mott et al. (1991) and adapted into Turkish by Hunuk and Ince (2010), was used to measure the students' HRFK level. In the adaptation of the test, which initially had 25 items, to Turkish, 11 more items were added by the researchers (Hunuk & Ince, 2010). The test was finalized with 36 items by obtaining opinions about the items from expert physical education teachers, and its reliability and validity were ensured by applying it to 420 secondary school students (Hunuk & Ince, 2010). The test included questions about heart rate, physical fitness, flexibility, cardiovascular endurance, strength, exercise, and the importance of warm-up. There are three options for each item of the 36-item test, with one correct answer for each question. The highest level that can be obtained from the test is 36, while the lowest level is 0.

Focus Group Interviews

In the study, focus group interviews were held with 30 students determined by purposeful sampling, according to the results of the HRFK test and the ESC Questionnaire. Focus group interviews are a data collection method in which individuals are asked questions and openly communicate with each other and convey their thoughts (Kitzinger, 1995). In this regard, focus group interviews are used to investigate the knowledge and experiences of group members to explain not only what they think but also how and why they think this way (Kitzinger, 1995). A semi-structured interview form was used in focus group interviews. Three researchers examined the interview form used, and its validity was ensured by determining whether the questions were prepared.

30 students were divided into four groups according to their HRFK and ESC levels and focus group interviews were conducted with each group. During the interviews, students were focused on what kind of exercises they participate in outside of their physical education class, the motivations of those who regularly participate in an exercise, how and where they update their HRFK, what resources they use, and the roles of physical education teachers and coaches (if any) in this regard. There were some differences in the questions depending on the groups the students were in. Data triangulation was made for trustworthiness by comparing the levels obtained from focus group interviews with students, questionnaires, and knowledge

tests. In addition, the trustworthiness of the data obtained from the students was ensured through member checking.

Data Collection Process

After obtaining the necessary permissions from the University Ethics Committee and Denizli Provincial National Education, data were collected from a public school with socio-economically middle-income families in the central district of Denizli. The data was collected in the second semester of the 2018-2019 academic year from a secondary school where two physical education teachers, a male and a female, worked during physical education classes. Data was collected according to the two aims of the study. Within the scope of the study's first aim, the Health-Related Fitness Knowledge Test and the Exercise Stages of Change Questionnaire were applied to all 511 6th, 7th, and 8th-grade students. After data were analyzed, 30 students with the highest and lowest HRFK level and ESC level in the school were determined. According to these values, the students were divided into four groups, as explained in the sample selection. The first group consists of nine students with the highest ESC and HRFK; the second group consists of nine students with the highest HRFK but the lowest ESC; the third group consists of six students with the lowest HRFK but the highest ESC, and the fourth group consists of six students with the lowest ESC and HRFK.

Within the scope of the study's second aim, data were collected from 30 students, determined by purposeful sampling through focus group interviews. Four focus group interviews were held with four different student groups. In each focus group interview, students were asked different questions according to their characteristics and analyzed student views. Each interview lasted between 30 and 40 minutes. Semi-structured focus group interviews were conducted by the study's second researcher, who is an expert in qualitative research methods and teaches graduate-level qualitative research methods courses. During the interviews, the first researcher participated in the interviews to take written notes. All interviews were recorded with a voice recorder with the permission of the parents.

Data Analysis

Descriptive statistics (frequency, percentage, min., max.) were used to analyze the quantitative data of the research. The thematic analysis method was used to analyze qualitative data. Thematic analysis is an analysis method that aims to identify and reveal patterns of meaning in a qualitative data set (Braun & Clarke, 2006). Thematic analysis shows which themes are important in defining the phenomenon to be defined (Joffe, 2011). In this study, the thematic analysis was informed by priori themes, which were established prior to

data collection based on the research objectives. The priori themes derived from the research objectives guide the coding process and interpretation of the data. In this study, student quotes were included under pseudonyms.

RESULTS

Findings on Quantitative Data

According to the study's first aim, the Exercise Stages of Change Questionnaire and the Health-Related Fitness Knowledge Test were administered to 511 students in a school. Table 1 shows the minimum, maximum, and average values of the ESC levels and HRFK test of 511 students.

Table 1
ESC Questionnaire and HRFK Test Levels of Students (N = 511)

Variables	n	Min.	Max.	Mean	SS
ESC Questionnaire	511	1	5	3.25	1.43
HRFK Test Level	511	10	32	24.27	4.14

Four groups were created by selecting 30 students with values in the questionnaire and test results. The quantitative values of these students are shown in Table 2. Accordingly, the average HRFK test level of the students in the first group was 31.22, and their level, according to the ESC, was 5. While the HRFK test average of the students in the second group was 30.22, their level, according to the ESC, was 1. The HRFK test average of the students in the third group was 12.66, and their level, according to the ESC, was 5. While the HRFK test average of the students in the fourth group was 14.50, their level, according to the ESC, was 1 (Table 2).

Table 2
Demographic Characteristics of 30 Students in Focus Group Interviews

Groups / Grades	GROUP 1		GROUP 2		GROUP 3		GROUP 4	
Total	9 Students (5 Boys ,4 Girls)		9 Students (5 Boys, 4 Girls)		6 Students (6 Boys)		6 Students (3 Boys, 3 Girls)	
8th grade	3 students		4 students		1 student		1 student	
7th grade	5 students		3 students		5 students		5 students	
6th grade	1 student		2 students		-		-	
Values	HRFK $\bar{x}$	ESC $\bar{x}$	HRFK $\bar{x}$	ESC $\bar{x}$	HRFK $\bar{x}$	ESC $\bar{x}$	HRFK $\bar{x}$	ESC $\bar{x}$
	31.22	5	30.22	1	12.66	5	14.50	1

The reason for choosing people with very low or high values rather than typical people in this study is that the researchers wanted to obtain more detailed data by identifying specific groups. In this context, four student groups were determined using the purposeful sampling method in the study.

Findings of Qualitative Data

According to the second aim of the study, it was interviewed with four groups to investigate how students with varying ESC and HRFK levels apply HRFK in their daily lives and identify the key sources and support systems (such as family, teachers, and peers) that facilitate this process. The interview data was explicitly analyzed for each group. Here are the findings obtained from the interviews of each student group;

Results From the Student Group With the Highest ESC and HRFK Level

Nine students with the highest ESC and HRFK level were interviewed in a focus group. It was found that the students in this group willingly participated in regular exercise at least three days a week. These students also participated in exercise or sports outside of school. These students are noteworthy as students who participate in sports outside of school and physical education classes. The female students in the group stated that they attended volleyball, gymnastics, and swam clubs. Also, they walked with their families outside of school. Male students regularly participated in karate, swimming, and basketball activities in sports clubs. The students in this group primarily relied on their coaches in sports clubs, family members, and the internet as sources of their HRFK. When looking at their participation in physical activity, it was found that students' intrinsic motivation to exercise was high, and their current HRFK also positively influenced this participation.

All of the students in this group participated in physical activity or sports outside of school, and they saw their coaches in the clubs they attended as the most reliable source of HRFK. Below are some quotes about the coaches of students with high ESC and HRFK levels.

> *"I ask my coach about my shortcomings and how I can improve by training. I ask what I should and should not eat before or after the matches."* Arda (male student)

Students in this group had a family member who regularly participated in physical activity or sports; they also had a background in sports. These family members were very conscious and encouraged the students to engage in exercise. It was also found that these students mainly learned HRFK from their fathers. Below are quotes from students with high ESC and HRFK levels.

> *"My father is researching knowledge about exercise. My father helps us, we are three siblings, he helps all of us and gives us knowledge about health."* Duru (female student)

> *"I worked with many coaches, but my father is my greatest coach."* Yaren (female student)

The students in this group are adept at utilizing the internet to acquire knowledge about nutrition and training. They follow various websites to stay up to date with the latest HRFK. Furthermore, they try to incorporate their training and nutrition plans into their routine by following the social media accounts of notable athletes. Some student quotes about their Internet and social media usage are as follows:

> *"For example, I often search for knowledge about bones on the internet. I wonder what will happen if we do sports, and I often look at such things."*' Tahsin (male student)

> *"I follow social media sites that share daily menus or exercise programs. For example, they suggest what to eat and what exercises to do for the day."* Yaren (female student)

> *"I was very obsessed with aerobic exercises. I watched videos on YouTube, such as rope skipping and cross-jumping."* Ayşe (female student)

According to some students, they often use the internet or social media to obtain HRFK. However, they have encountered instances where the HRFK they obtained was incorrect. As a result, they felt the need to verify the reliability of the HRFK they obtained from these platforms. They did this by consulting their coaches and seeking confirmation of the validity of the HRFK. Only after their coaches confirmed the accuracy of the HRFK did students begin to apply it to their lives. Some of the student quotes on this matter include:

> *"'I have received incorrect knowledge from the internet; for example, I have come across articles such as "You should push yourself too hard during exercise." But I asked my coach, and he warned me that this knowledge is not correct. He advised me that one should not continue exercising when having a hard time."* Tahsin (male student)

After analyzing the factors that influence students' participation in physical activity, it was found that personal curiosity is the most significant reason. Students with higher HRFK and ESC find participating in physical activity enjoyable and tend to incorporate them into their daily routines. Furthermore, they also expressed their interest in continuing sports or physical activity.

> *"'I am interested in every type of sport. Very rarely do sports seem boring to me; I don't know, I like volleyball and basketball, I love them all, and I'm curious; I want to join."* Halime (female student)

"Maybe I can be a basketball player or a swimmer in the future because I love it so much. I want to be selected for the NBA in basketball, for example, and I also want to be a professional athlete." Arda (male student)

Unlike their peers in other groups, the students in this particular group stated that their current HRFK positively impacted their exercise participation. Moreover, their high level of HRFK also positively impacted their intention to exercise. These students were more conscious about exercising than their peers in other groups. For example, a student who knew that he needed to take 10,000 steps a day mentioned that he walked longer on his way home from school as follows:

"My biggest problem is my weight. After leaving the school, I knew I had to take ten thousand steps a day to maintain my health. Although they (his family) were coming to pick me up by car, I decided to take the long way home instead of taking a ride. That's why I refused the ride and started walking towards home." Birce (female student)

Results from the Group of Students With the Lowest ESC Level and Highest HRFK Level

In the focus group interview with the group of nine students who had the lowest ESC level despite the highest level of HRFK, it was found that these students did not participate in regular exercise and did not participate in any physical activity or sports outside of physical education and sports classes at school. They learned about HRFK from television, science teachers, and social media. The students said they disliked participating in physical activity because they thought their skill levels were insufficient. However, these students had high academic expectations and were academically successful. In this group, science teachers played a significant role in imparting HRFK. The students in this group were academically successful at school, and it was seen that the role of the coach in the first group was taken by the science teachers at the school in this group. A related student quote was as follows:

"I learned about the human body in my science class, including knowledge about heartbeats, muscles, and bones." Kemal (male student)

"Here (referring to the knowledge test) it says heartbeat, I heard this in science classes." Tamer (male student)

Additionally, students in this group stated that they obtained their HRFK from television. They stated that they constantly follow some sports channels and update their knowledge through these channels. The internet was another source of HRFK for these students. Even though the students did not participate in physical activity, they said they

followed famous athletes and sites related to physical activity on the internet. They could access topics that they were curious about via the internet. Student quotes on the subject are as follows:

> *"There are some websites or applications related to sports, I download them to my phone and get them from there."* Kemal (male student)

> *"Whenever I hear things I'm curious about or words I don't know about this subject, I look them up on the internet."* Gamze (female student)

> *"There is a channel called Bein Sports, they talk about all kinds of sports there, I follow it there or watch movies about sports."* Kemal (male student)

When the physical activity participation of the students in this group was analyzed, it was found that the students were reluctant to participate in physical activity or sports. Students perceived their skill levels as lower than their peers. That is why they wanted to avoid participating in physical activity or sports, including physical education classes. Student quotes regarding this are as follows:

> *"I don't think I'm talented. Come on, watch me for 5 minutes and you'll see me... I mean, there are people better than me, I'm not the best at anything, so I don't want to participate."* Aslı (female student)

> *"I don't participate in physical activity much because I don't like it. I can't do it anyway."* Gamze (female student)

In addition, these students thought their families or teachers did not guide or support them regarding physical activity or sports participation. These students, who had high academic expectations, did not participate in physical activity or sports because they feared their academic success would decrease.

> *"I was going to join the school team, my physical education teacher said don't be a disgrace, he said you are not practicing, he said practice and come. I didn't participate to avoid embarrassment."* Bartu (male student)

> *"I'm very busy, there is an exam next year, and my mother is against it, so I can't attend because it might affect my exams."* Kemal (male student)

Results From the Group of Students With the Highest ESC Level and the Lowest HRFK Level

After conducting focus group interviews with six students who had the highest ESC, it was found that all of them were male and had the lowest level of HRFK. However, they all regularly participated in physical activity or sports outside of school for four to seven days a week. Five students attended the football club, while one regularly exercised in the fitness centre. It was noticed that the primary motivation for participating in physical activity was to improve their sporting abilities. It was noted that coaches in sports courses and the internet were the primary sources of HRFK for this group. Unlike the first group, it was worth mentioning that none of the students in this group had family members who regularly engaged in sports or physical activity. This group of students in the study consisted only of male individuals interested in either football or fitness. Their coaches provided them with exercise training principles to enhance their sports performance. However, unlike the first group, students in the third group did not need to know about HRFK. This knowledge was essential in promoting their conscious participation in exercise.

During the interviews, it was found that most students in this group attend football clubs outside of school. They relied on their coaches in these clubs for the current HRFK. However, it was concluded that the students in this group primarily received HRFK from their coaches regarding performance improvement, skill, and technical training rather than HRFK. It is thought that their HRFK is inaccurate because some of the HRFK they obtained from their coaches is incorrect. Because their coaches placed more emphasis on performance than HRFK, the students in this category were currently taught false HRFK. The following are quotes from students about the topic:

> *"My coaches give place-keeping or tactical HRFK in training. He says you lack speed, accelerate faster, etc. When you get home, make 2000 passes and run for 1 hour. It mostly gives HRFK to improve your performance in football."* Kazim (male student).

> *"In gyms, they say, this weight is high, do it with less, do it slowly. For example, if you lift 7.5 kg dumbbells in the gym, he tells you to lift 10 kg dumbbells by placing your knees on the floor. There is a movement called dumbbell; everyone is doing wrong but it shows them right. He told me to take additional nutrients as the training increased (protein powder). He tells or shows how to do the movement correctly or well, so there is not much knowledge about health, so mostly technical knowledge is given."* Hasan (male student)

It was seen that the students in this group also used the internet and social media as sources of knowledge, but they mostly gained HRFK about football from the Internet. Instead

of HRFK, they learned about teams and athletes from social media. Student quotes on the subject are as follows:

> *"For example, I look at photos while browsing Instagram. Galatasaray beat 3-1. There are caps about Fenerbahçe, I see funny things."* Mustafa (male student)

Results from the Student Group With the Lowest ESC Level and HRFK Level:

After conducting a focus group interview with six students with the lowest ESC level and HRFK at the school, it was discovered that these students lacked interest and curiosity in physical activity and sports. They mentioned that they only participated in physical activity during physical education classes. It was also found that these students were passive in physical education lessons and wanted to avoid participating. They did not put in any effort to gain HRFK and were not supported by their families or teachers to learn or participate in the exercise. Additionally, their physical education teachers stated that their participation in physical activity in the lesson could have been higher, and their academic success in other courses was below average. Student quotes on the subject are as follows:

> *"I have concluded that you do not participate in much regular exercise. Can you tell me a little about the reasons for this? Why don't you join"* (interviewer)
>
> *"I don't like doing sports, I did it when I was a child and I don't like it now."* Esra (female student)
>
> *"I do not like."* Ahmet (male student)
>
> *"'Do physical education teachers at school support your participation in exercise or sports? How?"* (interviewer)
>
> *"No, he doesn't support me."* Esra (female student)
>
> *"Do your families support your participation in exercise or sports? How?"* (interviewer)
>
> *"No, they don't support me."'* Murat (male student)
>
> *"No"* Ahmet (male student)

DISCUSSION

The first group of students with the highest ESC and HRFK were found to have positively transferred this knowledge to their daily lives, which increased participation in physical activity. The study also found that these students regularly engaged in physical activity outside school. Studies connected with this finding indicate that HRFK positively

influences lifelong physical activity (Haslem et al., 2016). The students in the first group acquired their HRFK from various sources such as coaches, family, internet, and social media. Although these students use the internet and social media to obtain HRFK, as revealed in other studies in the literature (Daum, 2020; Yılmaz et al., 2022), they made sure to confirm the reliability of their knowledge by having their coaches validate the HRFK. This group of students was distinguished from others by the support they received from their families, especially fathers, in adopting healthy and active lifestyles. The study also found that social support perceived by family members, particularly fathers for boys and mothers for girls, is positively related to students' participation in physical activity. When studies in the literature were examined, it was revealed that the social support perceived by family members (King, Wilson, & Tergerson, 2008) and the social support perceived by girls from their mothers and boys from their fathers are related to students' participation in physical activity (Ay, 2019). These findings are significant as they shed light on the importance of reliable sources of HRFK and the role of family support in promoting physical activity.

The second group of students comprised individuals with high levels of ESC but low HRFK. Studies have shown that having HRFK does not necessarily lead to increased exercise participation (Placek et al., 2001). Similarly, despite the fact that the students in this particular group had a high level of HRFK, their intention to participate in exercise was still quite low. Based on the findings, it can be concluded that HRFK alone is insufficient to increase exercise. The students in this group usually acquire HRFK from the internet, social media, science courses or their teachers. Unlike other groups, these students obtain HRFK with academic expectations, mostly in science classes. Health gains are incorporated in physical education curricula and other courses such as science (MoNE, 2018). The students in these courses gained HRFK from their teachers, but this knowledge alone did not lead to developing active and healthy lifestyle habits. By structuring physical education lessons well, students can develop active and healthy lifestyle habits (Harris & Cale, 2018). Because a well-designed physical education course, in addition to improving students' lifelong participation in physical activity (Tannehill et al., 2013; Yilmaz & Hunuk, 2022), can develop the necessary knowledge and skills for maintaining a healthy lifestyle (Sun et al., 2012).

The students in the third group had a remarkable feature. They had low HRFK but high ESC. These students were all boys interested in licensed football clubs outside of their school. Their participation in physical activity was solely to enhance their sports performance. The primary sources of knowledge for these students were their coaches in football clubs and the Internet. However, the HRFK they received from these sources may not always be accurate

and is mainly related to performance-based. Therefore, it can be concluded that HRFK alone cannot increase physical activity levels (Jayakumar et al., 2023). According to the findings in this study, relying on coaches and the accuracy of online resources for HRFK may lead to performance-orientated knowledge, neglecting the health aspects of HRFK. While HRFK is necessary, it alone does not guarantee increased physical activity. A more holistic approach that integrates health education with performance training may be required to promote healthier lifestyles among students.

The fourth group of students had low HRFK and ESC, and they did not try to acquire it. Like the second group of students, they felt that they did not have enough skills to participate in physical activity and, therefore, did not enjoy them. In addition, they did not receive support from their families or teachers to participate in physical activity. Students in both the second and fourth groups had low intentions to participate in physical activity because they felt they lacked the skills to do so. Studies have shown that physical self-perception is associated with physical activity (Makar, 2016). Unlike the students in the first and third groups, the students in the second and fourth groups did not participate in sports clubs outside of school. Physical education was the primary source of HRFK for these students. However, the fact that the courses were not structured according to the student's needs could prevent these students from developing an active and healthy lifestyle. A well-structured physical education course is known to positively influence students' active and healthy lifestyles (Cale, 2020; Pot, Whitehead, and Durden-Myers, 2018). Physical education teachers should not only structure their lessons with inclusive and varied teaching methods for all students. They should also provide students with satisfying, enjoyable, and meaningful learning environments. To encourage participation in physical activity and support lifelong physical activity habits, it is essential to personalise students' physical activity experiences and provide learning environments that are aligned with their interests (Gillies & Boyle, 2010). One of the distinguishing features of the fourth group of students was the absence of social support from their families or physical education teachers for physical activity, similar to the second group of students. These findings support existing literature highlighting the relationship between physical activity and perceived social support (King et al., 2008). Therefore, physical education teachers have the responsibility to help students become more physically active and to create lesson environments that increase their commitment to an active lifestyle (Cale, 2020). To achieve this, teachers need to be aware of the different needs and interests of students (Gillies & Boyle, 2010) and approach lessons in a more holistic way.

The findings of this study align with the Theory of Planned Behavior (TPB), which posits that behaviour is influenced by attitudes, subjective norms, and perceived behavioural control (Ajzen, 1985). In the context of physical activity, students' attitudes towards exercise are shaped by their HRFK. At the same time, the social support they receive from family and coaches reinforces subjective norms. For example, students in the first group, with high ESC and HRFK, exhibited positive attitudes and higher engagement in physical activity, supported by strong family involvement, particularly from fathers, as highlighted by King et al. (2008) and Ay (2019). On the other hand, students in the second and fourth groups, with low ESC and limited social support, lacked the motivation and perceived ability to exercise regularly, underscoring the importance of perceived behavioural control (Gillies & Boyle, 2010). This indicates that interventions aimed at enhancing HRFK should simultaneously target the development of supportive environments and positive attitudes towards exercise, consistent with TPB-based strategies that emphasize linking intention to action through education and social support (Park et al., 2009; Dermatis et al., 2023).

Limitations

This study has several limitations that should be acknowledged. Firstly, the research was conducted in a single secondary school in a specific region, which may limit the generalizability of the findings to other schools or areas with different socio-economic and cultural characteristics. Secondly, the study relied on self-reported data for assessing ESC and HRFK, which may be subject to social desirability bias or inaccuracies in students' responses. Thirdly, the study's cross-sectional design does not allow for conclusions about causality between ESC and HRFK. Future research could address these limitations by employing longitudinal designs, expanding the sample size and geographical scope, and incorporating objective measures of physical activity and HRFK.

CONCLUSION

It has been found that the needs and expectations of individuals vary based on the group they are associated with. Notably, students in groups 1 and 3, who exhibit the highest ESC, share a common trait of engaging in regular physical activity outside school. Furthermore, students who have high HRFK receive significant support from their families, particularly their fathers, whereas those with limited HRFK lack such support. Those with robust HRFK seek HRFK from reliable sources such as coaches, families, and the internet. In

contrast, individuals with limited HRFK often do not verify the accuracy of the HRFK they receive and tend to prioritize sports performance over HRFK.

There were notable differences between students with low HRFK in the second and fourth groups and those with high HRFK. The main differentiating factor was that those with high HRFK gained it through academic-focused science lessons. However, simply possessing high HRFK did not necessarily translate to active and healthy habits in life. The students in both low ESC and high groups struggled to develop habits related to physical activity and often did not feel confident enough to participate in it. They also needed more social support from their families and teachers, discouraging them from being active. These students typically only participated in physical activity during physical education lessons. However, even then, the classroom environment needed to be more inclusive for all student groups to develop active and healthy living habits. This study contributes to the literature by revealing distinct behavioral patterns across different student groups, underscoring the necessity for educators to adopt targeted strategies that address the diverse needs of students. We propose several recommendations for researchers, practitioners, and educators in light of the study's findings. Researchers are encouraged to explore the impact of social support from family and peers on students' HRFK and their progression through the ESC. They should also investigate the obstacles faced by students in lower ESC groups in terms of motivational factors and the influence of social and environmental contexts.

PRACTICAL IMPLICATIONS

Practitioners are urged to prioritize disseminating accurate HRFK by ensuring that evidence-based HRFK is readily available to students, particularly those in lower ESC groups, through reputable community and school programs. A group of secondary school students, especially those participating in physical activity or sports outside of school, acquire the related HRFK from their coaches. Therefore, physical education teachers should establish direct communication with these coaches to enhance the quality of students' participation in physical activity and to stay updated with the latest knowledge. Educators are advised to create inclusive physical education environments where all students feel empowered to participate in physical activity. Additionally, they should integrate academic content with practical applications to emphasize the importance of health over performance.

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Authors' Contribution

Both authors contributed equally to all parts of the study.

Declaration of Conflict Interest

There is no conflict of between the authors.

Ethics Statement

This research was found ethically appropriate with the decision of Pamukkale University of Applied Sciences Ethics Committee (30.05.2018, 11).

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