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Preservice teachers' attitudes toward pedagogical humour: the role of physical activity, sociodemographic factors, and academic discipline

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Abstract

Background Humour in educational contexts is not merely an element of entertainment but a powerful pedagogical tool that reduces anxiety, enhances motivation, strengthens classroom climate, and facilitates learning. While affiliative and anxiety-reducing functions of humour foster social bonds, it is well documented that hostile or aggressive humour can undermine students' self-concept. For this reason, humour must be employed with careful consideration in pedagogical settings. Although recent research has increasingly examined the associations between humour, psychological resilience, cognitive flexibility, and social interaction, studies evaluating preservice teachers' humour attitudes concerning lifestyle factors (e.g., physical activity) and socio-demographic variables remain limited. The present study seeks to address this gap by situating the multidimensional nature of humour at the intersection of pedagogy, lifestyle, and cultural context.

Methods The study, conducted within a cross-sectional survey design, included 766 preservice teachers (397 male, 369 female) enrolled at various universities in Turkey during the 2023–2024 academic year. Participants were classified as physically active or inactive based on WHO and ACSM criteria. The Attitude Scale Toward the Use of Humour in Education (ASTUHE) was employed as the data collection instrument. The scale consists of 17 items grouped into three subscales: PHNE (Perceiving Humour as Necessary in Education), ELI (Effect on Language and Instruction), and CCM (Contribution to Classroom Management). In Balta's (2016) original study, internal consistency was reported as $\alpha = 0.89$, whereas in the present research, internal consistency was $\alpha = 0.887$. For the analyses, independent-samples t-tests, one-way ANOVA, and post-hoc tests (LSD, Tukey HSD, Bonferroni) were conducted, with effect sizes (Cohen's d , η^2 , ηp^2) also reported.

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Results Preservice teachers generally evaluated humour as a positive element in education. Students who engaged in regular physical activity reported significantly higher attitude scores than their inactive peers ($M = 3.51$ vs. 2.86 ; $p < .001$, $d = 0.62$). Female students exhibited more favourable attitudes than males ($p < .05$, $d = 0.61$ – 0.98). Likewise, students involved in team sports demonstrated significantly higher scores than those engaged in individual sports ($p < .001$, $d = 0.60$ – 0.96). Differences were also observed across academic discipline, class level, family humour climate, income level, and place of upbringing ($p < .05$, $\eta^2 = 0.015$ – 0.027). In particular, students raised in urban centres evaluated the functions of humour in education more positively, likely due to their exposure to broader cultural and social stimuli. These findings underscore that humour is not merely a pedagogical skill but a multidimensional phenomenon shaped by lifestyle, social environment, and cultural factors.

Conclusions Regarding contribution to the literature, the study illuminates the relationship between humour and lifestyle factors, while simultaneously revealing the multilayered structure of humour through the combined examination of diverse socio-demographic variables. Moreover, the positive (affiliative, supportive) and negative (sarcastic, aggressive) aspects of humour are contextualised and discussed in light of the literature. Although the cross-sectional design and reliance on self-report data limit causal inference, the findings suggest that preservice teachers' humour awareness and the availability of physical activity opportunities in university settings may enhance pedagogical skills and psychosocial resilience. Future longitudinal and experimental research could more clearly elucidate the causal mechanisms linking humour and lifestyle factors.

Keywords Humour in education, Pedagogical humour, Teacher education, Pre-service teachers, Physical activity, Sociodemographic factors, Academic discipline

Background

Humour is a significant social indicator reflecting society's cultural fabric [1, 2]. Throughout history, various disciplines—including philosophy, psychology, literature, and sociology—have examined humour not merely as a form of entertainment but also as a powerful tool for understanding interpersonal communication, social structures, and human behaviour [3, 4]. Laughter and smiling, as universal forms of body language, are regarded as indicators of satisfaction and fundamental characteristics of being human [1, 5, 6]. In this context, humour has been defined as a form of communication brought to life through interaction and exchange, in which at least one party laughs [7]. Romero and Cruthirds [8] described humour as an amusing and playful mode of communication that elicits positive emotions in individuals. Martin [1] emphasised its broad scope, encompassing any situation or content that triggers laughter. Ruch [9] suggested that humour may arise from conflicts between objects, events, and expectations, whereas Meyer (2000) categorised its primary sources as relief, incongruity, and superiority [10].

In this study, pedagogical humour is defined as the intentional and purposeful use of humour by teachers in alignment with course content, aiming to facilitate the learning process and to strengthen teacher–student interaction [11]. Owing to its multidimensional nature, humour can therefore be regarded as an effective pedagogical tool when integrated into educational settings [12, 13].

In modern educational approaches, humour is regarded not only as an element that makes lessons enjoyable but

also as a means of capturing students' attention, reducing anxiety, enhancing motivation, and fostering a favourable classroom climate [1, 14–17]. In *Der Witz und seine Beziehung zum Unbewussten* (Jokes and Their Relation to the Unconscious) [18], Freud classified humour into two categories: “tendentious,” which operates at the expense of others, and “non-tendentious,” which encompasses harmless jokes. Graham, Papa, and Brooks [19] explained the relationship between humour and aggression through the theories of superiority, incongruity, and relief; meanwhile, Zillmann and Cantor [20] emphasised that sarcastic humour creates clear distinctions between winners and losers, a view later reinforced by Zillmann and Bryant [21].

Humour in education is considered a valuable tool that teachers can employ to create a motivating classroom environment and enhance student learning [22]. In higher education, humour is a distinctive feature of effective teaching [23–25]. Recent research has demonstrated the positive effects of humour on both the learning process and the classroom atmosphere [26, 27]. Findings indicate that humour increases student motivation, attention, and engagement; improves the classroom climate; reduces stress; and stimulates creative thinking [28–30]. Moreover, by alleviating classroom anxiety, humour contributes to developing more positive attitudes toward learning ([31]. From students' perspectives, humour facilitates learning and strengthens positive attitudes toward the teacher [28, 32–36]. However, hostile or aggressive humour may reduce students' interest in the course and undermine their self-esteem. Excessive humour also carries risks, such as distracting attention,

overshadowing instructional content, and weakening classroom authority [10, 28, 37–39]. For these reasons, scholars emphasise that pedagogical humour should be used carefully and in moderation [11, 14, 28, 31, 40].

Pre-service teachers' attitudes toward the use of pedagogical humour have increasingly become the focus of scholarly inquiry in recent years [12, 13, 41–43]. Pre-service *teacher* refers to students enrolled in teacher education programs who are training to obtain teacher certification or accreditation [44–47]. Examining this group is particularly important, as their pedagogical beliefs and attitudes toward humour are still in the developmental stage and may directly shape their future teaching practices [48, 49]. However, the existing body of literature has predominantly focused on single disciplines and has given limited attention to cross-disciplinary comparisons [43].

The effective use of humour is not confined to pedagogical skills alone; cultural norms and contextual dynamics also shape it. In some Asian societies, humour is perceived as a sign of weakened discipline, whereas in other contexts it is regarded as a tool for positive reinforcement and motivation [43, 50–52]. In Turkish society, humour has historically functioned both as a means of strengthening social solidarity and as a vehicle for criticising authority [53–56]. While Western cultures view humour as a more critical and individualistic mode of expression, Eastern cultures employ it to maintain social harmony and respect hierarchical balance [57–60]. Consequently, humour perceived as entertaining in one context may be regarded as meaningless or even inappropriate in another [23, 35, 61].

Individual factors also shape perceptions of humour. In particular, regular physical activity enhances psychological well-being, reduces stress levels, and fosters cognitive flexibility and emotional regulation skills [62–64]. These elements facilitate the perception and functional use of humour [65]. Among students engaged in sports, humour serves as a mechanism for enhancing group solidarity, strengthening team communication, and easing stress management [66–69], whereas for those who are not involved in sports, humour is more often employed to sustain interest in lessons and to facilitate participation [13, 53, 54, 70–73].

The variables examined in this study are grounded in individual and contextual factors shown in the literature to be associated with the perception and use of humour. Regular physical activity is significant as it enhances communication skills, facilitates stress management, and promotes social interaction [1, 74]. Gender can contribute to differences in humour styles [75], while academic level and field of study may shape attitudes toward humour through pedagogical knowledge and communicative competence [15]. Socioeconomic and cultural factors,

such as income level, place of residence, and humour within the family environment, also contribute to developing social skills [76]. The variable of physical activity was considered in line with the criteria recommended by the World Health Organisation (WHO, 2020) and the American College of Sports Medicine (ACSM, 2018) [77, 78].

The unique contribution of this study lies in its simultaneous examination of variables that have previously been investigated in a fragmented manner (physical activity, socio-demographic factors, and academic discipline). While existing findings in the literature generally focus on one-dimensional or limited variables, this research evaluates pre-service teachers' attitudes toward pedagogical humour from a multidimensional perspective. By considering the functionality of humour in education through individual factors (e.g., physical activity, gender) and contextual elements (e.g., socio-cultural factors, academic discipline), the study is expected to provide a more holistic contribution to the literature. The research addresses a significant gap by examining students from different universities and four distinct academic disciplines (Education, Social Sciences, Natural Sciences, and Arts & Humanities) regarding their attitudes toward using humour in education. Furthermore, testing the findings across diverse cultural and institutional contexts is an important direction for future research.

Accordingly, this study aims to comprehensively evaluate pre-service teachers' attitudes toward humour in education by simultaneously investigating individual (physical activity, gender) and contextual (socio-demographic factors, academic discipline) variables.

In light of the theoretical framework and the related literature, the hypotheses of the research are formulated as follows:

- H1: There is a statistically significant difference between pre-service teachers who engage in sports and those who do not regarding their attitudes toward using humour in education.
- H2: Female pre-service teachers' scores on pedagogical humour are statistically significantly higher than male pre-service teachers.
- H3: Participants engaged in team sports exhibit statistically significantly higher attitudes toward using humour in education than those engaged in individual sports.
- H4: Pre-service teachers who frequently use humour in daily life report statistically significantly higher ASTUHE total and subscale scores than those who do not.
- H5: Humour attitudes differ statistically significantly across academic disciplines.

- H6: Pre-service teachers' scores on attitudes toward using humour in education statistically significantly increase with higher academic grade levels.
- H7: Pre-service teachers raised in family environments where humour is frequently used and encouraged show statistically significantly higher attitudes toward the use of humour in education.
- H8: Pre-service teachers with higher income levels report statistically significantly higher pedagogical humour scores than those with lower income levels.
- H9: Pre-service teachers raised in urban centres show statistically significantly higher scores on attitudes toward the use of humour in education compared to those raised in towns or villages.

Materials and methods

This section outlines the details regarding the research model, the study group, as well as the process of developing the measurement tool and data collection.

Research design

In order to determine pre-service teachers' attitudes toward the use of humour in education, a comparative relational survey design based on the general survey model was employed [79, 80]. The hypotheses presented in the introduction section of this study were tested within this framework. Specifically, the research examined the effects of physical activity, gender, academic discipline, grade level, and socio-cultural factors on attitudes toward pedagogical humour. This study was conducted using a quantitative approach within the framework of a comparative relational survey design. As the data were collected at a single point in time, the study also carries the characteristics of a cross-sectional survey.

Participants

The participants of this study consisted of a total of 766 pre-service teachers (397 male, 369 female) enrolled in teacher education programs at various universities in Türkiye during the 2023–2024 academic year. The sample size ($n = 766$) substantially exceeded the minimum standards recommended in the social sciences and provided a robust statistical basis for hypothesis testing [81, 82]. Participants were selected through convenience sampling from among volunteer students who were accessible during the data collection process. To ensure diversity across academic disciplines, students from different departments with varying demographic characteristics, such as gender, age, and grade level—were included in the study. Prior to data collection, participants were informed about the study, participation was voluntary, and electronic consent was obtained.

Inclusion criteria

Being enrolled in a teacher education program, providing voluntary participation, and completing the questionnaire in full.

Exclusion criteria

Not being enrolled in a teacher education program and providing incomplete or erroneous responses. In addition, statistical procedures were applied to identify and remove outliers that violated normality assumptions during the data analysis phase.

Measures: physical activity

One of the key variables examined in this study is physical activity. In accordance with the guidelines of the World Health Organisation (WHO, 2020) and the American College of Sports Medicine (ACSM, 2018), physical activity was defined as participation in moderate- to vigorous-intensity exercise for at least three days per week, with each session lasting a minimum of 30 min [77, 78].

Moderate-intensity activity

Individuals can continue talking but cannot sing (e.g., brisk walking, cycling, rhythmic dancing).

Vigorous-intensity activity

Only short sentences can be spoken due to increased respiration (e.g., running, fast swimming, or physically demanding sports such as football) [83].

Participants were classified based on the following self-report question:

"During the past three months, have you engaged in moderate- or vigorous-intensity physical activity lasting at least 30 min per session on a minimum of three days per week?"

- Respondents answering "Yes" → classified as the physically active group.
- Respondents answering "No" → classified as the physically inactive group.

This approach is consistent with prior studies [84, 85], demonstrating that brief self-report questions can serve as a reliable and valid method for classifying physical activity. Furthermore, to minimise potential misinterpretations when responding to the self-report item, the questionnaire included illustrative examples of moderate- and vigorous-intensity activities (e.g., brisk walking, cycling, rhythmic dancing; running, fast swimming, football, etc.).

Table 1 presents the demographic characteristics of the participant.

Table 1 Demographic characteristics of the participants

	Variable	f	%
Gender	Male	397	51,8
	Female	369	48,2
Do you regularly participate in physical activity or sports?	Yes	429	56,0
	No	337	44,0
What type of sport are you interested in?	Team Sports	413	53,9
	Individual Sports	353	46,1
Do you regularly incorporate humour into your daily life?	Yes	386	50,4
	No	380	49,6
Which department are you enrolled in?	Educational Sciences	242	31,6
	Social Sciences	250	32,6
	Natural Sciences	158	20,6
	Arts and Humanities	116	15,1
What is your current year of study?	1 st Year	170	22,2
	2nd Year	172	22,5
	3rd Year	186	24,3
	4th Year	238	31,1
How would you describe the use of humour in your family environment?	Undecided/I don't remember.	170	22,2
	Humour was not welcomed; a serious attitude prevailed	168	21,9
	Humour was rarely used and not considered important	150	19,6
	Humour occurred occasionally, but was limited.	139	18,1
	Humour was very common and encouraged in the family	139	18,1
How would you describe your household income level?	Low	331	43,2
	Moderate	253	33,0
	High	182	23,8
What type of area did you grow up in?	City	371	48,4
	Town	273	35,6
	Village	122	15,9
	Total	766	100

Data collection

The research data were collected online via Google Forms during the 2023–2024 academic year. Voluntary participation was prioritised, all questions were set as mandatory to avoid missing data, and the system was configured to prevent multiple submissions from the same participant.

Personal information form

This form was designed to gather demographic and contextual information, including participants' gender, age, field of study, academic year, income level, type of settlement, and physical activity status.

Attitude Scale Toward the Use of Humour in Education (ASTUHE)

The ASTUHE, initially developed by Balta (2016), assesses pre-service teachers' attitudes toward using humour in educational contexts [86]. The validated Turkish adaptation of the scale was employed in the present study. The instrument comprises 17 items organised into three subscales: PHNE (Perceiving Humour as Necessary in Education), ELI (Effect on Language and Instruction), and CCM (Contribution to Classroom Management). These English abbreviations were retained throughout the manuscript and tables for clarity and consistency.

The ASTUHE is structured as a five-point Likert-type scale (1 = Strongly Disagree, 5 = Strongly Agree), with total scores ranging from 17 to 85. Higher scores reflect more positive attitudes toward humour in education. Expert review established content validity during its development, while exploratory factor analysis (EFA) identified a three-factor solution. This structure was subsequently confirmed by confirmatory factor analysis (CFA), which demonstrated acceptable fit indices. In Balta's (2016) original validation, the overall Cronbach's alpha was reported as 0.89, with subscale reliabilities ranging between 0.78 and 0.85. In the current study, the overall internal consistency reliability was $\alpha = 0.887$, indicating a high level of reliability within this sample.

Statistical analyses

Quantitative data obtained were first tested for normality. After confirming that the assumption of normality was met, parametric statistical tests were applied using IBM SPSS Statistics 27. In addition to descriptive statistical methods, independent-samples t-tests were conducted to compare quantitative continuous variables between two groups, and effect sizes (η^2) were calculated. According to Cohen (1988) and Lakens (2013), η^2 values of 0.01, 0.06, and 0.14 represent small, medium, and large effects, respectively [80, 81, 87–92].

For comparisons involving more than two groups, one-way ANOVA tests were employed [36, 41–47]. For ANOVA tests, effect sizes were reported using partial eta squared (ηp^2). Following standard benchmarks, ηp^2 values of 0.01, 0.06, and 0.14 were interpreted as small, medium, and large effects, respectively [81, 82, 87, 88]. Post-hoc comparisons were performed using LSD, Tukey HSD, and Bonferroni tests to ensure robustness against Type I error. Findings were analysed within a 95% confidence interval and at a 5% significance level, with results of $p < .05$ considered statistically significant. Initially, the LSD test was employed due to its sensitivity in detecting group differences. However, given its liberal nature and higher risk of Type I error, additional post-hoc comparisons were conducted using the more conservative Tukey

Table 2 Skewness and kurtosis values of the ASTUHE scale and its subscales

Scale/Subscale	n	M	Sum	Min.	Max.	SD	Skewness	SE Skewness	Kurtosis	SE Kurtosis
ASTUHE	766	3.23	2470.88	1.12	4.82	0.701	−0.365	0.088	−0.134	0.176
PHNE	766	3.06	2341.40	1.00	5.00	1.094	−0.198		−0.714	
ELI	766	3.16	2422.13	1.00	5.00	0.741	−0.373		−0.010	
CCM	766	3.56	2730.25	1.00	5.00	0.831	−0.220		−0.013	

ASTUHE Attitude scale toward the use of humour in education, PHNE Perceiving humour as necessary in education, ELI Effect on language and instruction, CCM Contribution to classroom management

Table 3 Independent samples t-Test results comparing the scale and subscale scores of regular exercisers and non-exercisers

Scale	Variable	n	M	SD	Cohen's d	t		
Subscale						t	df	p
ASTUHE	Regular exercisers	429	3.51	0.617	0.62	14.538	764	< 0.001*
	Non-exercisers	337	2.86	0.625				
PHNE	Regular exercisers	429	3.48	0.983	0.99	13.371	764	< 0.001*
	Non-exercisers	337	2.52	0.989				
ELI	Regular exercisers	429	3.40	0.653	0.69	10.517	764	< 0.001*
	Non-exercisers	337	2.86	0.740				
CCM	Regular exercisers	429	3.80	0.811	0.79	9.270	764	< 0.001*
	Non-exercisers	337	3.27	0.759				

ASTUHE Attitude scale toward the use of humour in education, PHNE Perceiving humour as necessary in education, ELI Effect on language and instruction, CCM Contribution to classroom management

* $p < .05$

HSD and Bonferroni tests to ensure the robustness of the findings [81, 92].

Regarding the scale used, possible scores ranged from a minimum of 17 to a maximum of 85. Lower scores indicated more negative attitudes, whereas higher scores reflected more positive attitudes toward using humour in education. The reliability of the scales was assessed through Cronbach's alpha coefficients. For the ASTUHE, the alpha coefficient was found to be 0.887, demonstrating high internal consistency and reliability [93].

As shown in the descriptive statistics (see Table 2), the skewness and kurtosis values of the scales and subscales fell within the ± 1.5 threshold, which is widely recognised in the literature as evidence that the normality assumption is satisfied [82]. Thus, the distributions met the normality criterion, and parametric statistical tests were subsequently applied.

Results

The data obtained from students are addressed in this section through descriptive analyses.

The findings presented in Table 3 indicate that pre-service teachers who regularly engaged in physical activity reported significantly higher attitudes toward using humour in education than their inactive peers. Regarding overall ASTUHE scores, this difference corresponds to a medium-to-large effect size ($d = 0.62$; $\eta^2 = 0.22$). This value suggests a difference that is not only statistically significant but also pedagogically meaningful, indicating that approximately 22% of the variance in humour attitudes is explained by physical activity.

Cohen's d reflects the magnitude of the difference between groups, while η^2 demonstrates the proportion of variance explained by this difference. These indices suggest that the findings hold both statistical and pedagogical significance when considered together.

A similar pattern was observed across the subscales. A strong effect emerged for PHNE ($d = 0.99$; $\eta^2 = 0.19$), indicating a robust association between physical activity and the perception of humour as necessary in education. In addition, participants who exercised regularly scored significantly higher on the ELI ($d = 0.69$; $\eta^2 = 0.13$) and CCM ($d = 0.79$; $\eta^2 = 0.10$) subscales, with medium-to-large effect sizes.

These results strongly support the H1 hypothesis, demonstrating a significant relationship between physical activity and attitudes toward pedagogical humour. A more detailed interpretation of these findings, along with their theoretical implications, is addressed in the Discussion section.

Figure 1 presents the mean scores of the ASTUHE total scale and its subdimensions according to exercise status (regular exercisers vs. non-exercisers). The detailed statistical results are provided in Table 3.

The findings presented in Table 4 reveal significant differences in attitudes toward the use of humour in education across gender, further indicating that these differences vary in relation to physical activity levels. In both groups, female pre-service teachers demonstrated more positive attitudes than their male counterparts; however, this difference was more pronounced among regular exercisers.

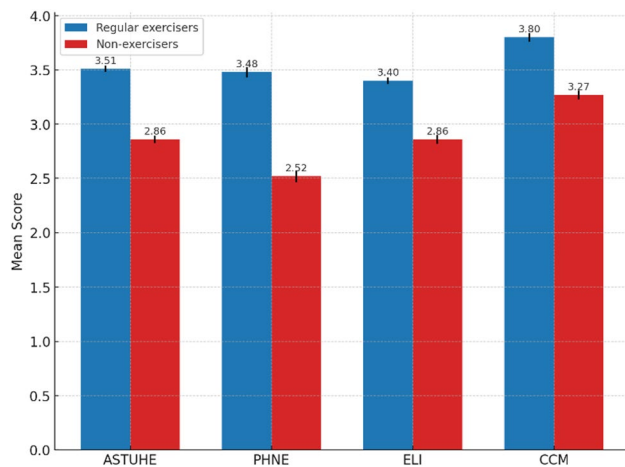


Fig. 1 Mean ASTUHE and subscale scores by exercise status (regular exercisers vs. non-exercisers)

Women in the physically active group scored significantly higher than men on the ASTUHE scale ($d=0.61$; $\eta^2 = 0.04$). Similarly, moderate effect sizes were observed for the PHNE ($d=0.61$; $\eta^2 = 0.02$) and ELI ($d=0.64$; $\eta^2 = 0.04$) subscales. Although women's scores were higher for CCM, the effect was small ($d=0.81$; $\eta^2 = 0.01$).

Among non-exercisers, women outperformed men in overall ASTUHE scores ($d=0.62$; $\eta^2 = 0.02$). An extreme difference was observed in the PHNE subscale ($d=0.98$; $\eta^2 = 0.02$). However, while women obtained higher scores in ELI ($d=0.74$; $\eta^2 = 0.01$) and CCM ($d=0.72$; $\eta^2 = 0.003$), these differences did not reach statistical significance.

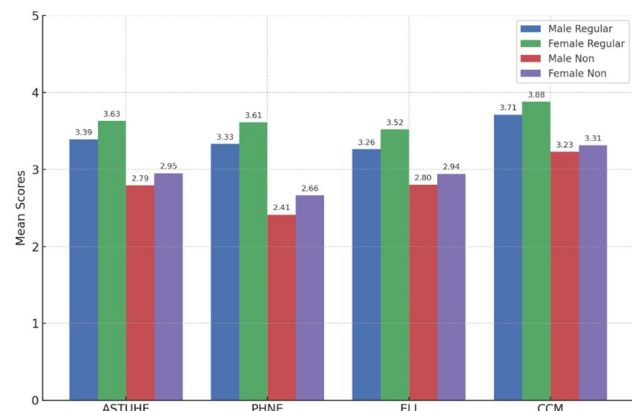


Fig. 2 Mean ASTUHE and subscale scores by gender and exercise status

Additionally, female and male participants who did not engage in regular physical activity had lower mean scores than their physically active counterparts. This pattern suggests that physical activity is consistently associated with more favourable attitudes toward humour in education, and that this relationship should be considered in conjunction with gender differences. Here, Cohen's d reflects the magnitude of the difference between groups, while η^2 represents the proportion of variance explained by this difference. Collectively, these findings provide statistical support for the H2 hypothesis.

Figure 2 presents the mean scores of the overall ASTUHE scale and its subdimensions according to gender and physical activity status. Detailed statistical results are provided in Table 4.

Table 4 Comparison of ASTUHE total and subscale scores by gender for regular exercisers and non-exercisers (Independent samples t-Test)

*	Scale/ Subscale	Variable	n	M	SD	Cohen's d	t test		
							t	df	p
Regular exercisers	ASTUHE	Male	207	3.39	0.596	0.606	-4.203	426.385	<0.001*
		Female	222	3.63	0.615				
	PHNE	Male	207	3.33	0.950	0.607	-2.991	426.773	0.003*
		Female	222	3.61	0.996				
	ELI	Male	207	3.26	0.637	0.641	-4.219	425.487	<0.001*
		Female	222	3.52	0.644				
	CCM	Male	207	3.71	0.783	0.807	-2.19	426.923	0.029*
		Female	222	3.88	0.829				
Non-exercisers	ASTUHE	Male	190	2.79	0.649	0.621	-2.377	327.342	0.020*
		Female	147	2.95	0.584				
	PHNE	Male	190	2.41	1.011	0.983	-2.352	323.147	0.019*
		Female	147	2.66	0.946				
	ELI	Male	190	2.80	0.751	0.738	-1.735	319.676	0.084
		Female	147	2.94	0.722				
	CCM	Male	190	3.23	0.753	0.722	-1.025	311.241	0.306
		Female	147	3.31	0.767				

ASTUHE Attitude scale toward the use of humour in education, PHNE Perceiving humour as necessary in education, ELI Effect on language and instruction, CCM Contribution to classroom management

* $p < .05$

The findings presented in Table 5, Panel A, reveal that the type of sport (individual vs. team) and the level of regular physical activity exhibit relational differences in attitudes toward using humour in education. Among participants who engaged in regular exercise, those involved in team sports reported significantly higher ASTUHE total scores than those engaged in individual sports ($d = 0.60$; $\eta^2 = 0.07$). Similar tendencies were observed across the subscales: strong effects in PHNE ($d = 0.96$; $\eta^2 = 0.03$), moderate effects in ELI ($d = 0.64$; $\eta^2 = 0.04$), and minor to moderate effects in CCM ($d = 0.80$; $\eta^2 = 0.02$).

A comparable pattern was also found among participants who did not exercise regularly. Those involved in team sports reported higher scores than those in individual sports (ASTUHE and ELI: $d = 0.60$ – 0.98 ; $\eta^2 =$

0.02 – 0.10). While a significant difference emerged in PHNE, the difference in CCM was more limited.

Furthermore, individual and team sports participants reported higher scores when they engaged in regular exercise compared to those who did not. These results suggest that regular physical activity may be positively associated with attitudes of pedagogical humour regardless of sport type. The findings further imply that the cooperative, communicative, and group identity-related dimensions of team sports may align with higher attitudes toward pedagogical humour. Detailed pedagogical interpretations of these findings are addressed in the Discussion section. Overall, the data provide statistical support for Hypothesis 3.

The findings presented in Table 5, Panel B, indicate that participants who reported using humour in daily

Table 5 Comparison of ASTUHE total and subscale scores by sport type and daily use of humour (Independent samples t-Test)

*	Sale/Subscale	Sale/Subscale	Variable	n	M	SD	Cohen d	t test		
								t	df	p
Panel A: Sport Type	Regular exercisers	ASTUHE	Individual Sports	195	3.33	0.524	0.596	-5.72	427	<0.001*
			Team Sports	234	3.66	0.650				
		PHNE	Individual Sports	195	3.26	0.858	0.963	-4.324	427	<0.001*
			Team Sports	234	3.66	1.043				
		ELI	Individual Sports	195	3.23	0.584	0.635	-5.032	427	<0.001*
			Team Sports	234	3.54	0.675				
		CCM	Individual Sports	195	3.65	0.850	0.800	-3.561	392.063	<0.001*
			Team Sports	234	3.93	0.755				
	Non-exercisers	ASTUHE	Individual Sports	158	2.67	0.722	0.600	-5.502	335	<0.001*
			Team Sports	179	3.03	0.465				
		PHNE	Individual Sports	158	2.36	1.101	0.979	-2.837	335	<0.005*
			Team Sports	179	2.66	0.857				
		ELI	Individual Sports	158	2.61	0.831	0.702	-6.206	335	<0.001*
			Team Sports	179	3.09	0.564				
		CCM	Individual Sports	158	3.16	0.771	0.754	-2.431	325.785	<0.016*
			Team Sports	179	3.36	0.738				
Panel B: Daily Use of Humour	Regular exercisers	ASTUHE	Yes	250	3.64	0.557	0.599	5.066	344.248	<0.001*
			No	179	3.34	0.654				
		PHNE	Yes	250	3.65	0.935	0.964	4.206	366.730	<0.001*
			No	179	3.24	1.003				
		ELI	Yes	250	3.50	0.628	0.641	4.013	371.762	<0.001*
			No	179	3.25	0.661				
		CCM	Yes	250	3.92	0.781	0.799	3.631	370.595	<0.001*
			No	179	3.63	0.825				
	Non-exercisers	ASTUHE	Yes	136	3.14	0.561	0.580	7.458	300.791	<0.001*
			No	201	2.67	0.594				
		PHNE	Yes	136	2.88	0.927	0.944	5.865	295.736	<0.001*
			No	201	2.27	0.955				
		ELI	Yes	136	3.18	0.682	0.694	6.893	295.469	<0.001*
			No	201	2.65	0.702				
		CCM	Yes	136	3.39	0.787	0.753	2.364	275.219	0.019*
			No	201	3.19	0.731				

ASTUHE Attitude scale toward the use of humour in education, PHNE Perceiving humour as necessary in education, ELI Effect on language and instruction, CCM Contribution to classroom management

* $p < .05$

life demonstrated more positive attitudes toward using humour in education than those who did not. This tendency was consistently observed across both groups—those who engaged in regular exercise and those who did not.

Among participants who exercised regularly, those who reported using humour in daily life had significantly higher ASTUHE total scores ($d = 0.60$; $\eta^2 \approx 0.07$). Subscale analyses highlighted powerful effects in PHNE ($d = 0.96$; $\eta^2 \approx 0.09$) and moderate effects in CCM ($d = 0.80$; $\eta^2 \approx 0.06$).

A similar difference was observed among participants who did not exercise regularly. Those who reported using humour in daily life had significantly higher ASTUHE scores than their counterparts who did not ($d = 0.58$; $\eta^2 \approx 0.16$). Although the effect size was relatively larger in this group, the total and subscale means were still lower than those of participants who exercised regularly. This pattern suggests that there may be a relational link between physical activity and positive attitudes toward humour; however, the internalisation of humour as a personal habit may partially offset the absence of regular physical activity by exhibiting a compensatory trend.

According to the findings presented in Table 6, significant differences were observed in ASTUHE total scores across academic disciplines among participants who engaged in regular physical activity, $F(3, 425) = 2.871$, $p = .036$, $\eta^2 = 0.020$, corresponding to a small effect size. Arts and Humanities students reported higher attitudes than all other disciplines. The LSD test indicated significant differences in all comparisons (4–1, 4–2, 4–3); however, in the Tukey and Bonferroni post hoc tests, only the 4–3 contrast remained significant.

A significant difference also emerged in the PHNE subscale, $F(3, 425) = 3.385$, $p = .018$, $\eta^2 = 0.023$. The LSD test revealed that Arts and Humanities students scored higher than students in all other disciplines. In contrast, Tukey and Bonferroni tests confirmed significance only for the 4–1 and 4–2 comparisons, with the 4–3 contrast losing significance.

A significant difference was also identified for the ELI subscale, $F(3, 425) = 2.120$, $p = .047$, $\eta^2 = 0.015$, again corresponding to a small effect size. This difference particularly favoured students in the Arts and Humanities. In contrast, no significant differences among those who exercised regularly were detected in the CCM subscale.

Among participants who did not engage in regular exercise, no significant differences were observed in ASTUHE, PHNE, or ELI subscales ($p > .05$). However, in the CCM subscale, students in Education and Social Sciences scored higher than those in the Natural Sciences, $F(3, 333) = 3.051$, $p = .029$, $\eta^2 = 0.027$, reflecting a small-to-moderate effect size. The LSD test revealed significance for both the 1–3 and 2–3 comparisons, but only the 2–3

difference remained significant in Tukey and Bonferroni tests.

These findings largely support Hypothesis 5 for participants engaged in regular exercise, while only partially confirming it in the non-exercising group through the CCM subscale. Overall, the differences observed across academic disciplines are more pronounced among participants who reported engaging in physical activity. The Discussion section elaborates on the detailed interpretation of these findings and their theoretical implications.

The findings presented in Table 7 demonstrate that pre-service teachers' attitudes toward using humour in education significantly differed across class levels. In both groups—those who engaged in regular physical activity and those who did not—attitudes toward humour increased notably as class level advanced.

Among participants who exercised regularly, ASTUHE scores rose significantly by class level, $F(3, 425) = 33.888$, $p < .001$, $\eta^2 = 0.19$, representing a large effect size. Similarly, significant effects were observed in the PHNE subscale, $F(3, 425) = 26.275$, $p < .001$, $\eta^2 = 0.16$ (significant effect), the ELI subscale, $F(3, 425) = 18.141$, $p < .001$, $\eta^2 = 0.11$ (moderate-to-large effect), and the CCM subscale, $F(3, 425) = 14.664$, $p < .001$, $\eta^2 = 0.10$ (moderate-to-large effect). Post hoc LSD analyses indicated that third- and fourth-year students scored significantly higher than lower-year students. Tukey and Bonferroni tests confirmed these differences, particularly for the 3–1, 3–2, and all fourth-year versus lower-level comparisons.

A similar upward trend was also observed among non-exercising participants. ASTUHE scores increased consistently with class level, $F(3, 333) = 65.884$, $p < .001$, $\eta^2 = 0.37$, reflecting a very large effect size. For the PHNE subscale, $F(3, 333) = 36.786$, $p < .001$, $\eta^2 = 0.25$ (large effect), for the ELI subscale, $F(3, 333) = 41.683$, $p < .001$, $\eta^2 = 0.27$ (large effect), and for the CCM subscale, $F(3, 333) = 14.724$, $p < .001$, $\eta^2 = 0.12$ (moderate-to-large effect). LSD analyses again revealed that third- and fourth-year students scored significantly higher than lower-year students; however, in Tukey and Bonferroni tests, some contrasts narrowed, with differences for fourth-year students versus lower years remaining consistent, while certain third-year contrasts did not retain statistical significance.

These findings indicate that as class level increases, more positive attitudes toward humour in education are reported, a trend consistently observed in physically active and inactive groups. This pattern provides empirical support for Hypothesis 6. Nonetheless, given the cross-sectional design, these differences should be interpreted as correlational patterns rather than causal effects. A detailed interpretation of these findings, their theoretical connections, and comparisons with existing literature are provided in the Discussion section.

Table 6 ANOVA results for attitudes toward the use of humour in education by academic department

[illegible]

Table 6 (continued)

*	Scale/Subscale	Groups	n	M	SD	Source of Variance	SS	df	MS	F	p	η^2	Signification	
													LSD	Tukey HSD
Non-exercisers	ASTUHE	Educational Sciences ⁽¹⁾	124	2.92	0.571	B.Groups	2.033	3	0.678	1.744	0.158	0.015	-	
		Social Sciences ⁽²⁾	102	2.86	0.604	W.Groups	129.351	333	0.388					
		Natural Sciences ⁽³⁾	69	2.71	0.737	Total	131.384	336						
		Arts and Humanities ⁽⁴⁾	42	2.90	0.615									
		Total	337	2.86	0.625									
PHNE		Educational Sciences ⁽¹⁾	124	2.60	0.992	B.Groups	2.319	3	0.773	0.788	0.501	0.007	-	
		Social Sciences ⁽²⁾	102	2.48	0.965	W.Groups	326.526	333	0.981					
		Natural Sciences ⁽³⁾	69	2.39	1.054	Total	328.845	336						
		Arts and Humanities ⁽⁴⁾	42	2.60	0.938									
		Total	337	2.52	0.989									
ELI		Educational Sciences ⁽¹⁾	124	2.93	0.657	B.Groups	1.727	3	0.576	1.051	0.37	0.009	-	
		Social Sciences ⁽²⁾	102	2.83	0.688	W.Groups	182.411	333	0.548					
		Natural Sciences ⁽³⁾	69	2.75	0.910	Total	184.138	336						
		Arts and Humanities ⁽⁴⁾	42	2.93	0.785									
		Total	337	2.86	0.740									
CCM		Educational Sciences ⁽¹⁾	124	3.31	0.646	B.Groups	5.181	3	1.727	3.051	0.29*	0.027	1-3; 2-3;	2-3;
		Social Sciences ⁽²⁾	102	3.38	0.751	W.Groups	188.479	333	0.566					
		Natural Sciences ⁽³⁾	69	3.04	0.973	Total	193.660	336						
		Arts and Humanities ⁽⁴⁾	42	3.23	0.621									
		Total	337	3.27	0.759									

η^2 Partial eta squared, ASTUHE Attitude scale toward the use of humour in education, PHNE Perceiving humour as necessary in education, ELI Effect on language and instruction, CCM Contribution to classroom management

* $p < .05$

Table 7 (continued)

*	Scale/Subscale	Groups	n	M	SD	Source of Variance	SS	df	MS	F	p	np ²	Signification		
													LSD	Tukey HSD	Benferroni
Non-exercisers	ASTUHE	1 st Year ¹	73	2.35	0.483	B.Groups	48.936	3	16.312	65.884	<0.001*	0.37	3–1,2;	3–1,2;	3–1,2;
		2nd Year ²	80	2.63	0.670	W.Groups	82.448	333	0.248				4–1,2,3	4–1,2,3	4–1,2,3
		3rd Year ³	86	2.92	0.337	Total	131.384	336							
		4th Year ⁴	98	3.37	0.461										
		Total	337	2.86	0.625										
	PHINE	1 st Year ¹	73	1.81	0.733	B.Groups	81.853	3	27.284	36.786	<0.001*	0.25	3–1,2;	3–1,2;	3–1,2;
		2nd Year ²	80	2.25	1.093	W.Groups	246.991	333	0.742				4–1,2,3	4–1,2,3	4–1,2,3
		3rd Year ³	86	2.67	0.752	Total	328.845	336							
		4th Year ⁴	98	3.14	0.824										
		Total	337	2.52	0.989										
	ELI	1 st Year ¹	73	2.36	0.645	B.Groups	50.27	3	16.757	41.683	<0.001*	0.27	3–1,2;	3–1,2;	3–1,2;
		2nd Year ²	80	2.59	0.782	W.Groups	133.868	333	0.402				4–1,2,3	4–1,2,3	4–1,2,3
		3rd Year ³	86	2.97	0.481	Total	184.138	336							
		4th Year ⁴	98	3.37	0.609										
		Total	337	2.86	0.740										
	CCM	1 st Year ¹	73	3.01	0.692	B.Groups	22.680	3	7.560	14.724	<0.001*	0.12	4–1,2,3	4–1,2,3	4–1,2,3
		2nd Year ²	80	3.16	0.713	W.Groups	170.980	333	0.513						
		3rd Year ³	86	3.13	0.750	Total	193.660	336							
		4th Year ⁴	98	3.66	0.707										
		Total	337	3.27	0.759										

np² Partial eta squared., ASTUHE Attitude scale toward the use of humour in education, PHINE Perceiving humour as necessary in education, ELI Effect on language and instruction, CCM Contribution to classroom management

*p < .05

Table 8 ANOVA results for attitudes toward the use of humour in education by perceived family humour climate

[illegible]

Table 8 (continued)

*	Scale	Groups	n	M	SD	Source of Variance	SS	df	MS	F	p	η^2	Signification		
													LSD	Tukey HSD	Benferoni
Non-exercisers	ASTUHE	A	71	2.84	0.603	B.Groups	17.511	4	4.378	12.764	<0.001*	0.13	A-B;	A-B;	A-B;
		B	72	2.55	0.485	W.Groups	113.873	332	0.343				C-B;	C-B;	C-B;
		C	62	2.84	0.509	Total	131.384	336					D-B;		
		D	54	2.78	0.637								E-A, B,C, D	E-A, B,C, D	E-A, B,C, D
		E	78	3.22	0.668										
PHNE		Total	337	2.86	0.625										
		A	71	2.51	1.037	B.Groups	24.899	4	6.225	6.799	<0.001*	0.08	A-B;		
		B	72	2.17	0.862	W.Groups	303.946	332	0.915				E-A, B,C,D	E-A, B,C	E-A, B,C
		C	62	2.40	0.957	Total	328.845	336							
		D	54	2.50	0.998										
ELI		E	78	2.96	0.934										
		Total	337	2.52	0.989										
		A	71	2.88	0.703	B.Groups	20.097	4	5.024	10.168	<0.001*	0.11	A-B;		
		B	72	2.56	0.63	W.Groups	164.041	332	0.494				C-B;		
		C	62	2.83	0.642	Total	184.138	336					E-A, B,C, D	E-A, B,C, D	E-A, B,C, D
CCM		D	54	2.72	0.760										
		E	78	3.26	0.769										
		Total	337	2.86	0.740										
		A	71	3.18	0.619	B.Groups	10.012	4	2.503	4.525	0.001*	0.05			
		B	72	3.02	0.662	W.Groups	183.648	332	0.553						
		C	62	3.42	0.772	Total	193.660	336					C-B;	C-B;	C-B;
		D	54	3.23	0.798								E-A,B	E-B	E-B
		E	78	3.48	0.850										
		Total	337	3.27	0.759										

Groups A-E represent the five-level classification of perceived family humour climate. A = Undecided/I do not remember; B = Humour was not welcomed, a serious attitude prevailed; C = Humour was rarely used and not considered important; D = Humour occurred occasionally, but was limited; E = Humour was prevalent and encouraged in the family

η^2 Partial eta squared., ASTUHE Attitude scale toward the use of humour in education, PHNE Perceiving humour as necessary in education, ELI Effect on language and instruction, CCM Contribution to classroom management

* $p < .05$

The findings in Table 8 indicate that the humour climate within the family significantly differentiates pre-service teachers' attitudes toward using humour in education. This trend was observed consistently among both regular exercisers and non-exercisers.

Among participants who engaged in regular physical activity, students who reported that humour was strongly encouraged in their families (Group E) achieved significantly higher ASTUHE scores compared to all other groups, $F(4, 424) = 16.826$, $p < .001$, $\eta^2 = 0.14$, reflecting a medium-to-large effect size. LSD tests revealed that Group E significantly differed from Groups A, B, C, and D, while Tukey and Bonferroni tests notably confirmed the E–B and E–C contrasts. Similarly, significant differences favouring Group E were observed across the PHNE, ELI, and CCM subscales, with η^2 values ranging between 0.07 and 0.11, corresponding to small-to-moderate effect sizes.

Comparable results were obtained among non-exercising participants. For ASTUHE total scores, family humour climate produced significant differences, $F(4, 332) = 12.764$, $p < .001$, $\eta^2 = 0.13$, indicating a moderate effect size. LSD tests again showed that Group E scored higher than all other groups, while Tukey and Bonferroni tests particularly validated the E–B and E–C differences. PHNE and ELI subscales displayed similar patterns, with η^2 values ranging from 0.08 to 0.11, corresponding to small-to-moderate effects. For the CCM subscale, differences were more limited, with $\eta^2 = 0.05$, reflecting a small effect size.

As the family humour climate strengthens, pre-service teachers report significantly higher pedagogical humour attitudes. The fact that Group E consistently scored higher than all other groups suggests that a supportive family humour environment may be closely related to pedagogical attitudes. These findings strongly support Hypothesis 7. The broader implications of family humour climate for teaching and learning processes are discussed in detail in the Discussion section.

The findings in Table 9 indicate that income level produced significant differences in attitudes toward using humour in education, particularly among participants who engaged in regular physical activity.

For ASTUHE total scores, students with higher income levels obtained significantly higher scores compared to those in the low-income group, $F(2, 426) = 5.969$, $p = .003$, $\eta^2 = 0.027$, corresponding to a small-to-moderate effect size. This difference was consistently confirmed across all three post hoc tests (LSD, Tukey, and Bonferroni) for the 3–1 comparison.

In the ELI subscale, high-income students scored higher than both low- and middle-income groups, $F(2, 426) = 6.630$, $p = .001$, $\eta^2 = 0.030$. LSD tests revealed significant differences for both 3–1 and 3–2 comparisons,

while the more conservative Tukey and Bonferroni tests retained significance only for the 3–1 contrast, with the 3–2 comparison losing statistical significance.

For the CCM subscale, a significant difference was also identified by income level, $F(2, 426) = 2.843$, $p = .049$, $\eta^2 = 0.013$, reflecting a small effect size. LSD and Tukey tests indicated that high-income students scored higher than the low-income group (3–1); however, this difference did not remain significant under the Bonferroni adjustment.

By contrast, no significant differences were observed in the PHNE subscale across income groups ($p > .05$).

Among participants who did not exercise regularly, income level did not produce significant differences in ASTUHE total scores or any of its subscales ($p > .05$).

In other words, income level alone is not a decisive factor in shaping humour attitudes. Overall, the effect of income level on pedagogical humour attitudes was significant only among the physically active group. These findings partially support Hypothesis 8, suggesting that while income level is not an independent determinant, it may interact with physical activity to influence pedagogical humour attitudes.

The findings presented in Table 10 demonstrate that humour attitudes significantly differed according to participants' place of upbringing, both among those who engaged in regular physical activity and those who did not. Overall, students raised in urban centres reported more positive attitudes than those raised in districts or rural villages.

Among participants who exercised regularly, those raised in city centres scored significantly higher on the ASTUHE, $F(2, 426) = 20.427$, $p < .001$, $\eta^2 = 0.09$, corresponding to a medium effect size. This difference was consistently confirmed by LSD, Tukey, and Bonferroni post hoc tests (1–2, 1–3). Similarly, in the PHNE ($F(2, 426) = 17.41$, $p < .001$, $\eta^2 = 0.08$; medium effect) and ELI ($F(2, 426) = 17.805$, $p < .001$, $\eta^2 = 0.08$; medium effect) subscales, students raised in urban centres, particularly compared to those from rural backgrounds, achieved significantly higher scores. All post hoc tests supported these differences. In contrast, for the CCM subscale, the difference approached significance ($p = .064$) but did not reach statistical significance.

A comparable trend was observed among non-exercising participants. Students raised in city centres obtained higher ASTUHE scores, $F(2, 334) = 16.888$, $p < .001$, $\eta^2 = 0.09$, indicating a medium effect size. This difference was consistently validated across LSD, Tukey, and Bonferroni tests, favouring urban upbringing (1–2, 1–3). Significant differences also emerged in the PHNE ($F(2, 334) = 7.516$, $p < .001$, $\eta^2 = 0.04$; small-to-medium effect) and ELI ($F(2, 334) = 14.351$, $p < .001$, $\eta^2 = 0.08$; medium effect) subscales, again favouring urban-raised students, with post hoc tests particularly confirming city–village contrasts.

Table 9 ANOVA results for attitudes toward the use of humour in education by income level

Scale	Groups	n	M	SD	Source of Variance	SS	df	MS	F	p	np ²	Signification		
												LSD	Tukey HSD	Benferroni
Regular exercisers	ASTUHE	Low ¹	189	3.42	0.522	B.Groups	4.446	2	2.223	5.969	0.003	0.027	3 – 1;	3, 1
		Moderate ²	131	3.52	0.667	W.Groups	158.676	426	0.372					
		High ³	109	3.67	0.677	Total	163.122	428						
		Total	429	3.51	0.617									
	PHNE	Low ¹	189	3.38	0.907	B.Groups	3.780	2	1.890	1.964	0.142	0.009	-	-
		Moderate ²	131	3.52	1.033	W.Groups	409.917	426	0.962					
		High ³	109	3.61	1.040	Total	413.697	428						
		Total	429	3.48	0.983									
	ELI	Low ¹	189	3.29	0.591	B.Groups	5.514	2	2.757	6.63	0.001	0.030	3 – 1, 2	3, 1
		Moderate ²	131	3.40	0.687	W.Groups	177.151	426	0.416					
Non-exercisers		High ³	109	3.57	0.683	Total	182.665	428						
		Total	429	3.40	0.653									
	CCM	Low ¹	189	3.72	0.787	B.Groups	3.705	2	1.852	2.843	0.049	0.013	3 – 1;	-
		Moderate ²	131	3.78	0.827	W.Groups	277.604	426	0.652					
		High ³	109	3.95	0.817	Total	281.309	428						
		Total	429	3.80	0.811									
	ASTUHE	Low ¹	142	2.92	0.628	B.Groups	1.111	2	0.556	1.424	0.242	0.008	-	-
		Moderate ²	122	2.79	0.646	W.Groups	130.273	334	0.390					
		High ³	73	2.86	0.580	Total	131.384	336						
		Total	337	2.86	0.625									
PHNE	Low ¹	142	2.58	0.956	B.Groups	0.956	2	0.478	0.487	0.615	0.003	-	-	-
	Moderate ²	122	2.47	1.064	W.Groups	327.889	334	0.982						
	High ³	73	2.48	0.928	Total	328.845	336							
	Total	337	2.52	0.989										
	ELI	Low ¹	142	2.94	0.757	B.Groups	1.617	2	0.809	1.48	0.229	0.009	-	-
	Moderate ²	122	2.79	0.772	W.Groups	182.521	334	0.546						
	High ³	73	2.83	0.642	Total	184.138	336							
	Total	337	2.86	0.740										
	CCM	Low ¹	142	3.29	0.835	B.Groups	2.305	2	1.152	2.011	0.135	0.012	-	-
	Moderate ²	122	3.17	0.697	W.Groups	191.356	334	0.573						
Total	High ³	73	3.39	0.690	Total	193.660	336							
	Total	337	3.27	0.759										

np²Partial eta squared., ASTUHE Attitude scale toward the use of humour in education, PHNE Perceiving humour as necessary in education, ELI Effect on language and instruction, CCM Contribution to classroom management

*p < .05

In the CCM subscale, differences were more modest, $F(2, 334) = 5.532$, $p = .004$, $\eta^2 = 0.03$, corresponding to a small effect.

Considering the table means, it was evident that across all three settlement groups, students who engaged in regular exercise scored higher on both ASTUHE total and subscale measures than those who did not. This pattern suggests a consistent association between regular physical activity and positive attitudes toward humour.

In conclusion, Hypothesis 9 is supported. The findings indicate that pre-service teachers raised in urban centres hold more favourable attitudes toward humour, and that physical activity may further reinforce these positive orientations.

Discussion

This study aimed to investigate pre-service teachers' attitudes toward using humour in education, focusing on the role of regular physical activity and a range of socio-demographic variables. The findings largely support the proposed hypotheses and provide valuable insights into the complex interplay between lifestyle factors, academic background, and pedagogical beliefs. The results demonstrate that humour is not merely a teaching strategy but a multidimensional phenomenon intertwined with individuals' psychological flexibility, social environments, and cultural socialisation.

The demographic profile of the participants also offers important clues for understanding this multidimensional structure. The balanced gender distribution (51.8% male, 48.2% female), the relatively high prevalence of regular physical activity (with more than half engaging in exercise), and the greater inclination toward team sports compared to individual sports all point to the close connection between humour perceptions and social context. Furthermore, the diversity of factors such as family humour climate, income level, and place of residence highlights that the findings are linked to individual characteristics and broader cultural and environmental conditions.

This holistic approach contributes to the international literature while allowing for a deeper understanding of the local dynamics shaping Turkish pre-service teachers' perceptions of humour (e.g., family humour climate, differences in place of residence).

The role of physical activity in shaping pre-service teachers' attitudes toward pedagogical humour

H1 hypothesised that there would be a significant difference in attitudes toward pedagogical humour between pre-service teachers who regularly engage in physical activity and those who do not. The findings strongly confirm this hypothesis. Participants who exercised regularly scored significantly higher across all dimensions

of the ASTUHE scale ($p < .001$, $d = 0.62$). The effect sizes reported in Table 3 further substantiate this result, with the overall difference in ASTUHE total scores corresponding to a medium-to-large effect ($d = 0.62$; $\eta^2 = 0.22$). Notably, the PHNE subscale revealed a powerful effect ($d = 0.99$; $\eta^2 = 0.19$), indicating that regular physical activity is not only associated with more positive evaluations of humour in education but also with heightened recognition of its functions in language development, learning processes, and classroom management.

This suggests that physical activity may strengthen the perception of humour as a pedagogical tool beyond mere enjoyment. Previous studies have similarly reported that instructional humour becomes more functional when it aligns with individuals' humour orientations [94, 95]. The cognitive flexibility and social confidence developed through sports participation may facilitate this alignment, thereby contributing to the more effective use of pedagogical humour.

The findings are consistent with the extensive body of literature demonstrating that physical activity enhances psychological well-being, reduces stress, and fosters positive affect [68, 96–105]. These cognitive and emotional benefits overlap with the functions of humour in supporting learning, reducing anxiety, and facilitating interaction. McGhie [106] conceptualised humour as a resource supporting cognitive and affective processes. The World Health Organisation's [77] multidimensional health model may also be regarded as theoretically reinforcing this relationship. Improvements in mood associated with regular exercise, enhanced social confidence, and more effective stress management could represent the key mechanisms underlying the development of more positive attitudes toward humour [107, 108].

This interpretation is further substantiated by recent research. White et al. [109] reported that physical activity strengthens mental health through mechanisms of social support, self-esteem, and psychological self-efficacy. Wu et al. [110] demonstrated that exercise reduces social anxiety by fostering psychological resilience and emotion regulation processes. Similarly, Wang et al. [111] found that exercise interventions exert positive effects on social adaptation and academic stress management.

In the Turkish context, the findings are also noteworthy. The increasing availability of sports facilities and university student clubs enhances pre-service teachers' participation in physical activity while exposing them to humour's social-sharing functions. Students engaged in sports are more readily integrated into group settings, which allows them to experience humour more frequently as a mechanism for social bonding, motivation, and stress relief [19, 112]. Thus, the pedagogical functionality of humour is reinforced by the social and psychological benefits of physical activity.

Table 10 ANOVA results for participants' attitudes toward the use of humour in education based on their place of residence

Scale	Groups	n	M	SD	Source of Variance	SS	df	MS	F	p	η^2	Signification		
												LSD	Tukey HSD	Benferoni
Regular exercisers	ASTUHE	City Center ^(a)	182	3.72	0.708	B.Groups	14.275	2	7.137	20.427	<0.001*	0.09	1-2,3	1-2,3
		District ^(b)	168	3.39	0.497	W.Groups	148.848	426	0.349					
		Village ^(c)	79	3.29	0.467	Total	163.122	428						
		Total	429	3.51	0.617									
PHNE		City Center ^(a)	182	3.79	1.103	B.Groups	31.259	2	15.629	17.41	<0.001*	0.08	1-2,3	1-2,3
		District ^(b)	168	3.27	0.778	W.Groups	382.438	426	0.898					
		Village ^(c)	79	3.21	0.884	Total	413.697	428						
		Total	429	3.48	0.983									
ELI		City Center ^(a)	182	3.60	0.705	B.Groups	14.092	2	7.046	17.805	<0.001*	0.08	1-2,3	1-2,3
		District ^(b)	168	3.27	0.582	W.Groups	168.574	426	0.396					
		Village ^(c)	79	3.19	0.531	Total	182.665	428						
		Total	429	3.40	0.653									
CCM		City Center ^(a)	182	3.88	0.806	B.Groups	3.614	2	1.807	2.772	.064	0.013	1-3;	-
		District ^(b)	168	3.80	0.800	W.Groups	277.695	426	0.652					
		Village ^(c)	79	3.62	0.826	Total	281.309	428						
		Total	429	3.80	0.811									
Non-exercisers	ASTUHE	City Center ^(a)	189	3.00	0.618	B.Groups	12.066	2	6.033	16.888	<0.001*	0.09	1-2,3	1-2,3
		District ^(b)	105	2.76	0.617	W.Groups	119.318	334	0.357					
		Village ^(c)	43	2.45	0.432	Total	131.384	336						
		Total	337	2.86	0.625									
PHNE		City Center ^(a)	189	2.66	0.974	B.Groups	14.162	2	7.081	7.516	<0.001*	0.04	1-3;	1-3;
		District ^(b)	105	2.46	1.002	W.Groups	314.682	334	0.942					
		Village ^(c)	43	2.04	0.875	Total	328.845	336						
		Total	337	2.52	0.989									
ELI		City Center ^(a)	189	3.03	0.758	B.Groups	14.572	2	7.286	14.351	<0.001*	0.08	1-2,3;	1-2,3;
		District ^(b)	105	2.74	0.697	W.Groups	169.566	334	0.508				1-2,3;	
		Village ^(c)	43	2.44	0.516	Total	184.138	336					2-3;	
		Total	337	2.86	0.740									
CCM		City Center ^(a)	189	3.37	0.706	B.Groups	6.209	2	3.105	5.532	0.004	0.03	1-2,3	1-3;
		District ^(b)	105	3.19	0.843	W.Groups	187.451	334	0.561					
		Village ^(c)	43	2.99	0.690	Total	193.66	336						
		Total	337	3.27	0.759									

η^2 Partial eta squared, ASTUHE Attitude scale toward the use of humour in education, PHNE Perceiving humour as necessary in education, ELI Effect on language and instruction, CCM Contribution to classroom management

* $p < .05$

In light of the data obtained, the more positive attitudes of physically active pre-service teachers toward using humour can be explained by the stress-reducing and mental health–promoting effects of physical activity [100]. The literature has consistently demonstrated that humour supports learning by alleviating anxiety and facilitating communication [113–115]. As emphasised in the humour orientation literature, humour is not a mandatory form of communication; however, it becomes more functional when aligned with an individual's own humour orientation [32, 94, 95]. The greater self-confidence and cognitive flexibility developed by physically active pre-service teachers may strengthen their humour orientation, enabling them to employ pedagogical humour more comfortably and effectively.

Building on these results, the study next explored whether gender differences contributed to variations in attitudes toward pedagogical humour.

Gendered perceptions of pedagogical humour among pre-service teachers

Hypothesis H2 proposed that female pre-service teachers would demonstrate more positive attitudes toward pedagogical humour than their male counterparts. The findings support this hypothesis. Across both physically active and inactive participants, women scored higher on the ASTUHE total scale than men. Effect sizes were particularly pronounced in the physically active group ($d = 0.61$; $\eta^2 = 0.04$), suggesting that physical activity may have amplified gender differences. Subscale analyses further corroborated this trend: women's scores produced moderate and statistically significant differences in the PHNE and ELI dimensions, whereas differences in CCM were more limited. Among inactive participants, women also scored significantly higher on ASTUHE, particularly in PHNE; however, the differences in ELI and CCM did not reach statistical significance.

These results align with the notion that gender roles influence perceptions of humour. Prior studies have shown that aggressive or exclusionary humour can foster climates of fear and anxiety in the classroom [33–116], whereas positive humour contributes to perceptions of warmth and closeness. The tendency of physically active students to evaluate humour more positively may be explained by their greater internalisation of humour styles that reduce anxiety and reinforce social bonds.

According to social role theory, women's socially oriented tendencies toward cooperation, empathy, and communication facilitate their adoption of humour to enhance learning and foster a favourable classroom climate [117]. When considered alongside Zillmann and Cantor's [20] theoretical explanations of the social functions of humour and Zillmann and Stocking's [118] findings on sarcastic humour, as well as the study by Yaprak

et al. [119] it can be inferred that women tend to prefer humour styles that reinforce social cohesion. The contributions of physical activity to attentional control and cognitive flexibility [120], together with its role in fostering self-regulation and cooperative skills [97], may further strengthen this tendency. Thus, gender differences can be understood as being reinforced by social roles and lifestyle-related factors.

In Turkish, teaching is traditionally perceived as more suitable for women, with cultural expectations emphasising qualities such as compassion, patience, and openness to communication. These societal norms help explain why female pre-service teachers are more likely to adopt humour as a tool for communication and classroom management. Consequently, the stronger endorsement of pedagogical humour among female pre-service teachers can be interpreted as the combined outcome of gender role expectations and lifestyle-related factors.

The literature supports these findings, frequently emphasising that women perceive humour as a tool for social cohesion and communication [121–123]. Recent research further confirms this tendency: Bear's [124] meta-analysis highlights the persistence of gender differences in humour expression, while Zhou et al. [13] report that perceptions of humour in educational contexts vary depending on student and teacher gender. Similarly, the study by Miron-Spektor et al. [125] demonstrates that female speakers gain communicative and influential advantages when using humour. These results suggest that the tendency of female pre-service teachers to evaluate pedagogical humour more positively can be explained not only by gender roles but also by differences in humour expression.

Female pre-service teachers' stronger humour attitudes may be explained by humour's functions in enhancing classroom climate, increasing student motivation, and reducing social distance [106, 126, 127]. Moreover, women's greater orientation toward relational communication, combined with humour's role in strengthening group cohesion, may facilitate its more effective use as a pedagogical tool.

In the subsequent analysis, the focus shifted to the type of sport activity, comparing pre-service teachers involved in team sports with those in individual sports.

Team sports versus individual sports: humour attitudes among pre-service teachers

H3 hypothesised that pre-service teachers engaged in team sports would demonstrate more favourable attitudes toward using humour in education than those involved in individual sports. The findings strongly confirm this hypothesis. Across both regular exercisers and non-exercisers, students interested in team sports reported significantly higher ASTUHE total and subscale

scores. Examination of effect sizes revealed that the difference in ASTUHE total scores was of medium magnitude ($d \approx 0.60$; $\eta^2 \approx 0.07$), while the PHNE subscale demonstrated a significant effect ($d \approx 0.96$; $\eta^2 \approx 0.03$). This outcome indicates that participation in team sports strongly reinforces the perception of humour as “necessary” in education. Furthermore, medium effects were observed for the ELI subscale ($d \approx 0.64$; $\eta^2 \approx 0.04$), and small-to-medium effects for the CCM subscale ($d \approx 0.80$; $\eta^2 \approx 0.02$). Comparable patterns were identified among non-exercisers, particularly ASTUHE and ELI scores, which yielded medium-to-large effects ($d = 0.60$ – 0.98 ; $\eta^2 = 0.02$ – 0.10).

These findings suggest that the inherent elements of communication, collaboration, and empathy within team sports facilitate the perception of humour as a tool for strengthening group cohesion and align with prior studies emphasising its role in fostering creativity [128–130]. In this context, the affiliative function of humour, which underscores its relational quality, becomes particularly salient [1, 75]. Safaei et al. [126] demonstrated significant associations between using humour in team sports and team cohesion, highlighting how positive humour strengthens interpersonal interaction and perceptions of connectedness among team members. At the same time, some studies caution that humour may reinforce social hierarchies or foster exclusionary dynamics [131–133]. Research on instructional humour similarly underscores that hostile or aggressive humour can generate an atmosphere of fear and anxiety in the classroom, whereas positive, “laughing together” forms of humour foster closeness and warmth [33, 116]. Accordingly, the empathy and social cohesion cultivated through physical activity may explain the stronger adoption of positive humour styles among students engaged in team sports.

The contemporary literature further supports this interpretation. Nikbakhsh and Farahani (2024) demonstrated positive humour reduces anxiety and enhances student cooperation [134]. Tod et al. [135] emphasised that sports counsellors employ humour to strengthen client interactions. Wei et al. [136] reported that physical activity enhances psychological flexibility through mechanisms of social support and emotional regulation; similarly, Cui and Zhou [137] highlighted the substantial impact of team sports on collective belonging and stress management; and Wang et al. [111] underscored the role of humour in facilitating communication and cohesion within sport-based group interventions. In addition, Şahin [56, 138] also showed that humour contributes to motivation and learning processes in instructional settings. The observed effect sizes also carry pedagogical significance.

In particular, the strong effect detected in PHNE ($d \approx 0.96$) indicates that the perception of humour as

“necessary” in education is far more pronounced among students engaged in team sports. This underscores that humour is not solely a cognitive resource but also a pedagogical tool shaped by social context and group dynamics.

In this context, the more positive perceptions of humour among pre-service teachers engaged in team sports can be explained by the role of humour within group dynamics. The literature emphasises that humour strengthens social bonds, enhances motivation, and supports group cohesion [139, 140]. Consequently, experiences gained through team sports may facilitate perceiving humour as a more functional tool in pedagogical settings. The findings also align with prior research showing that humour facilitates learning processes [30, 113, 114, 141], and positively influences classroom climate [11, 142]. Moreover, they parallel studies demonstrating that humour is effective when integrated with content, but yields adverse outcomes when expressed in aggressive or sarcastic forms [28, 94, 127, 143].

This study has organised the discussion section more holistically and thematically, rather than simply reiterating the tabulated results. While variables such as physical activity, gender, and academic discipline were examined under separate hypotheses, several common themes in the literature—for instance, the role of physical activity in enhancing cognitive flexibility and social adaptation [68, 97, 140, 144], —were consistently emphasised. Furthermore, prior research has underscored that humour is not merely a form of “entertainment” but becomes effective when employed as a tool for enhancing learning [32, 127], whereas inappropriate humour may undermine the learning environment [95]. Our findings indicate that pre-service teachers who engage in sports are particularly inclined to evaluate pedagogical humour more consciously and within appropriate contexts, thereby reinforcing the link between physical activity and the functional use of humour. In this way, the discussion offers a detailed and integrative analytical framework.

Beyond physical activity, the study also examined whether humour practices in everyday life shaped pre-service teachers’ pedagogical humour attitudes.

Humour in daily life and its impact on pre-service teachers’ pedagogical attitudes

Hypothesis 4 posited that pre-service teachers who regularly employ humour in their daily lives would exhibit more positive attitudes toward pedagogical humour. The findings strongly support this hypothesis. Participants who integrated humour into their everyday lives reported significantly higher ASTUHE total and subscale scores among those who engage in regular exercise and those who do not. Effect sizes (Cohen’s $d = 0.58$ – 0.96) ranged from medium to large, indicating that the results

are statistically significant and pedagogically meaningful. Particularly noteworthy is the strong effect observed in the PHNE subscale ($d \approx 0.96$). It suggests that students who use humour daily are more likely to regard it as a “necessary” component of the educational process. Similarly, the medium effect size in the CCM subscale ($d \approx 0.80$) highlights that humour is perceived as a more functional tool in classroom management and interaction contexts.

This finding suggests that humour may function as a transferable skill, with individuals’ degree of internalisation of humour in daily life directly linked to their pedagogical attitudes. The literature similarly reports that humour is associated with positive social and psychological outcomes [145]. Pre-service teachers who habitually employ humour in their everyday lives tend to view it as a facilitative element in classroom learning.

In Turkish culture, humour is widely employed as a means of communication within family and social relationships; however, an ambivalence persists regarding its use in educational settings. The findings indicate that pre-service teachers who actively engage with humour can better overcome this barrier and recognise its pedagogical value more clearly. This outcome is consistent with the evidence presented by Torok, McMorris, and Lin [15], which demonstrated that teacher humour can facilitate learning and strengthen teacher–student relationships.

Moreover, physical activity reinforces this relationship. Students who exercise regularly and employ humour in their daily lives tend to perceive pedagogical humour as both “necessary” and “functional.” This finding aligns with literature indicating that physical activity is associated with physical health, subjective well-being, and socio-emotional resources [109, 146]. Indeed, Wei et al. [136] and Cui and Zhou [137] reported that the impact of physical activity on subjective well-being is indirectly strengthened through mechanisms such as social support, health perceptions, and self-esteem.

Regarding humour’s psychological effects, Szabo [147] demonstrated that laughter exerts a more powerful relaxation effect in reducing anxiety and stress than either exercise or music. Similarly, the Dalli and Pehlivan [148] meta-analysis revealed that laughter-based interventions positively affect students’ psychological, physiological, and educational outcomes. These findings are consistent with theoretical frameworks that conceptualise humour as a resource for emotional regulation and stress management at individual and interpersonal levels [149, 150].

In light of these findings, it becomes evident that humour in daily life is significantly associated with pedagogical attitudes and that this relationship is particularly pronounced when combined with regular physical activity. The medium-to-large effect sizes suggest that, when

considered together, humour and physical activity may be conceptualised as two protective factors linked to pre-service teachers’ academic and social development.

Ziv’s [32] findings that humour enhances memory retention of learning material and increases attentional focus become more meaningful when considered alongside the cognitive advantages of physical activity (e.g., improvements in attentional control and memory performance). The clearer perception of humour as a facilitator of learning among physically active pre-service teachers can thus be explained by the dual mechanism of humour’s memory-enhancing function and exercise’s role in promoting cognitive flexibility.

These results are indirectly consistent with R. A. Martin and colleagues’ [145] four-dimensional model of humour. Although the present study did not directly assess humour styles, the higher pedagogical humour attitudes observed among pre-service teachers who engage in sports, participate in team-based activities, or use humour more frequently in daily life align with the functions of self-enhancing and affiliative humour styles, both of which have been emphasised in the literature for their positive outcomes. Conversely, aggressive or overly self-defeating humour has been highlighted as potentially detrimental to learning processes [127, 143]. Therefore, the positive attitudes observed in this study may be explained not only by physical activity or socio-demographic variables but also by the adoption of healthier humour styles within the pedagogical context.

This framework analysed disciplinary differences to determine whether academic fields influenced humour perceptions.

Disciplinary differences in pedagogical humour attitudes among pre-service teachers

H5 posited that differences across academic disciplines may influence pre-service teachers’ attitudes toward pedagogical humour. The findings supported this hypothesis, particularly for participants who engaged in regular physical activity. Students from the Arts and Humanities reported significantly higher ASTUHE total scores and higher scores on the PHNE and ELI subscales compared to students from other disciplines. Although the effect sizes were small ($\eta^2 = 0.015$ – 0.023), they are noteworthy in illustrating cross-disciplinary tendencies. Significant differences emerged only on the CCM subscale among those who did not exercise regularly. Education and Social Sciences students scored higher than their peers in the Natural Sciences, with the effect size corresponding to a small-to-moderate magnitude ($\eta^2 = 0.027$).

Post-hoc analyses further clarified these patterns. The LSD test indicated that Arts and Humanities students scored higher than all other groups (4–1, 4–2, 4–3). However, the more conservative Tukey HSD and Bonferroni

tests confirmed significance only for the difference between Arts and Humanities and Natural Sciences (4–3). Similarly, on the PHNE subscale, LSD revealed significant differences across all comparisons, whereas Tukey and Bonferroni confirmed only the contrasts with Education (4–1) and Social Sciences (4–2). This suggests that LSD is more sensitive in small-to-moderate samples but less stringent in controlling for Type I error. In contrast, Tukey and Bonferroni validate only the most robust differences. Accordingly, the most reliable and consistent distinction was observed between Arts and Humanities and Natural Sciences students.

These findings underscore the close association between humour, disciplinary culture, and communicative context. The more favourable attitudes toward humour expressed by Arts and Humanities students parallel Kotthoff's [151] conceptualisation of humour as a discursive practice. Moreover, Koerner and Fitzpatrick [152] emphasised that the impact of humour is not merely a function of its presence but emerges within the communicative context in which it is situated. This perspective helps explain how the communicative styles inherent in academic disciplines may shape attitudes toward humour.

The literature provides further support for this interpretation. Torok, McMorris, and Lin [15] reported that humour reduces anxiety and enhances attention; Şahin [56] highlighted its role in strengthening teacher–student relationships; Özdemir, Sezgin, Kaya, and Receptoğlu [54] linked humour to coping skills; and Tuğut and Kaya [153] found that higher levels of humour were associated with improved problem-solving abilities.

In this context, the findings presented in Table 6 support Hypothesis 5, demonstrating that academic disciplinary differences can shape attitudes toward pedagogical humour. The exceptionally positive attitudes expressed by Arts and Humanities students indicate that humour is not solely a function of individual traits but rather a dynamic construct intertwined with disciplinary culture and the socio-pedagogical context. Moreover, the fact that these differences become more pronounced among physically active participants is noteworthy.

From the reliability standpoint, the LSD, Tukey, and Bonferroni comparisons must be reported together. These findings suggest that the pedagogical functions of humour are linked to students' areas of interest, the structural characteristics of their academic disciplines, and their modes of instruction. Indeed, the literature has frequently emphasised that humour is directly connected to teaching quality and contributes to learning outcomes [141, 154].

At the next stage, attention turned to academic grade level, investigating whether seniority was associated with more favourable attitudes toward pedagogical humour.

Academic progression and shifts in pre-service teachers' humour attitudes

Hypothesis 6 posited that pre-service teachers would exhibit more positive attitudes toward pedagogical humour as class increases. The findings strongly support this hypothesis. Results presented in Table 7 demonstrate that higher class levels correspond to significantly greater scores across all dimensions of the ASTUHE scale. Among participants who engaged in regular physical activity, medium-to-large effect sizes were observed ($\eta^2 = 0.10$ – 0.19). In contrast, among those who did not engage in physical activity, substantial effects were reported for ASTUHE ($\eta^2 = 0.37$), PHNE ($\eta^2 = 0.25$), and ELI ($\eta^2 = 0.27$). These findings indicate that class level is a powerful determinant of humour perception, regardless of physical activity status. Ziv's [32] work similarly demonstrated that humour may be misinterpreted in younger age groups, whereas its cognitive and social functions are more consciously appreciated at more advanced ages. This aligns with the present finding that upper-year students develop more favourable attitudes toward pedagogical humour.

Post-hoc tests further reinforced this trend. LSD analyses revealed that third- and fourth-year students scored significantly higher than lower-year students. Tukey and Bonferroni tests confirmed the differences between fourth-year students and all lower classes. In contrast, some of the differences involving third-year students remained significant only in the LSD analysis. This suggests that fourth-year students adopt a more deliberate and robust orientation toward pedagogical humour, while third-year students show partial but more heterogeneous development.

The findings also align with the broader literature that underscores the importance of humour in classroom settings. Prior research has demonstrated that instructor humour enhances students' attention, improves classroom climate, and strengthens teacher–student relationships [142, 155]. However, the impact of humour is contingent upon the style employed; while course-related and positive humour fosters learning, aggressive or sarcastic humour may yield adverse outcomes [61]. Beyond functioning as a pedagogical tool that strengthens memory and comprehension processes [30, 113, 141], humour also reduces anxiety and cultivates a classroom climate that minimises social distance [11, 114].

In this context, developing positive attitudes toward humour among pre-service teachers may contribute to their ability to design more supportive, interactive, and anxiety-reducing learning environments once they enter the profession. Accordingly, teachers who consciously employ humour as a pedagogical tool likely have an advantage in enhancing student motivation, fostering classroom engagement, and facilitating instructional

processes. Ziv [32] demonstrated that humour facilitates the retention of learning materials and increases attention. The finding that physically active pre-service teachers perceive humour more positively may be more comprehensively explained by the combined effects of physical activity on attention and cognitive control and the reinforcing function of humour on learning.

This tendency becomes more pronounced not only with academic seniority but also when combined with regular physical activity. The results indicate that senior students, particularly those in the fourth year who engage in regular exercise, demonstrate a firmer grasp of the pedagogical functions of humour. This suggests that the beneficial effects of humour are reinforced not only by academic experience but also by lifestyle-related factors. Indeed, the literature reports similar trends. Torok, McMorris, and Lin [15] and Wanzer, Frymier, and Irwin [127] observed that senior students more favourably evaluate the pedagogical functions of humour. Likewise, Banas et al.'s [11] meta-analysis revealed that humour's cognitive and affective contributions are increasingly recognised as students advance in their academic trajectory. Moreover, humour has been associated with enhanced social competence and emotional regulation [156] higher levels of hope [157] and empathic sensitivity [158] it has been shown to facilitate coping with stress in childhood [150, 159] and to alleviate depression and anxiety while enhancing psychological resilience in adulthood [75, 160–162]. Thus, this increasing awareness of the value of humour observed by the fourth year, when combined with regular physical activity, may contribute to equipping pre-service teachers with stronger pedagogical and socio-emotional competencies as they transition into the profession.

From an analytical perspective, pre-service teachers conceptualise humour as an entertaining element and a pedagogical resource that facilitates emotional regulation, social cohesion, and learning motivation. This perspective parallels the functions of humour in familial and peer contexts: positive humour reduces tension and enhances relationship satisfaction [163, 164], whereas negative forms of humour may exacerbate internalising problems in children [150]. Moreover, when considered alongside humour's role in facilitating self-regulation [165]–[166] and the self-regulatory capacities that develop with age and experience [167], these elements can be viewed as complementary factors in explaining the increased pedagogical awareness observed among pre-service teachers.

In the Turkish context, the concentration of pedagogical formation courses in the upper years allows students to learn about the functions of humour more systematically. Garner [14] highlighted the role of humour in supporting cognitive processes, while Banas et al. [11] and

Chabeli [113] reported that humour enhances motivation and facilitates the learning environment. Therefore, pre-service teachers who evaluate humour positively will also experience strengthened academic achievement.

Finally, the regulatory functions of humour in group life align with these findings. Humour reinforces solidarity, reduces tension, sustains norms, and contributes to the formation of group identity [32, 168–171]. Thus, the heightened awareness of pedagogical humour that develops in upper-year students, combined with the cognitive and emotional flexibility fostered by physical activity, can be expected to make a more substantial contribution to teaching processes.

Moving from institutional to familial contexts, the study addressed the role of family humour climate in shaping attitudes toward humour in education.

Family humour climate as a determinant of pre-service teachers' attitudes toward pedagogical humour

H7 posited that the family humour climate would play a decisive role in shaping attitudes toward humour in education. The findings strongly support this hypothesis. In particular, students who reported that humour was strongly encouraged within the family environment (Group E) achieved significantly higher attitude scores than all other groups, both among those engaging in regular exercise and those not. Effect sizes were moderate to large for ASTUHE ($\eta^2 = 0.13\text{--}0.14$) and minor to moderate for PHNE, ELI, and CCM ($\eta^2 = 0.05\text{--}0.11$). These results demonstrate that the family humour climate exerts a robust influence on perceptions of pedagogical humour.

Post-hoc analyses reinforced these findings. LSD comparisons indicated that Group E diverged from nearly all other groups, while the more conservative Tukey and Bonferroni adjustments confirmed the E–B and E–C contrasts particularly. This suggests that, compared to climates where humour is not actively encouraged or regarded as trivial, students raised in families where humour is strongly promoted consistently exhibit a clearer and stronger advantage in their pedagogical humour attitudes.

Findings from the literature also support this tendency. The results indicate that the strong encouragement of humour within the family environment reinforces pre-service teachers' attitudes toward pedagogical humour. This aligns with previous research identifying the family humour climate as a fundamental socialisation factor shaping individuals' humour orientation [107, 172]. DiDomenico's [173] findings, which highlight the direct reflection of family humour valuation on individual humour perceptions, and Madsen's [174] evidence that father–child humour interactions enhance self-regulation skills, further explain why humour becomes more

functional in pedagogical contexts. In addition, studies demonstrating that humour strengthens resilience within the family and functions as a stress-reducing mechanism indicate that this advantage is grounded not only in cognitive but also in emotional and social domains [175–177]. Therefore, the strong encouragement of humour in the family, combined with the cognitive and emotional gains associated with physical activity, can be regarded as complementary factors that jointly enhance attitudes toward pedagogical humour.

From a pedagogical perspective, the family humour climate shapes individuals' communication habits and fundamental dispositions toward humour during early socialisation. The frequent use of positive humour within the family fosters the internalisation of humour as a communicative tool [174, 176], while simultaneously creating a safe, relaxed, and supportive environment [12]. This, in turn, enhances preservice teachers' propensity to employ humour more effectively and functionally in classroom contexts.

Qualitative research has likewise demonstrated the role of humour in fostering family resilience. For instance, in families coping with chronic illness, those who engaged in humour more frequently exhibited greater flexibility regarding roles and expectations, thereby managing challenges more effectively [176]. This finding underscores humour as a buffering mechanism that supports family functionality and translates into pedagogical attitudes in educational settings.

In sum, the family humour climate constitutes a powerful source of socialisation that nurtures individual humour orientations and pedagogical humour awareness. Consistent with the literature, the findings indicate that individuals raised in humour-supportive family environments are more inclined to evaluate humour consciously and positively in the teaching profession.

As another factor, socioeconomic status was considered, with analyses comparing income groups to assess potential differences in humour perceptions.

Socioeconomic status and pre-service teachers' pedagogical humour perceptions

H8 hypothesised that income level would play a determining role in attitudes toward pedagogical humour. The findings supported this hypothesis only among participants who engaged in regular physical activity. Although the effect of income level was small to moderate in magnitude ($\eta^2 \approx 0.03$), significant and consistent differences were particularly observed between low- and high-income groups. This suggests that income level is not a strong predictor but gains importance when interacting with lifestyle factors—such as regular exercise.

The most pronounced difference emerged when subscales were examined in the “Effect on Language and

Instruction” (ELI) dimension. In contrast, differences in the “Contribution to Classroom Management” (CCM) dimension were weaker and less stable. Some differences identified through LSD analyses were not confirmed by the more conservative Tukey and Bonferroni tests, with statistical significance maintained only in comparisons between the extreme ends of income. This finding indicates that the effect of income is particularly evident in the low- versus high-income groups, while statistical consistency diminishes in the middle-income group. These results align with Martin's [1] assertion that humour supports psychological well-being and cognitive flexibility. Higher income levels are typically associated with reduced chronic stress, richer cultural capital, and broader social networks, which may contribute to perceiving humour as more functional in teaching and learning processes. Conversely, studies conducted in Turkey reported no significant differences in humour perceptions across income levels [178]. This may explain why the exercise factor emerged as a decisive moderator in the present study.

Teacher candidates from higher-income backgrounds may evaluate pedagogical humour more favourably, a tendency that can be explained by the supportive communication climate and functional humour conditions fostered by socioeconomic prosperity. Such dynamics may also contribute to developing healthier relationships within school environments and more positive interactions with students.

Nevertheless, income level alone does not constitute a strong determinant of attitudes toward pedagogical humour. However, socioeconomic advantage facilitates the development of a more positive orientation toward humour when combined with regular physical activity. This finding suggests that the impact of socioeconomic prosperity on pedagogical humour is most salient when reinforced by an active lifestyle, further underscoring humour as a multidimensional socio-psychological phenomenon. Therefore, income level, rather than serving as a decisive factor in its own right, acquires significance primarily when combined with lifestyle variables such as physical activity.

Finally, the analysis turned to the broader cultural and environmental dimension, comparing urban and rural upbringings as contextual influences on pedagogical humour attitudes.

Urban versus rural upbringing: contextual influences on pre-service teachers' humour attitudes

H9 hypothesised that teacher candidates raised in urban centres would exhibit more positive attitudes toward pedagogical humour than those raised in district or village/town environments. The findings supported this hypothesis. As shown in Table 9, physically active and

inactive students raised in urban centres reported higher humour attitude scores, whereas those from rural/village backgrounds displayed the lowest values. Effect sizes were moderate ($\eta^2 \approx 0.08\text{--}0.09$). Differences were particularly pronounced in the “urban–village” and, to a lesser extent, the “urban–district” comparisons. While LSD tests revealed broader differences, the more conservative Tukey and Bonferroni procedures consistently confirmed the urban–village distinction. This pattern underscores the substantial contribution of urban environments to the perception of pedagogical humour.

From an environmental perspective, urban centres typically provide greater cultural diversity, opportunities for social interaction, and access to educational resources. Such enriched environmental stimuli may facilitate individuals’ tendency to perceive humour as a more functional tool for communication and learning [5, 179]. By contrast, the lower humour attitude scores observed among students from village/town backgrounds may be explained by limited access to cultural activities and reduced social diversity. At the same time, those from district settings occupied an intermediate position between these two poles. The consistent positive influence of regular physical activity across settlement types suggests that exercise’s psychological flexibility and social skills may mitigate the restrictive effects of less stimulating environments.

The cultural context literature aligns closely with these findings. Ruch [9] and Kim [180] argue that humour can elicit either positive or negative emotional experiences depending on cultural frameworks, while O’Neill [181] discusses how emotional culture within organisational settings can transform the effects of humour. Jiang [59] demonstrates that differences in humour perception, humour use, and psychological well-being across Eastern and Western cultures highlight humour as a multi-dimensional phenomenon shaped by culture. Similarly, Cao et al. [182] emphasise the decisive role of social distance in shaping the perception, sharing, and production of humour, thereby underscoring its strong link with interpersonal contexts. Norrick [183] further suggests that humour may serve as a mechanism of solidarity in some contexts and as a form of social control in others. Fine [168, 169], Lefcourt [5], and Cann and Collette [184] likewise stress that the social environment and cultural context directly shape humour. Mendiburo-Seguel, Páez, and Martinez-Sanchez [179] report that in Latin America, humour in urban settings is frequently deployed to strengthen social cohesion. In contrast, in rural settings, it tends to serve more as a source of everyday enjoyment. These international findings become significant when interpreted within the hybrid cultural fabric of Turkey.

The hybrid nature of Turkish culture, drawing simultaneously on the collectivist forms of humour

characteristic of Eastern societies and the critical and individualistic orientations prevalent in Western traditions, provides further nuance to this interpretation. The findings suggest that students raised in urban centres may be more receptive to humour’s critical and cognitive functions. In contrast, those with rural backgrounds may experience humour primarily as a mechanism for reinforcing belonging and community ties. From a psychosocial perspective, the more favourable humour attitudes observed among teacher candidates raised in metropolitan areas can be explained by humour’s functions within social communication and cultural diversity. In large cities, humour tends to be used more frequently and functionally in interpersonal interactions, which may in turn foster more positive evaluations of pedagogical humour [185]. In this way, the moderating role of physical activity is consistently observed across both socioeconomic and cultural contexts.

In conclusion, the place of upbringing emerges as an important variable in shaping attitudes toward pedagogical humour. Students raised in urban centres, having been exposed to broader cultural and social stimuli, tend to evaluate the functions of humour in education more positively. This finding supports the notion that pedagogical humour is informed not only by individual characteristics but also by social and cultural contexts.

Building on these contextual findings, these results underscore the necessity of considering cultural context in conjunction with lifestyle factors when evaluating the pedagogical functions of humour. O’Neill and Jazaieri [186] emphasise the interaction between humour and emotional culture, noting that humour may carry different meanings across cultural environments. Similarly, Ruch [9] argues that humour affects emotional experiences that are contextually shaped rather than culturally independent. Martin and Ford [31] further demonstrate that humour is not merely an entertainment element but also a cultural and social tool that facilitates interpersonal communication and learning. In this regard, physical activity is associated with psychological flexibility and stress management, group solidarity, social belonging, and cultural interaction. The social bonds fostered through sports participation may mediate the perception of humour as a more functional element in pedagogical settings. Accordingly, Turkish pre-service teachers’ positive attitudes toward humour can be explained by Turkey’s hybrid cultural structure—which draws simultaneously from collectivist (Eastern) humour traditions and critical-individualist (Western) orientations—and by physical activity’s social and emotional contributions. Within this framework, the study’s findings can be understood not solely through individual-level variables but also through cultural embeddedness and the mediating

role of social bonds, thereby offering a more substantial contribution to the international literature.

The differentiated functions of humour styles within pedagogical contexts further corroborate the findings. For instance, Stocking and Zillmann [118] demonstrated that aggressive humour enhanced perceptions of the speaker as more intelligent and confident, whereas self-deprecating humour weakened such perceptions. Similarly, Bippus [187] and Wanzer, Frymier, and Wojtaszczyk [28] reported that students may, in some cases, positively receive self-directed humour. In contrast, Cann and Matson [75], Bippus, Dunbar, and Liu [188], and Campbell, Martin, and Ward [163] provided evidence that affiliative humour fosters greater intimacy, relational satisfaction, and perceptions of trust among individuals. These findings reinforce the view that preservice teachers evaluate pedagogical humour as an entertaining element and a functional tool that strengthens social bonds and facilitates communicative environments.

Furthermore, Martin and Ford [31] emphasised that deliberately integrating humour into teaching processes enhances students' learning motivation while supporting cognitive and affective development. Finally, Neff and Dewaele [189] showed that teachers' humour styles are directly related to their pedagogical competence, with spontaneous humour proving effective in capturing attention and planned humour facilitating learning. Likewise, in the Japanese context, Neff and Rucynski [189, 190] highlighted how humour fosters a supportive learning climate and strengthens teacher–student relationships.

In the Turkish context, the findings situate the pedagogical functions of humour within a culturally distinctive framework. Turkish culture reflects influences from the collectivist humour traditions of Eastern societies—emphasising relational harmony and cohesion—and Western societies' individualistic and critical humour orientations. Within educational settings, this duality creates a certain ambivalence: while humour is often perceived as a tool to foster intimacy and enhance motivation in the classroom, it is sometimes constrained by concerns that may undermine seriousness. The results of the present study indicate that preservice teachers who engage in regular physical activity exhibit more favourable attitudes toward pedagogical humour. This outcome suggests that the psychological flexibility, stress-coping capacities, and social interaction opportunities afforded by physical activity align with humour's affiliative, anxiety-reducing, and cohesion-enhancing functions. Consequently, when Turkey's hybrid cultural structure combines physical activity's individual and social benefits, pedagogical humour may be positioned as a bridge between the critical functions emphasised in Western

traditions and the community-oriented functions rooted in Eastern perspectives.

Accordingly, the deliberate cultivation of humour within teacher education programs can enrich students' learning experiences and strengthen the pedagogical competencies of preservice teachers.

Limitations of the study and recommendations for future research

Several limitations may affect the generalizability and validity of the findings of this study. First, the data were collected through self-report questionnaires, which may have introduced subjective biases or susceptibility to social desirability effects. Moreover, the study relied on a correlational design, which precludes causal inferences.

The sample consisted of preservice teachers selected through convenience sampling from various universities in Turkey during the 2023–2024 academic year. While this provided a certain degree of diversity, it limits the generalizability of the results. Participation was voluntary, which may have excluded the perspectives of students who opted not to participate. Since humour perceptions may vary across cultural contexts, future research employing more representative and random sampling procedures would be valuable.

Second, the physical activity variable was measured solely through a binary yes/no self-report question. Although practical, this method may be prone to recall bias or social desirability effects. Future studies should incorporate validated instruments (e.g., IPAQ) or objective measures (e.g., accelerometers).

Third, the cross-sectional design allowed for the identification of associations among variables but offered no insight into the directionality or underlying mechanisms of these relationships. Longitudinal or experimental studies would be needed to address this gap.

Fourth, since all data were based on participant self-reports, the possibility of social desirability bias—particularly in behaviours perceived as socially favourable—cannot be excluded. Future research should incorporate multiple data sources, such as instructor observations, peer evaluations, or qualitative interviews, to achieve more comprehensive assessments.

Fifth, the present study employed only the ASTUHE scale. The absence of additional instruments that capture other dimensions of humour attitudes (e.g., humour styles, aggressive or affiliative humour) may have constrained the scope of the findings.

In conclusion, these limitations delineate the interpretive framework within which the findings can be understood. Future research involving more diverse cultural samples, validated measurement tools, longitudinal designs, and multi-source data collection is expected to yield more robust contributions to the field.

Conclusion

This study examined the attitudes of preservice teachers from different academic disciplines toward using humour in education concerning sports participation and a range of socio-demographic variables. The findings suggest that preservice teachers generally perceive humour as a positive element within the educational process. The observation that students engaged in regular physical activity obtained higher attitude scores indicates that physical activity may be associated with physical health, psychological well-being, and social interaction skills. Moreover, gender, class level, family humour climate, income, and place of residence were also reported to generate significant differences in humour-related attitudes.

These results indicate that humour is not merely a classroom entertainment strategy but a multidimensional phenomenon intertwined with individuals' lifestyles, social contexts, and psychological resilience. Preservice teachers' positive orientations toward humour may contribute to their ability to communicate effectively with students in the future and to create more interactive, participatory, and supportive learning environments.

This study offers several important contributions to the literature. First, it stands out as one of the few investigations to examine the relationship between sports participation, lifestyle factors, and attitudes toward humour. Second, the simultaneous consideration of multiple socio-demographic variables has highlighted the multi-layered structure of humour-related attitudes. The findings broaden theoretical perspectives on the pedagogical value of humour, illuminating its connections with teaching processes, stress management, psychological resilience, and social interaction. Moreover, they underscore the importance of addressing humour in teacher education programs in a conscious, pedagogical, and inclusive manner.

Overall, the distinctive contribution of this study lies in its treatment of pedagogical humour not solely as a teaching strategy but as a phenomenon intersecting with physical activity and lifestyle habits. In this regard, the research highlights the multidimensional nature of humour and suggests that this dimension should be explicitly considered within teacher education programs.

At the same time, the observed patterns indicate that promoting opportunities for physical activity in university settings may enhance preservice teachers' awareness of humour and strengthen their professional competencies. Future research could examine in greater detail the mechanisms underlying these relationships.

Abbreviations

SD	Standard deviation
X	Mean
SPSS	Statistical Package for the Social Sciences
p value	Probability value

t test	Student's t test
F value	F statistic
df	Degrees of freedom
ASTUHE	Attitude Scale Toward the Use of Humour in Education
PHNE	Perceiving Humour as Necessary in Education
ELI	Effect on Language and Instruction
CCM	Contribution to Classroom Management
SS	Sum of squares
MS	Mean square
η^2	Eta squared
ηp^2	Partial eta squared
A	Undecided / I do not remember
B	Humour was not welcomed, a serious attitude prevailed
C	Humour was rarely used and not considered important
D	Humour occurred occasionally, but was limited
E	Humour was prevalent and encouraged in the family

Authors' contributions

Conception and design of the study: Z.Ç., M.T., T.Ö., M.S.Y., K.Y., and M.G.; **Data acquisition, analysis, or interpretation of data: ** Z.Ç., M.G., A.Ş., F.Ç., S.G., K.Y., and M.S.Y.; **Drafting the manuscript: ** Z.Ç., T.Ö., A.Ş., M.G., F.Ç., K.Y., and S.G.; **All authors** critically reviewed the manuscript for important intellectual content; **Senior authorship: ** Z.Ç.; **All authors** approved the final version of the manuscript.

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Data availability

The data that support the findings of this study are available from the corresponding author upon reasonable request. The dataset will be accessible only for academic purposes, and any use of the data will recognize the original study and maintain the confidentiality of the participants.

Declarations

Ethics approval and consent to participate

The research was conducted with the knowledge and approval of the school administration. The study was carried out in accordance with the Declaration of Helsinki and applicable local guidelines and regulations. Ethical approval was obtained from the Faculty Ethics Committee of the Bayburt University Rectorate, Bayburt University, with the decision number 08.02.2023—118171 documented in the 2023/35 Bayburt University Rectorate Ethics Committee Decisions. The participants in this study voluntarily participated of their own accord. Informed consent was obtained from all participants. In order to conduct the required measurements, and all methods were carried out in accordance with the relevant guidelines and regulations.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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