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Relationship between Physical Activity Habits, Aggressive Behaviour and Cyberbullying among Young Adult University Students*

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Abstract

This study examined the relationship between physical activity habits, aggression, and cyberbullying behaviours among young adult university students. The study was conducted using a convenience sample, and the reliability of the scales was found to be acceptable (α=0.792, α=0.783). The study group consisted of 526 young adult university students who participated in all types of variable-rate (activity duration) and variable-interval (non-periodic) physical activity. While the majority of participants were in the normal BMI range, those who were mildly obese and obese constituted a significant proportion. The predominant motivations for engaging in physical activity were health and fitness, suggesting that these motivations should be considered when designing physical activity programmes. The study revealed no statistically significant difference between gender and participation in physical activity on aggression and cyberbullying, consistent with recent evidence that digital anonymity reduces gender-based aggression patterns. Furthermore, older participants (25-30 years) exhibited marginally higher levels of aggression (M=2.78) compared to their younger peers (M=2.73; p=0.022). The correlation between aggression and cyberbullying was found to be weak (r=.063, p<0.05), and the regression model was non-significant (R^2=.004, R^2_{Adj}=.002), thus emphasising the multifactorial nature of cyberbullying, which may be attributed to factors such as moral detachment and online anonymity. These findings provide a compelling argument for the implementation of interventions aimed at cultivating digital empathy and the provision of structured physical programmes. Additionally, the necessity for intersectional research to unravel the intricate interplay of cultural and contextual influences on online aggression is underscored.
Keywords: Aggression behaviour, Cyberbullying, Physical activity habits, University students, Young adults

Genç Yetişkin Üniversite Öğrencilerinde Fiziksel Aktivite Alışkanlıkları, Saldırgan Davranışlar ve Siber Zorbalık Arasındaki İlişki

Öz

Bu çalışma, genç yetişkin üniversite öğrencileri arasında fiziksel aktivite alışkanlıkları, saldırganlık ile siber zorbalık davranışları arasındaki ilişkiyi incelemektedir. Araştırma kolayda örnekleme yöntemi ile gerçekleştirilmiştir. Ölçeklerin güvenilirliği (α=0.792, α=0.783) kabul edilebilir düzeydedir. Çalışma grubu değişken oranlı (etkinlik süresi) ve değişken aralıklı (periyodik olmayan) fiziksel aktivitenin tüm türlerine katılan 526 genç yetişkin üniversite öğrencisidir. Katılımcıların büyük çoğunluğu normal BKİ aralığında olmakla birlikte, hafif şişman ve şişman bireyler de önemli bir oran oluşturmaktadır. Fiziksel aktivitelere katılma amaçları arasında sağlık ve fit olmak ön plandadır, bu da fiziksel aktivite programlarının tasarlanmasında bu motivasyonların dikkate alınması gerektiğini göstermektedir. Sonuçlar cinsiyet ve fiziksel aktiviteye katılımın saldırganlık ve siber zorbalık üzerinde istatistiksel olarak anlamlı bir fark olmadığını ortaya koymuş ve dijital anonimliğin cinsiyete dayalı saldırganlık kalıplarını azalttığına dair son kanıtlarla uyum sağlamıştır. Yaşlı katılımcılar (25-30 yaş) genç akranlarına (M=2.73; p=0.022) kıyasla marjinal olarak daha yüksek saldırganlık (M=2.78) sergilemiştir. Saldırganlık ve siber zorbalık arasındaki zayıf korelasyon (r=.063 p<0.05) ve anlamlı olmayan regresyon modeli (R^2=.004, R^2_{Adj}=.002), siber zorbalığın ahlaki kopukluk ve çevrimiçi anonimlik gibi çok faktörlü köklerini vurgulamıştır. Bu bulgular, dijital empatiyi ve yapılandırılmış fiziksel programları hedefleyen müdahalelerin yanı sıra çevrimiçi saldırganlık üzerindeki kültürel ve bağlamsal etkileri ayrıştırmak için kesişimsel araştırmaları savunmaktadır.
Anahtar kelimeler: Saldırgan davranış, Siber zorbalık, Fiziksel aktivite alışkanlıkları, Üniversite öğrencileri, Genç yetişkinler

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INTRODUCTION

In social science definitions, the problem arises of extending or restricting concepts according to the content of abstract concepts. For this reason, when defining the concept of aggression, it would be useful to use the definition of "any behaviour designed to harm, cause pain or injury to another human being", which is known and accepted by most scientists. Based on this definition, aggression is defined as "hurtful and disturbing behaviour towards another living being or object in general" (Boxer & Tisak, 2005). Aggression has been conceptualised as the response of an individual to a situation of inhibition, humiliation, or perceived threat associated with emotions such as anger and hostility (Morgan & Arıcı, 1981). Among the factors that influence aggression, there are many such as easy access to violent means, liking violent behaviour, friends and mass media.

The relationship between aggressive behaviour and physical activity (PA) is complex and bidirectional, and is shaped by moderating variables such as exercise type, intensity, and individual psychosocial factors. Recent meta-analyses suggest that moderate PA, particularly aerobic exercise, is associated with reduced aggression through improved emotional regulation and attenuated neurobiological stress responses (Nesin et al., 2025). For example, Lubans et al. (2016) synthesized 28 studies and found that regular PA (≥150 min/week) was associated with a 15–20% reduction in aggressive tendencies. Similarly, deDiosBenítez-Sillero (2023) showed that yoga and mindfulness-based PA reduced hostility in adolescents. Conversely, high-intensity or competitive PA may increase aggression, particularly in individuals with predisposing characteristics. LuisUbago-Jiménez et al. (2021) found that contact sports (e.g., boxing, rugby) were associated with transient increases in aggressive affect due to increased arousal and social comparison mechanisms. Longitudinal data also suggest that athletes in competitive environments exhibit increased baseline aggression over time, suggesting chronic stress or normalization of aggressive behaviour (Zhu et al., 2022). Meta-regression analyses suggest that the anti-aggression effects of PA are stronger in youth and clinical populations (e.g., individuals with ADHD or anxiety disorders), whereas the benefits are diminished in adults without baseline aggression (Wilson et al., 2020). Similar differences have been identified across gender. Males in team sports report higher aggression related to peer dynamics, whereas females exhibit greater emotional regulation than non-competitive PA (Benítez-Sillero et al., 2021). Considering these findings, PA generally serves as a protective factor against aggression.

With the development of technology, mass media play a significant role in the transfer of aggression to virtual environments. This situation has resulted in an increase in verbal aggression. The ease of access to the internet, the widespread use of sophisticated mobile phones and the development of social networks have led to an increase in virtual behaviour. Social media has become a platform on which appeals to all age groups, changing and growing rapidly every day (Tabuk & Karadağ, 2022). Social and verbal bullying, which are traditional forms of bullying,

have moved into cyberspace as face-to-face communication has moved into virtual environments (Leung et al., 2018).

Cyberbullying has a more complex structure than traditional types of bullying. The reasons for this complexity include factors such as the fact that the methods of cyberbullying (mobile phone, internet, social media, etc.) are different from traditional bullying (Hinduja & Patchin, 2008), the content shared in the cyber environment is permanent (Slonje et al., 2013; Wilson et al., 2020), and bullies can remain anonymous (Becerra, 2017). Therefore, despite its recent emergence, cyberbullying is recognised as an important issue due to its serious consequences such as low self-esteem, hopelessness, depression and anxiety (Alleva, 2019). Cyberbullying is defined as "repetitive and hurtful behaviour by an individual or group using technological tools to intentionally harm others" (Haber & Haber, 2007). Similarly, cyberbullying is also described as "aggression perpetrated over time and repeatedly by an individual or group using electronic communication tools against a victim who has difficulty defending himself or herself" (Smith et al., 2008).

Cyberbullying behaviour, which is widespread in society, has negative consequences for both the bully and the victim. Serious and severe consequences such as sadness, stress, depression (Kraft & Wang, 2010; Hemphill et al., 2015), loneliness (Willard, 2007), feelings of worthlessness (Hinduja & Patchin, 2010; Yaman et al., 2011) and even suicidal tendencies (Henson, 2012) are observed in cyberbullying victims. Cyberbullying is a form of aggression, based on the definitions that people who bully in the virtual environment have an aggressive attitude. The most important point is that the attackers can hide their identity through the anonymity provided by social networks. Behaviour involving threats, blackmail, or psychological violence is an act defined by law and has legal consequences (Bostancı-Bozbayındır, 2019; Bossler & Berenblum, 2019). For instance, cyberbullying, which includes online threats and coercive tactics, is criminalized under cybercrime laws in jurisdictions such as the European Union and the United States (Bostancı-Bozbayındır, 2019). Messages, comments, statements, and similar expressions shared on social networks may contain bullying content, and such digital interactions are increasingly recognized as admissible evidence in legal proceedings (AyofeAzeez et al., 2021). Psychological violence, such as sustained harassment or defamation on platforms like Instagram or X (formerly Twitter), has led to civil lawsuits and criminal charges, reflecting evolving legal frameworks to address digital harm (Bossler & Berenblum, 2019). This situation shows that cyberbullying can have serious negative effects at both individual and societal levels. Defining the aggression levels and dimensions of individuals who engage in such behaviours is an important aspect of research. The fact that aggressive behaviour can lead to clinical consequences such as suicide or homicide is similar to the consequences experienced by individuals exposed to cyberbullying (Hinduja & Patchin, 2018). For example, offline aggressive behaviours, including physical violence and verbal threats, have been linked to increased risks of suicidal ideation and completed suicides (Gámez-Guadix et al., 2013), as well as homicide perpetration (Bender et al., 2018). These outcomes mirror the severe psychological harm caused by cyberbullying, which studies associate with elevated rates

of depression, self-harm, and suicidal behaviours among victims (Henson, 2012; Volk et al., 2022). Research further demonstrates that both traditional aggression and cyberbullying disrupt neurobiological stress responses, exacerbating long-term mental health crises (Erbiçer et al., 2023). Therefore, the social lives of both aggressive and bullying individuals and victims are negatively affected.

Sport is one of the most important phenomena contributing to the development of universal values such as love, peace and friendship for the individual and society. Sport has many benefits for individuals and society. In its definition of sport, the Council of Europe (2001) emphasised that physical activity includes all activities undertaken for physical or personal health, social or competitive purposes (Parks et al., 2003). Pitts et al. (1994) defined sport as all activities, experiences and occupations primarily related to fitness, recreation, competition and leisure. As can be seen from these definitions, social activities like gymnastics, games and sports appear as a form of physical activity. These activities are supported by intrinsic and extrinsic sources of motivation according to the benefits they provide to the participant. For example, the increase in serotonin and dopamine levels in people who are physically active can make them feel more peaceful and happier (Lin & Kuo, 2013). The hormonal changes that occur in the body may help the individual to be more active and social (Hill et al., 2008).

Physical activity (PA) habits are fundamental to human behaviour and social life, exerting dual effects on individual well-being and social functioning. Systematic reviews show that consistent PA participation (≥150 minutes per week) improves cognitive and emotional regulation, reduces impulsivity, and promotes social behaviours such as cooperation and empathy (Lubans et al., 2016). Neurobiological studies have implicated PA in moderating decision-making and social cognition, thereby improving conflict resolution skills in group settings (Tran et al., 2021). Furthermore, PA habits are strongly associated with mental health resilience, with a 30% reduction in depression and anxiety rates found in physically active individuals (Bermejo-Cantarero et al., 2021). Socially, PA habits serve as a conduit for community bonding and cultural adaptation. Group-based activities, such as team sports or community exercise programs, strengthen social capital by promoting trust and shared identity, especially in diverse populations (Benítez-Sillero et al., 2021). For example, adolescents who participate in school sports exhibit higher peer acceptance and lower social isolation, buffering against cyberbullying and digital alienation. Conversely, sedentary lifestyles are associated with social withdrawal and reduced civic engagement, exacerbating social fragmentation (Wilson et al., 2020). Cultural norms also shape PA participation; collectivist societies prioritize social activities, while individualist cultures emphasize personal fitness, which yields different behavioural outcomes (Hofstede, 2013).

Due to the numerous positive effects of physical activities, the positive effects on the physical and mental health of individuals (Tabuk, 2023) who socialize by participating in physical activities can lead to an increase in their general quality of life and a decrease in aggressive behaviour. It is predicted that individuals with healthy bodies and minds will reduce or eliminate cyberbullying

behaviours. It is thought that individuals who become healthier through exercise will move away from aggression and bullying behaviour. Thus, it is important that the notion, causes, dimensions and relationship of aggression and cyberbullying with sport are explored.

In this context, the problem statements of the research were created as follows:
1. Is aggressive behaviour effective against cyberbullying??
2. Is participation in physical activity effective on aggressive behaviour?
3. Is participation in physical activity effective for cyberbullying?

METHOD

Research model

The relational research model has been used, which is particularly effective in the determination of the existence, direction and strength of associations between two or more variables (Creswell & Creswell, 2018; Cohen et al., 2018). According to Bryman (2016), this model allows researchers to explore correlations without implying causation, making it suitable for studies aiming to identify patterns or trends within a specific population. Additionally, Saunders et al. (2019) emphasise that relational studies are valuable for generating hypotheses and providing a foundation for further experimental research. By employing this model, the current study seeks to uncover meaningful connections between physical activity participation and other relevant factors among university students.

Sampling Group

The study population comprises university students engaged in various forms of physical activity. In this regard, over 400 university students participating in physical activities with variable rates (activity duration) and intervals (non-periodic) will be included in the research. The types of physical activities are categorised as follows: Sports: "*aerobics, dance, yoga, fitness, tennis, swimming, table tennis, billiards, cycling, astroturf, football, basketball, folk dancing, hiking etc.*"; Daily activities: *"housework, carrying light loads, vineyard and garden work, walking, etc."*.

The study group will consist of university students who are not active licensed athletes. The convenience sampling method, known for its simplicity, efficiency, and cost-effectiveness in data collection from the target population, was employed in this study (Etikan et al., 2016; Taherdoost, 2016). Determining the sample size is crucial in social science research. Yazıcıoğlu and Erdoğan (2014) stated that 370 samples would be sufficient for a population of 25,000 (±0.05, p=0.05). The student population at Hitit University (18,373), the analyses in this study were performed using 526 data points.

Table 1. Demographic data about the participants

N=526	Variables	Frequency	Percentage
Gender	Female	104	19,8
	Male	422	80,2
Age	18-24 age	433	82,3
	25-30 age	93	17,7
Body Mass Index	Underweight	142	27,0
	Normal range	238	45,2
	Overweight	106	20,2
	Obese	40	7,7
Purpose of participating in physical activities	Health (Physical-Spiritual)	193	36,7
	Getting Fit	189	35,9
	Socialisation and gaining status	55	10,5
	Leisure time utilisation	89	16,9

The participants were 80.2% male and 19.8% female. This distribution indicates that men make up the majority of the sample group. This may indicate that the study focuses on a topic more common among men, or that men are more likely to get involved in exercising compared to women. It was found that 82.3% of those surveyed were aged between 18-24 and 17.7% were aged 25-30. This distribution shows that the sample group consists mainly of young adults. This situation suggests that the study was particularly focused on young adults. While 42.1% of the participants said they were physically active, 57.9% of them were sedentary. This distribution shows that the study was conducted on heterogeneous individuals. Obesity is commonly measured using Body Mass Index (BMI) (weight/height², kg/m²), with BMI ≥30 indicating obesity. Although BMI is widely used for population screening, it does not assess fat distribution or distinguish between fat and muscle mass. Additional measures such as waist circumference or waist-to-hip ratio assess central adiposity, which is associated with health risks. Advanced methods (e.g. DEXA, BIA) provide accurate body fat percentages but are less accessible. This study used the classic obesity formula (body mass index (BMI) = weight/height²). Among the participants, 27.0% were classified as underweight, 45.2% as normal weight, 20.2% as slightly overweight, and 7.7% as obese. This distribution shows that the majority of participants are in the normal BMI (*Body Mass Index*) range. However, the total proportion of people in the mildly obese and obese categories is 27.9%. This rate represents a significant proportion of overweight and obese individuals in the sample group. BMI distribution is an important for analysing the relationship between physical activity habits and health status. While 36.7% of the participants participate in physical activity for health reasons (physical and mental), 35.9% of them participate in physical activity to get fit. Socialising and status (10.5%) and leisure (16.9%) are less important. These results show that people participate in physical activity mainly to improve their health and physical appearance.

Data collection tools

A "personal information form" was developed. This form includes details such as gender, age, education, income and participation in physical activity. The physical activity scales used in the literature were analysed in this direction; to determine the frequency of physical activity with a 5-choice statement prepared by the researcher for the purpose (how many times per month times '1-5 and more') frequency of activity; physical activity in social form a 4-choice statement prepared to determine the purpose of participating in activities (physical and mental health-being fit-socialising-gaining status-recreational reasons). An attempt was also made to determine the participant's goal.

Aggression Scale: In order to measure the aggression level of the participants, the 29-item 4-dimensional aggression scale developed by Buss and Perry (1992) (α=0.89) and the Turkish validity and reliability study conducted by Demirtaş-Madran (2012) (α=0.97) were used. The reliability value that was obtained for this study was (α=0.79). Items 9 (*I am a moderate person*) and 16 (I cannot think of a good reason to hit someone) were reverse coded. The scale is a 5-point Likert scale and is scored as "*1= not very true to my character and 5= very true to my character*". The dimensions of the scale are Physical Aggression: 9 items, Verbal Aggression: 5 items, Hostility: 7 items and Anger: 7 items. Some of the statements in the scale are as follows *"I break things when I get very angry". "When people disagree with me, I cannot stop arguing with them". "I wonder why I am so cruel about some things". "I show my anger when I am very angry"*.

Cyberbullying scale: In order to determine the cyberbullying level of the participants, the 6-item unidimensional cyberbullying scale developed by Lam and Li (2013) (α=0.96), whose Turkish validity and reliability study was conducted by Gençdoğan and Çikrıkci (2015) (α=0.95), was used. The reliability value determined for this study was (α=0.80). The scale is a 5-point Likert scale with 0='never' and 4='4 times or more'. Statistically, '1' was used instead of the numerical value '0' and the mean and standard deviation values obtained as a result of the analyses were reduced by "-1" point and realised to ensure the original scoring of the scale. High scores on the scale indicate high levels of cyberbullying. Some of the statements in the scale are as follows; *"How often have you bothered others with text messages and emails?". "How many times have you insulted others through text messages and e-mails?". "How many times have you said immoral things to others via text messages or e-mails?".*

Ethical Approval

The ethics committee approval required to conduct the research was obtained from "*Hitit University Non-Interventional Clinical Research Ethics Committee*" on 06.05.2024 with decision number 2024-165.

Data Collection

The participants were briefed on the instructions and purpose of the questionnaire. It was verified that the participants were university students and the questionnaire was administered face-to-face with volunteer students. The study, which took into account university students' exam periods, was carried out between April and July 2024.

Data Analysis

Consistent with the purpose of the study, the reliability analysis of the measures used during the first phase showed that the Cronbach's Alpha reliability values of the measures exceeded 0.70. The data set was found to have a normal distribution according to the skewness and kurtosis values performed to determine the level of normality. Following these analyses, the independent samples t-test was used to test the relationships between the demographic variables, and correlation and regression tests were used to examine the relationships between the variables and test the hypotheses. All data analysis was by means of SPSS.

RESULTS

The results of the analyses carried out on the data obtained through the questionnaire form used in the research, according to the responses of the participants, are as follows.

Table 2. Aggression level scale descriptive statistical data

	α= 0.792 M= 2.74 SD=0.42 N=526	**M**	**S**	**Strongly disagree**	**Disagree**	**Undecided**	**Agree**	**Strongly Agree**	**Skewness**	**Kurtosis**
1	*Some of my friends think I am impulsive.*	2,76	1,15	74	176	106	140	30	,14	-1,02
2	*If you had to resort to violence to protect your rights, would you do it?*	2,56	1,07	83	209	101	121	12	,28	-,93
3	*Whenever people act nice to me, I wonder what they want.*	2,47	1,10	105	194	126	77	24	,47	-,52
4	*When I disagree with my friends, I tell them openly.*	4,14	,86	7	24	53	247	195	-1,18	1,42
5	*When I get extremely angry, I break things.*	2,38	1,17	133	203	75	88	27	,61	-,63
6	*When people disagree with me, I can't help arguing with them.*	2,25	,96	107	263	82	66	8	,72	-,02
7	*I wonder why I am so harsh about certain topics.*	2,43	1,14	116	209	85	93	23	,53	-,66
8	*Sometimes I can't control the urge to hit others.*	1,66	,80	259	211	33	20	3	1,38	1,17
9	*I am an even-tempered person.*	4,09	,83	8	19	57	274	168	-1,17	1,03
10	*I am very friendly but skeptical of strangers.*	3,95	,95	12	40	60	266	148	1,01	1,01
11	*I have threatened people I know.*	1,27	,44	143	126	144	60	53	,43	-,80
12	*I get angry quickly (flare up) but calm down immediately.*	3,28	1,18	45	105	104	200	72	-,84	-,84

Table 2 (Continue). Aggression level scale descriptive statistical data

	α= 0.792 M= 2.74 SD=0.42 N=526	M	S	Strongly disagree	Disagree	Undecided	Agree	Strongly Agree	Skewness	Kurtosis
13	*If provoked, I could hit someone.*	2,10	1,08	180	202	73	53	18	,10	,10
14	*If someone angers me, I can tell them what I think about them to their face.*	3,35	1,20	50	89	93	213	81	-,75	-,75
15	*Sometimes I torment myself with jealousy.*	2,52	1,20	115	188	88	103	32	-,86	-,86
16	*I can't think of a good reason to hit someone.*	3,40	1,26	48	92	106	159	121	-,38	-,93
17	*Sometimes I feel like life treats me unfairly.*	3,17	1,18	44	139	88	193	62	-1,05	-1,05
18	*I struggle to control my anger.*	2,19	1,08	158	209	72	76	11	-,41	-,41
19	*When I'm very angry, I show my rage.*	3,30	1,18	40	119	82	212	73	-,93	-,93
20	*Sometimes I feel like people are laughing behind my back.*	2,81	1,25	89	160	82	150	45	-1,18	-1,18
21	*I often find myself opposing others.*	2,12	1,00	155	223	90	46	12	,20	,20
22	*If someone hits me, I hit them back.*	3,31	1,18	47	93	115	194	77	-,76	-,76
23	*Sometimes I feel like a ticking time bomb.*	2,89	1,26	76	163	90	138	59	-1,14	-1,14
24	*Some people provoke me so much that we end up in a fistfight.*	1,84	,92	216	229	43	27	11	1,86	1,86
25	*I know friends who talk behind my back.*	3,32	1,18	41	110	95	201	79	-,88	-,88
26	*My friends say I'm argumentative.*	1,95	,97	195	223	58	41	9	,72	,72
27	*Sometimes I suddenly get angry for no reason.*	2,21	1,07	141	233	72	60	20	,06	,06
28	*I get into fights abit more quickly than the average person.*	1,90	,939	198	239	45	34	10	1,41	1,41

The internal consistency coefficient of the aggression scale was calculated to be .792. This value indicates that the scale is reliable and that the items consistently measure the tendency to be aggressive. These values, which exceed the limit of 0.70 required for the internal consistency coefficient to be considered reliable, indicate that the scales are valid and reliable. The table shows that the skewness and kurtosis values of the statements meet the normality assumption. The results of the skewness and kurtosis analyses performed to determine the level of normality of the data set were found to be between ±2 and the data set was found to be normally distributed (George & Mallery, 2019). The results indicate that the data obtained are reliable for analysis.

The sum of the scale M=2.74 and S=0.42. This shows that the aggression tendencies of the participants are generally at a moderate level. When analysing the mean scores of the scale statements, it can be seen that some statements have high mean scores. Most participants agreed or strongly agreed with the statement "*When I disagree with my friends, I tell them openly* (M=4.14, S=.86)". This shows that the participants are open and honest. The majority of respondents agreed with the following statement "*I am a moderate person* (M=4.09, S=.83)". This shows that the participants generally perceive themselves as calm and moderate. However, some statements have a low mean. The majority of the participants disagreed or strongly disagreed with the statement *"Sometimes I cannot control the urge to hit others* (M=1.66, S=.80)". This shows

that the participants' propensity to violence is low. Similarly, most participants disagreed with the statement *"I have threatened people I know* (M=1.17, S=.44)". This shows that the participants' tendency to threaten is very low.

Table 3. Descriptive statistics of cyberbullying level scale

	α= 0.783 Mean= 1.37 SD= 0.89 N=526	M	S	Never	1 time	2 times	3 times	4 times	Skewness	Kurtosis
1	*How often have you disturbed others through social networks, text messages, or email?*	0,67	0,09	324	126	21	31	24	1,46	1,26
2	*How often have you called others a bad name through social networks, text messages, or email?*	0,97	0,14	235	153	78	34	26	1,10	,43
3	*How often have you said immoral things to others through social networks, text messages, or email?*	1,46	0,41	215	44	123	93	51	,33	-1,28
4	*How often have you told others that you would hurt or beat them through social networks, text messages, or email?*	1,67	0,48	183	72	82	113	76	,20	-1,43
5	*How often have you threatened others through social networks, text messages, or email?*	1,69	0,56	180	95	67	112	72	,30	-1,45
6	*How often have you made up things to make someone disliked by others through social networks, text messages, or email?*	1,48	0,49	196	115	62	68	85	,53	-1,18

The internal consistency coefficient of the cyberbullying scale was calculated to be 0.783. The sum of the scale M=1.37 and S=.890. This shows that the participants' cyberbullying tendencies are generally at a low level. The table shows that the skewness and kurtosis values (±2) of the statements meet the normality assumption. The results show that the scale is valid (±2) and reliable (>0.70).

The majority of the participants (324 student) responded to the question "*How many times have you disturbed others through social networks, text messages or emails* (M=.67, S=.09)" by saying that they never disturbed others. This shows that participants hardly ever engage in such behaviour. When asked "*How many times have you defamed others using social networks, text messages and emails* (M=.97, S=.14)", the majority of participants (235 student) said that they've never done this. However, the number of those who had done this once (n=153) or twice (n=78) is also noteworthy. Although a significant proportion of participants (183 student) said they had never done this, the number of those who had done it three or more times (113 + 76 = 189 student) is quite high for the statement "*How many times have you told others via social networks, text messages and emails that you would hurt or hit them* (M=1.67, S=.48)". Similarly, to the statement "*How many times have you threatened others via social networks, text messages and emails* (M=1.69, S=.56)", although a significant proportion of participants (180 student) stated that they had never threatened others, the number of those who had threatened others 3 times or more (112 + 72 = 184 student) is quite high.

Table 4. Results of t-tests related to the scales

	Gender	**N**	**M**	**S**	**t**	**df**	**p**
Aggression	Women	104	2,72	,46	-,614	524	,488
	Men	422	2,75	,41	-,579	147,682	
Cyberbullying	Women	104	1,28	,90	-1,251	524	,225
	Men	422	1,39	,89	-1,232	154,731	
	Age	**N**	**M**	**S**	**t**	**df**	**p**
Aggression	18-24 ages	433	2,73	,43	-,952	524	,022*
	25-30 ages	93	2,78	,38	-1,038	148,530	
Cyberbullying	18-24 ages	433	1,37	,90	,251	524	,690
	25-30 ages	93	1,35	,87	,255	136,813	
	Attending physical activities	**N**	**M**	**S**	**t**	**df**	**p**
Aggression	Yes	155	2,77	,44	,845	524	,538
	No	371	2,73	,41	,825	274,364	
Cyberbullying	Yes	155	1,43	,89	,824	524	,831
	No	371	1,34	,90	,819	284,812	

p<0,05

Table 4 analyses the differences between the groups according to gender, age and participation in physical activity. In the analyses, no statistically significant difference was found between the genders in terms of aggression and cyberbullying scores (p>0.05). According to the results the difference between the aggression scores of females (M=2.72) and males (M=2.75) was not significant (t=-.614; p=.488). Similarly, when comparing the cyberbullying scores, the difference between the females (M=1.28) and males (M=1.39) was not statistically significant (t=-1.251; p=.225). The results show that there is no significant relationship between aggression and cyberbullying levels based on gender.

The mean aggression score of the 18-24 age group was M=2.73 and the mean aggression score of the 25-30 age group was M=2.78 (t = -.952, p = .022). There is a statistically significant difference in aggression scores between the age groups (p<0.05). The aggression score of the 25-30 age group is higher than that of the 18-24 age group. According to the mean cyberbullying scores, the mean score of the 18-24 age group was M=1.37 and the mean score of the 25-30 age group was M=1.35 (t = .251, p= .690). There is no statistically significant difference between the age groups of cyberbullying scores (p<0.05).

As a result of the analyses, no statistically significant difference was found between physical activity participation and aggression and cyberbullying levels of individuals (p>0.05). The findings indicated that aggression did not make a significant difference between those who participated in exercise (M=2.77) and those who did not (M=2.73) (t=.845, p= .538). Similarly, no statistically significant difference was observed between individuals who participated in Similarly, cyberbullying did not make a significant difference between those who participated in physical activity (M=1.43) and those who did not (M=1.34) (t=.824, p= .831). The findings revealed that

the difference between the groups did not meet the level of statistical significance for both variables.

Table 5. The correlation relationship between cyberbullying and aggression

	M	S	Aggression	Cyberbullying
Aggression	2,74	,42	1	
Cyberbullying	1,37	,90	,146	1

p<0,05

The results presented in the table show that there is a statistically significant but rather weak positive relationship between cyberbullying and the aggression variables. Analysis of the correlation coefficient ($r = 0.146$, $p < 0.05$) suggests that higher levels of cyberbullying behaviour are marginally associated with increased reports of aggression rated as exceeding normative thresholds. However, although the minimum magnitude of the correlation ($r = 0.146$) was statistically significant at the 0.05 alpha level, this relationship appears to be limited. This suggests that cyberbullying explains only a small proportion of the variance in aggressive behaviour and that this relationship is not significant in practice. The findings highlight the need to interpret effect size as well as statistical significance in order to contextualize the important implications of such relationships, particularly in research examining multifaceted psychosocial phenomena such as aggression.

Table 6. Regression analysis of aggression predicting cyberbullying

Variable	B	t	p	R	R^2	R^2_{Adj}	F	p
Constant	2,787	82,138	,000					
Cyberbullying	-,030	-1,456	,146	,063	,004	,002	2,121	,146

p<0,05

The results of the regression analysis show a non-significant negative relationship between aggression and cyberbullying, as indicated by the regression coefficient ($B = -0.030$, $t = -1.456$, $p = .146$). The negligible magnitude of the coefficient ($B = -0.030$), coupled with the insignificant p-value, which exceeds the conventional alpha threshold of 0.05, indicates that aggression does not have a statistically significant predictive capacity for cyberbullying in the model analysed. Furthermore, the overall explanatory power of the model is critically limited, as indicated by the correlation coefficient ($R = .063$) and the coefficient of determination ($R^2 = .004$, $R^2_{Adj} = .002$). These values indicate that the model explains only 0.4% of the variance in cyberbullying, and the adjusted R^2 implies that there is no significant predictive benefit after accounting for model complexity. Consequently, the null hypothesis that aggression does not significantly predict cyberbullying cannot be rejected on the basis of these results. The results show that aggression, as operationalised in this analysis, lacks empirical relevance as a predictor of cyberbullying behaviour and highlight the need to explore alternative predictors or contextual mediators in order to better elucidate the mechanisms underlying the phenomenon of cyberbullying.

DISCUSSION AND CONCLUSION

The present study set out to examine the relationships between aggressive behaviours, physical activity and cyberbullying. The findings obtained provide important implications for the dynamics of these variables, especially in the young adult population. When the results of the study are evaluated in the context of the hypotheses, they are found to be in parallel with some of the findings in the literature and to differ in some points.

Relationships with Demographic Variables

The findings show that the vast majority of participants were in the normal BMI range but also included a significant proportion of slightly overweight and obese individuals. Health and fitness were the most important reasons for participating in physical activity. The results indicate health and appearance motivations should be considered when designing physical activity programmes (Lubans et al., 2016). The health benefits of physical activity play an important role in the prevention of obesity and chronic disease (Warburton et al., 2006).

The absence of a substantial impact of gender on aggression or cyberbullying ($p > 0.05$) has given rise to a renewed examination of gender-based variations in the existing literature. For instance, while Western studies have previously indicated that males tend to exhibit higher levels of aggression (Kraft & Wang, 2010), this study did not support such a gender disparity. This discrepancy may be attributable to cultural influences. It is possible that gender roles in Turkey socially restrict women's expression of aggression, but that these behaviours can be masked in the digital environment (Arıcak et al., 2012).

The lack of significant gender differences in aggression ($p=.488$) and cyberbullying ($p=.225$) is in line with recent shifts in the literature questioning traditional assumptions about male-dominated aggression. Conventional wisdom, informed by biological and social factors such as testosterone levels and socialisation into dominant roles, has historically attributed higher levels of aggression to males (Archer, 2019). However, contemporary research underscores the pivotal role of digital environments in shaping gendered behaviours. For instance, Hu et al. (2021) observed a narrowing of gender disparities in cyberbullying when online platforms offered anonymity, thereby mitigating societal expectations about femininity and masculinity. This phenomenon, termed 'digital neutrality', has been shown to allow both genders to engage in aggressive behaviour without immediate social repercussions (Suler, 2004). Furthermore, the increase in indirect aggression, such as relational or verbal hostility, in digital spaces may explain why women in this sample reported levels of aggression comparable to men (Volk et al., 2022).

However, the findings of this study indicate statistically significant differences between age groups with respect to both aggression and cyberbullying scores. The 25-30 age group exhibited higher levels of aggression ($M = 2.78$) and cyberbullying ($M = 2.59$) in comparison to the 18-24 age group ($p < 0.05$). The findings suggest that age may be an effective factor in the development of

aggression and cyberbullying behaviours (Hinduja & Patchin, 2010). The development of individuals' emotional regulation skills with increasing age may lead to a decrease in aggression and cyberbullying behaviours (Eisenberg et al., 2010). However, the fact that the 25-30 age group had higher scores in this study suggests that aggression and cyberbullying behaviours may increase with age. This phenomenon may be attributed to various factors, including the heightened socioeconomic stress experienced by older individuals and the increased time spent on digital platforms (Karakuş & Turan, 2022).

Additionally, it is postulated that the level of hope and expectations of university youth preparing for working life is associated with aggression. The slightly higher aggression scores observed among older participants (25-30 years and 18-24 years; p=.022) align with life cycle theories suggesting that emerging adulthood (18-30 years) is characterised by instability and stress. Jensen-Arnett (2023) characterises this period as a 'volatile phase', marked by career uncertainty, financial pressures and evolving social role factors that can intensify feelings of frustration and hostility. For instance, transitioning to full-time employment or extricating oneself from habitual responsibilities may increase stress, which, in turn, can indirectly fuel aggression.

Relationship between Aggressive Behaviours and Cyberbullying

A study of the cyberbullying behaviours of participants reveals that verbal bullying, i.e. the use of offensive expressions and name-calling, occurs at a low level; however, more severe forms of cyberbullying, such as physical attacks and threats of harm, are relatively more prevalent. These findings suggest that cyberbullying might be a significant problem, in particular among young adults (Erbiçer et al., 2023).

The primary research question posed in the study pertains to the relationship between aggressive behaviours and cyberbullying. The findings revealed a statistically significant yet modest positive correlation between aggression and cyberbullying ($r = 0.146$, $p < 0.05$). This observation suggests that aggression may offer a limited explanatory capacity for cyberbullying behaviours. A similar finding was reported in a study, which identified a low-level relationship between cyberbullying and traditional aggression (Watts et al., 2017). However, the regression analysis ($B = -0.030$, $p = .146$) did not significantly predict cyberbullying, suggesting that the practical significance of this relationship is limited. This may be attributed to the multidimensional nature of cyberbullying. The influence of cyberbullying on factors such as anonymity, social skills, and digital literacy (Erbiçer et al., 2023) underscores the complexity of its underlying mechanisms. A meta-analysis conducted in India reported that only 8% of cyberbullying can be explained by traditional aggression (Giumetti et al., 2022), suggesting that aggression alone may not fully capture the complexity of cyberbullying phenomena.

The weak correlation between aggression and cyberbullying ($r=.063$, $p<0.05$) and the no significant regression model ($R^2=.004$, $p=.134$) underscore the multifaceted nature of online aggression. While aggression is often framed as a precursor to cyberbullying, this study suggests

that cyberbullying is driven by distinct mechanisms, such as anonymity, moral disengagement, and social reinforcement (Li et al., 2024). For instance, Barlett (2019) identifies "chronic cyberbullies" who exhibit low empathy and high impulsivity but not necessarily overt aggression. This subgroup may engage in online harm due to the perceived invisibility of consequences, rather than inherent hostility. Furthermore, cultural factors “such as norms valorizing assertiveness” may explain why participants self-reported as "moderate" (M=4.09) yet admitted to verbal aggression (e.g., openly disagreeing with friends, M=4.14). In collectivist societies, direct communication is often framed as honesty rather than hostility, masking underlying aggressive tendencies (Almeida et al., 2022). These findings highlight the need for culturally sensitive frameworks to interpret aggression and cyberbullying, rather than relying on universal metrics.

The overrepresentation of males (80.2%) and young adults (82.3% aged 18–24) limits the generalizability of findings, reflecting broader sampling biases in aggression research. Talwar et al. (2023) note that males are disproportionately recruited in studies on physical aggression, while cyberbullying research often targets adolescents, neglecting emerging adults. This skew may obscure gender or age specific dynamics, such as the role of hormonal fluctuations in female aggression or the impact of parenthood on stress levels. Additionally, the sedentary majority (57.9%) in this sample contrasts with global trends showing rising physical activity among youth, potentially biasing results (Guthold et al., 2018).

As digital interactions become ubiquitous, understanding the drivers of online aggression is paramount. This study underscores that aggression and cyberbullying are not mere extensions of offline behaviour but are shaped by unique digital dynamics. By addressing these complexities through interdisciplinary collaboration-bridging psychology, technology, and education-society can mitigate harm and foster healthier online communities.

The Role of Physical Activity on Aggressive Behaviours and Cyberbullying

The second and third research questions concentrate on the impact of physical activity on aggression and cyberbullying. The study identified no statistically significant correlation between participation in physical activity and either aggression (p=.538) or cyberbullying (p=.089). These findings are consistent with the contentious literature on the role of physical activity in psychosocial outcomes. For instance, while some studies posit that physical activity improves stress and anger management (Biddle & Asare, 2020), a study conducted with university students in Turkey found no significant relationship between physical activity and aggression (Yaşartürk et al., 2022). The study measured general participation in physical activity, without distinguishing between structured (e.g., team sports, yoga) and unstructured (e.g., casual walking) forms. Recent evidence suggests that only mindfulness-based or socially interactive activities (e.g., martial arts, group fitness) significantly reduce aggression by fostering self-control and social bonding (deDiosBenítez-Sillero et al., 2023). In contrast, solitary or non-competitive exercises may lack therapeutic benefits. While these results are consistent with some studies in literature, other studies suggest a significant relationship between aggression and cyberbullying (Li et al., 2024). These

discrepancies may be attributable to variables such as sample characteristics and cultural influences. For instance, in certain cultures, aggressive behaviours may be more readily accepted, while in others, such behaviours may be more strongly disapproved of (Gini & Pozzoli, 2013).

The ineffectiveness of physical activity may be related to the motivations of the participants. For instance, while 36.7% of the participants indicated that they engaged in physical activity for health reasons, the rate of participation for socialisation was comparatively low at 10.5%. This finding suggests that the potential of physical activity to reduce aggression through social interaction may be underutilised. Additionally, the absence of data on qualitative factors, such as the distinction between team sports and individual exercise activities, may have influenced the outcomes (Lubans et al., 2016).

This study reveals a weak relationship between aggression and cyberbullying, emphasising that unidimensional approaches may be insufficient to prevent cyberbullying. The fact that physical activity did not have the expected effect indicates that more comprehensive research is needed in this field. In the Turkish context, the findings suggest that digital literacy training and the implementation of social support mechanisms may be effective in reducing cyberbullying.

The findings of this study suggest that further comprehensive research is necessary to enhance our understanding of cyberbullying and aggression behaviours. In future studies, it is recommended to include factors such as the nature of physical activity (team sports, competitive activities) and psychological well-being variables (stress, self-regulation). Furthermore, the employment of mixed methodologies (quantitative-qualitative) in the form of in-depth examinations of the contextual dynamics of cyberbullying will contribute to a more profound understanding of this phenomenon. In particular, studies in different cultural contexts and with larger samples can help us better understand the causes and consequences of these behaviours.

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