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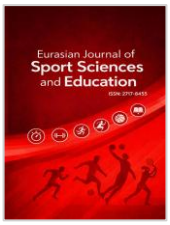

Research Article

Recording-Related Discomfort in Exercise Environments: A Scale Development Study

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Abstract

This study aimed to develop a measure of recording-related discomfort associated with the presence of cameras, smartphones, wearables, and social media technologies in exercise settings. As gyms and fitness centers are gradually digitalizing, their physical environments are also becoming places where these technologies converge. The change itself may be subtle, but it may have implications for how uncomfortable, anxious, or concerned about privacy individuals feel when recording takes place while exercising. In the study, the pilot sample consisted of 75 participants, while the main research sample consisted of 275 volunteer participants exercising at fitness centers on the European side of Istanbul. This quantitative research employed a scale-development design. Scale development began with a literature review. An item pool of 41 items was created. Taking expert opinions into account, the number was reduced to 32 items, and successive exploratory analyses and conceptual item review during the pilot stage produced 23-item and 13-item forms before the final 7-item scale was established. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's Test of Sphericity were used to assess factorability. The KMO value was 0.863, and Bartlett's Test of Sphericity was statistically significant, indicating that factor analysis could be performed. EFA of the 7-item version of the scale yielded a one-factor structure explaining 47.6% of the variance, with item factor loadings ranging from .569 to .971. Internal consistency estimates (Cronbach's alpha = .832; McDonald's omega = .836) were good, considering the limited number of items in the scale. The CFA results indicated that the model fit the data adequately. Overall, the psychometric properties of the Recording-Related Discomfort in Exercise Environments Scale indicate that it is a reliable tool with preliminary evidence of factorial validity for measuring recording-related discomfort in physical activity contexts.

Keywords: Recording-Related Discomfort, Privacy Concerns, Digital Recording, Exercise Environments, Scale Development

INTRODUCTION

Digitalization can also be observed in gyms and fitness centers, virtual health and sports platforms, and other sport and exercise environments. Cameras, wearables, mobile applications, and social media technologies have quantified, tracked, and broadcast users' sport and exercise activities (Yılmaz, Hacıcaferoğlu, & Hacıcaferoğlu, 2025; Uludağ & Gün, 2023). Thus, exercise no longer occurs only as a private experience but has increasingly become captured and shared in a public, digital, and visible manner (Hurley, 2021; Benzer & Ünal, 2021; Tamminen et al., 2025).

Recording-related discomfort is defined in this study as a subjective, aversive reaction elicited either by the actual presence of recording or by the mere anticipation of being recorded in exercise settings. This reaction is not unitary. It reflects a cluster of interrelated affective states, including unease, heightened anxiety, tension, and perceived stress. Privacy-related concern is conceptually distinct, preferring instead to a more deliberative, cognitive evaluation of perceived boundary violation or intrusion. The distinction between the two constructs lies primarily in their underlying mechanisms: discomfort is affective in nature, whereas privacy related concern stems from appraisal processes. Despite this conceptual divergence, both responses originate from a common situational trigger the possibility or occurrence of being recorded during physical activity. For this reason, they are treated in the present framework not as separate, unrelated reactions, but as interrelated facets of a broader, higher order construct: recording-related discomfort.

Digital visibility refers to sharing one's exercise behavior and performance, including body-related aspects, with other people through digital media (Yılmaz & Mermutlu, 2025). While it can produce positive outcomes such as social support, motivation, and constructive feedback, digital visibility may also be associated with discomfort and privacy-related concerns, particularly when individuals are recorded or may appear in digital content without their consent. The negative effects of social

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surveillance, social comparison, and evaluation apprehension have been described in the literature (Toffoletti et al., 2023; Yılmaz & Mermutlu, 2025; İlter & Baş, 2025; Harrison, 2025), and recording-related situations may also evoke feelings of discomfort, anxiety, or vulnerability (Toffoletti et al., 2023; Yılmaz & Mermutlu, 2025).

Psychological safety is defined as the ability of individuals to speak or act without fear of being put at risk, blamed, or rejected by others. Within the sport and exercise domain, psychological safety has been suggested as an important aspect of psychosocial climate and a primary predictor of adherence, performance, and psychological well-being (Schinke et al., 2022). It has also been associated with increased willingness among individuals to participate, take risks by making mistakes, and socialize with one another (Pakyardım, Karademir, & Paksoy, 2024). However, psychological safety is conceptually broader than the discomfort or anxiety that individuals may experience in response to being recorded in exercise environments.

Digital technologies enable people to seek more feedback and monitor their performance more frequently, but their use for recording and sharing content may also create discomfort, anxiety, tension, and privacy concerns, particularly when individuals perceive that they may be recorded without consent (Yılmaz & Mermutlu, 2025; Uludağ & Gün, 2023). Visibility has also been linked to body image, social comparison, and self-regulation in sport contexts (Silk et al., 2019; Greene et al., 2023; Benzer & Ünal, 2021), providing a broader context for understanding individuals' responses to recording and visibility in exercise settings.

Digital visibility has been mostly studied in relation to social media, data privacy, and data protection (Abay, 2024; Yılmaz & Mermutlu, 2025; Uludağ & Gün, 2023). However, research on the relationship between digital visibility and the psychological mechanisms of exercise environments remains limited (Kılıç, 2023), and measurement tools examining recording-related discomfort in gym and physical activity spaces are insufficient (Yılmaz & Mermutlu, 2025). The importance of psychological and social characteristics of sport and physical activity spaces in the Turkish context has been highlighted in previous studies (Kılıç, 2023; Çuhadar & Bozgüney, 2025), yet the psychosocial effects of digitalization remain less understood.

Therefore, this study contributes to the literature of sport psychology, exercise science, and sport management by developing a reliable and valid measure of recording-related discomfort in exercise environments.

METHOD

Research Model

Within the scope of methodological research, a measurement instrument for assessing recording-related discomfort in exercise environments was developed and psychometrically evaluated. The study was implemented within a quantitative research approach and cross-sectional survey model. Quantitative research allows variables to be expressed numerically, making it possible to generalize findings and draw comparisons (Creswell & Creswell, 2017). Survey models are preferred in studies that seek to measure individuals' thoughts, views, and characteristics at a specific point in time and are commonly used in scale development research (Büyüköztürk et al., 2018; Creswell, 2014). Data were collected through a structured questionnaire, which assessed participants' self-reported perceptions and responses related to recording in exercise environments.

The scale was developed based on Classical Test Theory (CTT), which states that any observed score is the sum of a true score and an error term, and is widely used in reliability and validity analyses (DeVellis, 2017; Tezbaşaran, 2008). After developing the items, the research proceeded with expert consultation and a pilot study, and the items were statistically analyzed before the factor structure was established.

To examine the factorial structure of the instrument, exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were conducted. Several psychometric analyses were then performed to assess internal consistency, including Cronbach's alpha and McDonald's omega, to determine whether the tool provided reliable measurement of the intended construct.

Population and Sample

The population in scientific research refers to the complete set of units being investigated (Somekh & Lewin, 2005; Karasar, 2019). In this study, the population was defined as individuals who engage in regular physical exercise at sports facilities in Turkey.

The sample consisted of 275 volunteer participants who were members of fitness centers on the European side of Istanbul. Convenience sampling was used to recruit participants. To be eligible, participants had to be currently exercising at a gym or fitness center, at least 18 years old, and willing to participate. The aim was to recruit a sample that was diverse in terms of sex, age, and training experience to obtain a broader view of the research variables.

No personally identifiable data were collected, and all analyses were conducted using de-identified data. Participation was voluntary, and participants were informed that they could withdraw from the study at any time.

The sample size was determined with consideration of the planned psychometric analyses, particularly factor analysis, and the recommendations reported in the scale development literature.

Data Collection Tools

Recording-Related Discomfort in Exercise Environments Scale

In this study, a measurement tool was developed to assess recording-related discomfort in exercise environments. The development of this measurement tool was carried out in accordance with the systematic steps recommended in the literature (Seçer, 2018; DeVellis, 2017). This process included a literature review, item pool construction, expert consultation, pilot testing, and psychometric analyses of the instrument.

In the first step, a literature review was conducted, and items were developed to measure recording-related discomfort in the exercise context, resulting in an initial pool of 41 items. Afterward, the items were submitted to expert review to assess content validity. Two academics with expertise in sport sciences, in addition to one expert in measurement and evaluation, reviewed the items. Items assessed as vague, redundant, or overlapping by the experts were removed; nine items were eliminated, and a 32-item draft version was produced. The items were also reviewed by a Turkish language expert for linguistic and stylistic appropriateness and were revised as necessary.

The 32-item draft scale was then tested on 75 participants as part of the pilot study. Participants rated each item on a 7-point Likert-type scale from "Strongly Disagree (1)" to "Strongly Agree (7)", selecting the option that best applied to them. Following the pilot administration, an iterative item-reduction process involving exploratory factor analyses and conceptual review was conducted to examine the preliminary factor structure of the scale. Successive analyses resulted in reduced 23-item and 13-item forms before the final 7-item scale was established. Items were removed based on factor-analytic findings and their conceptual consistency with the intended construct.

To confirm the factor structure identified through EFA, the final version of the scale was administered to 275 participants in the main research sample and Confirmatory Factor Analysis (CFA) was performed. The CFA results indicated that the proposed factor structure of the scale had satisfactory fit indices and that the model fit the data adequately.

Higher scores on the scale indicate greater recording-related discomfort in exercise settings, reflecting higher levels of discomfort, anxiety, tension, stress, and privacy-related concern associated with actual or potential recording.

Pilot Study Process

In the initial phase of the study, it was important that the individuals participating in the pilot study shared characteristics similar to those of the main research group. This alignment was necessary for evaluating the clarity, applicability, and preliminary psychometric properties of the measurement instrument (DeVellis, 2017). Accordingly, the pilot study group was composed of individuals with characteristics similar to those of the main research sample.

At this stage, participants were administered the 32-item draft scale that had been revised in line with expert feedback. Following the pilot administration, an iterative item-reduction process involving exploratory factor analyses and conceptual review was conducted to examine the preliminary factor structure of the scale. Successive analyses resulted in reduced 23-item and 13-item forms before the final 7-item structure was established.

The findings from the pilot study served as the foundation for constructing the final form of the scale and prepared the groundwork for the confirmatory factor analysis conducted in the subsequent main-study stage.

Data Collection

In the pilot study conducted within the scope of the research, care was taken to ensure that participants displayed characteristics similar to those of the primary research group. This was considered important for evaluating the applicability, clarity, and preliminary psychometric properties of the measurement instrument being developed (DeVellis, 2017).

The pilot study was conducted with 75 volunteer participants exercising at fitness centers in the Beylikdüzü district of Istanbul. The 32-item draft scale, developed in line with expert feedback, was administered to participants via a face-to-face survey method. Prior to the administration, participants were informed about the purpose of the study, and data collection was carried out on a voluntary basis.

Exploratory factor analyses and conceptual item review were conducted on the pilot study data as part of an iterative item-reduction process. The successive analyses produced 23-item and 13-item forms before the scale was reduced to the final 7-item structure. The factor-analytic results and item-reduction process are reported in detail in the Results section.

Following the pilot application, the scale in its final form was administered to 275 participants in the main phase of the research via an online survey method (Google Forms). Confirmatory Factor Analysis (CFA) was then conducted on the main-study data in order to evaluate the fit of the proposed factor structure.

Data Analysis

To assess the factorial structure and reliability of the scale developed within this study, a series of statistical analyses were performed. As a first step, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's Test of Sphericity were used to determine whether the data met the prerequisites for factor analysis.

Once data suitability had been established, exploratory factor analysis was used to examine the instrument's underlying factor structure. Item evaluation proceeded iteratively, guided by several considerations rather than a single decision rule. Each item was assessed in terms of the strength and clarity of its factor loading, the presence of problematic cross-loadings, its conceptual overlap with other retained items, and its coherence with the theoretical definition of the construct. Decisions regarding item retention or removal drew on both statistical evidence and conceptual reasoning; no single mechanical or purely numerical exclusion criterion was applied. Items with weak loadings, those loading across multiple factors, and those judged redundant in meaning or inconsistent with the intended theoretical domain were removed from the final scale.

Confirmatory Factor Analysis (CFA) was conducted on the main-study data using the final form of the scale to evaluate the factor structure obtained through EFA. Model parameters were estimated using Full Information Maximum Likelihood (FIML). Model fit within the CFA was evaluated using several fit indices, including the chi-square/degrees of freedom ratio (χ^2/df), Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Square Residual (SRMR), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Normed Fit Index (NFI), and Parsimony Normed Fit Index (PNFI).

Internal consistency was assessed using Cronbach's alpha and McDonald's omega coefficients. Outlier analysis revealed no extreme values in the dataset that would compromise the analyses. The normality of the data distribution was examined through skewness and kurtosis values, which were found to fall within the ±1 range.

All data obtained within the scope of the study were analyzed using the JAMOVI statistical software program (Version 2.7.24.0).

FINDINGS

Table 1. Demographic Characteristics of Participants

Variable	Category	n	%
Gender	Female	167	60.7
	Male	108	39.3
Age	18–25	98	35.6
	26–35	75	27.3
	36–45	64	23.3
	46 and above	38	13.8
Weekly exercise frequency	1 day	18	6.5
	2–3 days	110	40.0
	4–5 days	80	29.1
	More than 5 days	67	24.4
Gym experience	Less than 3 months	33	12.0
	3–6 months	69	25.1
	6–12 months	115	41.8
	More than 12 months	58	21.1
Daily social media use	Less than 1 hour	45	16.4
	1–3 hours	42	15.3
	3–5 hours	123	44.7
	More than 5 hours	65	23.6

The demographic profile of the participants showed that women constituted a larger proportion of the sample than men, with 60.7% identifying as female and 39.3% as male. The largest age group was 18–25 years (35.6%), followed by 26–35 years (27.3%), 36–45 years (23.3%), and 46 years or older (13.8%).

Most participants reported exercising several times per week. Specifically, 40.0% exercised 2–3 days per week, 29.1% exercised 4–5 days per week, 24.4% exercised more than 5 days per week, and 6.5% exercised once weekly. Regarding gym experience, the largest group had been attending a gym for 6–12 months (41.8%), followed by 3–6 months (25.1%), more than 12 months (21.1%), and less than 3 months (12.0%).

Daily social media use was also relatively high among participants. Nearly half of the sample reported using social media for 4–5 hours per day (44.7%), while 23.6% used it for more than 5 hours. Smaller proportions reported less than 1 hour (16.4%) or 2–3 hours of daily use (15.3%).

The 32-item form was the initial pilot version; detailed factor-analytic output for this stage was not available. The documented iterative exploratory factor analyses included 23-item and 13-item intermediate versions before the final 7-item structure was obtained (Table 2).

Table 2. Summary of the Iterative Item-Reduction and Exploratory Factor Analysis Process

Stage	Items	KMO	Bartlett's Test	Main Result	Item-Removal Basis
Draft form	32	-	-	Pilot form administered	Initial expert-reviewed pilot form
Intermediate EFA	23	.955	$\chi^2(253) = 3030$, $p < .001$	Intermediate factor solution	Factor-analytic findings and conceptual review
Subsequent EFA	13	.948	$\chi^2(78) = 1484$, $p < .001$	One-factor solution; loadings .654–.806	Cross-loading patterns, conceptual redundancy, and theoretical consistency
Final EFA	7	.863	$\chi^2(21) = 793.000$, $p < .001$	One-factor solution; 47.6% variance explained	Conceptual refinement, reduction of redundancy, and stronger alignment with recording-related discomfort

Table 3. KMO and Bartlett's Test Results

Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO)		0.863
Bartlett's Test of Sphericity	Approx. Chi-Square	793.000
	df	21
	Sig.	<.001

The KMO and Bartlett's tests reported in Table 3 were conducted on the final 7-item form of the scale. Prior to conducting the Exploratory Factor Analysis (EFA) to examine the factor structure of the scale, the KMO measure of sampling adequacy and Bartlett's Test of Sphericity were applied to assess the suitability of the data for analysis. The KMO coefficient was found to be 0.863, and as this value exceeds 0.80, it indicates good sampling adequacy for factor analysis. Bartlett's test results were also found to be statistically significant ($\chi^2 = 793.000$; $df = 21$; $p < .001$). In light of these findings, it was concluded that the dataset possesses a structure that is appropriate and sufficient for conducting factor analysis.

Table 4. Exploratory Factor Analysis (EFA) Results

Items	Factor Loading	Variance Explained (%)
Other people filming makes me uncomfortable.	.971	47.6
The possibility of being recorded increases my anxiety.	.715	
Being filmed on social media without my consent makes me uneasy.	.668	
I feel more tense in environments where video recording takes place.	.633	
My stress level increases in gyms where video recording is taking place.	.596	
The presence of people filming for social media makes me uncomfortable.	.594	
Being recorded without permission is a violation of privacy.	.569	
Total		

To examine the factor structure of the final 7-item form of the scale, exploratory factor analysis was conducted. Prior to the analysis, the suitability of the data was assessed through the Kaiser-Meyer-Olkin measure of sampling adequacy and Bartlett's Test of Sphericity. The KMO coefficient was .863, exceeding the .80 criterion and indicating that the sample was appropriate for factor analysis (Kaiser, 1974). Bartlett's Test of Sphericity was statistically meaningful, $\chi^2(21) = 793$, $p < .001$, showing that the correlation matrix was suitable for factor extraction.

Principal Axis Factoring was used to identify the factor structure. Since the analysis produced a single-factor solution, rotation was not applied. The eigenvalue results showed that only one factor had an eigenvalue above 1.00, with an eigenvalue of 3.33; the remaining factors were below this criterion. The scree plot was also consistent with a one-factor solution. The extracted factor explained 47.6% of the total variance. For single-factor structures in the social sciences, variance values of 40% or higher are generally treated as acceptable (Hair et al., 2014).

The factor loadings ranged from .569 to .971, indicating that the items were adequately associated with the underlying factor. These findings supported the interpretation of the final 7-item form as a unidimensional structure. Based on these results, confirmatory factor analysis was conducted to test the proposed unidimensional structure of the scale.

In determining the number of factors within the exploratory factor analysis, eigenvalues and the scree plot were examined together. As shown in Figure 1, a clear elbow point is visible in the graph following the first factor. The first factor displays a notably high eigenvalue, while eigenvalues drop sharply from the second factor onward and follow a relatively flat trajectory.

This pattern indicates that the scale possesses a single-factor structure. The fact that only the first factor has an eigenvalue exceeding 1, while the contribution of subsequent factors remains considerably limited, further supports this conclusion. When the scree plot findings are considered alongside the eigenvalue and explained variance results, it can be concluded that the scale exhibits a unidimensional structure.

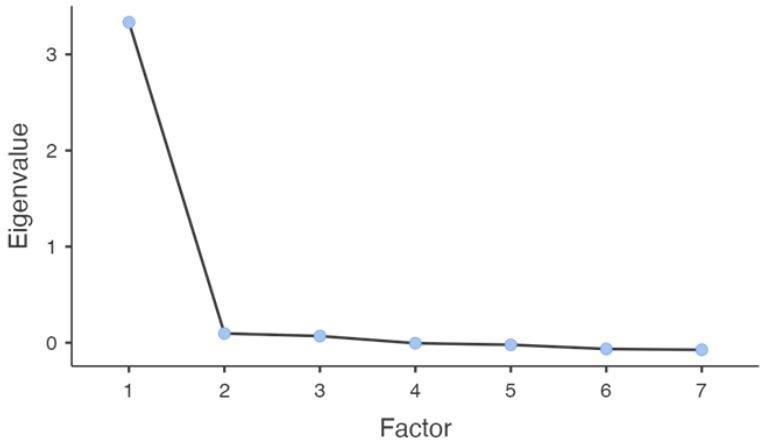

Figure 1. Scree Plot

Table 5. Reliability Analysis of the Recording-Related Discomfort in Exercise Environments Scale

Scale	Reliability Coefficient	
	Cronbach's Alpha	McDonald's Omega
Recording-Related Discomfort in Exercise Environments Scale	.832	.836

Cronbach's alpha and McDonald's omega coefficients were calculated to determine the internal consistency of the scale developed in this study. The analysis yielded a Cronbach's alpha of .832 and a McDonald's omega of .836.

In the literature, a Cronbach's alpha value of .70 or above is generally accepted as an indicator of scale reliability (Nunnally & Bernstein, 1994). Based on these findings, it can be stated that the developed scale demonstrates a good level of internal consistency and functions as a reliable measurement instrument.

Furthermore, the Cronbach's alpha values obtained upon item deletion were not found to increase the overall alpha coefficient to any meaningful degree, suggesting that the items comprising the scale exhibit a homogeneous structure and each contribute to the integrity of the overall instrument.

Table 6. Fit Indices of the Recording-Related Discomfort in Exercise Environments Scale

Model Fit Index	Excellent Range	Acceptable Range	Scale Values
χ^2/df	$0 < \chi^2/df < 2$	$2 < \chi^2/df < 5$	1.10
RMSEA	0.00 < RMSEA < .05	.05 < RMSEA < .10	0.020
SRMR	0.00 < SRMR < .05	.05 < SRMR < .10	0.023
CFI	.95 < CFI < 1.00	.90 < CFI < .95	0.998
TLI	.95 < TLI < 1.00	.90 < TLI < .95	0.997
NFI	.95 < NFI < 1.00	.90 < NFI < .95	0.981
PNFI	.95 < PNFI < 1.00	.50 < PNFI < .95	0.654

As shown in Table 6, the confirmatory factor analysis fit indices showed a good fit between the proposed model and the data. The chi-square test was non-significant, $\chi^2(14) = 15.5$, $p = .343$, and the χ^2/df ratio was 1.11. The RMSEA was .020, with a 90% confidence interval of [.000, .063], and the SRMR was .023, both indicating low residual error.

Support for model fit was also found in the incremental fit indices: the CFI, TLI, and Normed Fit Index (NFI) were greater than .95, with respective values of .998, .997, and .981. The PNFI value of .654 was found to be acceptable for a parsimony fit index. No correlated residual error terms were specified, and no post hoc model modifications were introduced on the basis of modification indices.

Overall, the fit indices indicate a good fit for the assumed one-factor solution. The results from the confirmatory factor analysis provide further support for the proposed one-dimensional factor structure of the scale.

As shown in Figure 2, the Recording-Related Discomfort in Exercise Environments Scale items had standardized factor loadings ranging from .58 to .97. Kline (2015) suggests that standardized factor loadings should be .30 or greater, with values above .50 considered preferable.

All factor loadings in the present analysis were higher than .50; several items had particularly high factor loadings, indicating that they were strongly related to the latent variable measured by the scale. Taken together, the standardized factor loadings support the single-factor structure identified through confirmatory factor analysis.

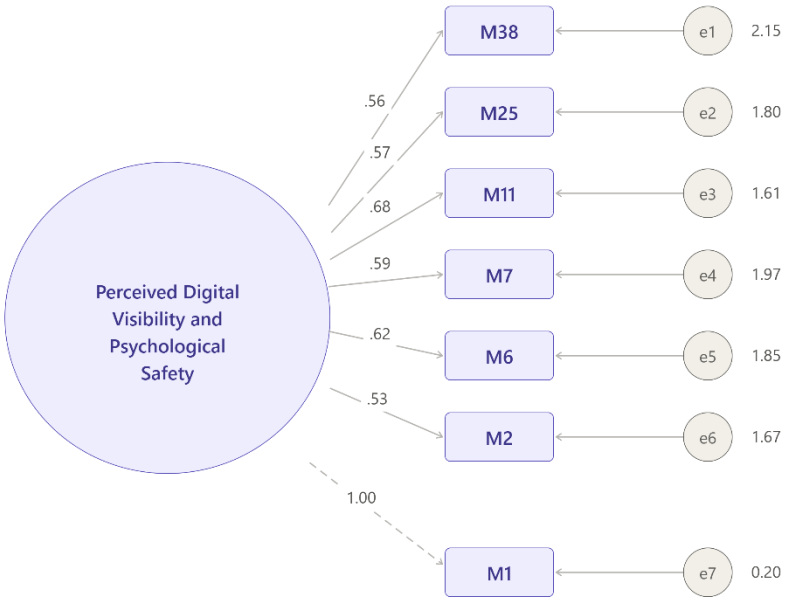

Figure 2. Unidimensional CFA Model of the Recording-Related Discomfort in Exercise Environments Scale

DISCUSSION AND CONCLUSION

The findings support the factorial validity and internal consistency of the Recording-Related Discomfort in Exercise Environments Scale and highlight how the use of digital technologies in sport settings extends beyond the development of performance data to include individuals' discomfort and privacy-related concerns associated with being recorded or potentially recorded in physical activity contexts.

The use of smartphones and social media in fitness contexts has been associated with concerns related to visibility, vulnerability, privacy, and unwanted exposure (Toffoletti et al., 2023; Zimdars, 2021). These concerns are particularly relevant when individuals have limited control over whether and how their image is captured or shared. Some gyms in the US have also introduced restrictions on smartphone video recording in response to such concerns (The Independent, 2024a; The Independent, 2024b). Exercise spaces therefore are not just physical places but also sites of potential recording, visibility, and privacy concern in everyday life.

These experiences of potential recording and being watched align with Aschoff (2020), who suggests that digital technologies create a near-constant sense of being monitored which has psychological implications for users. At the gym, the body is subject to visual scrutiny and, in addition to physical spectators, individuals may feel watched through social media or other means.

These findings are consistent with broader literature on social physique anxiety, which suggests that the posting of photos, appearance focus, and social comparison are associated with body image concerns and higher levels of anxiety and stress (Yu, 2023; Rios, 2025). Although body image and performance were not directly measured in the present study, future research could examine whether recording-related discomfort is associated with greater appearance concern or reduced performance focus during exercise.

Edmondson's (1999) definition of psychological safety as the perceived ability to speak and act without fear of negative consequences has been associated with participation, motivation, and well-being in the sport domain (Saxe & Hardin, 2022; Maughan & Jowett, 2024). From this standpoint, psychological safety provides a broader conceptual context for considering individuals' responses to visibility and recording in exercise environments; however, psychological safety itself was not directly measured in the present study.

However, digital visibility has positive effects. Fitness apps and social media, for example, can improve motivation and provide social interaction and a sense of belonging (Toffoletti et al., 2023; Rutledge, 2024; Golaszewski, 2022; Pınar et al., 2020; Kızılgüneş & Öztürk, 2024). Despite these potential benefits, involuntary or poorly controlled visibility may also be associated with experiences of vulnerability, discomfort, and concern over privacy and personal boundaries (Toffoletti et al., 2023). Such concerns may become particularly salient when individuals perceive that they can be recorded or included in digital content without meaningful control over the recording process (Erdoğan, 2020; Turan, 2024).

The majority of items on the scale were related to being recorded or potentially recorded and the discomfort, anxiety, tension, stress, and privacy-related concern associated with such situations; together, these items appear to reflect a single underlying dimension of recording-related discomfort.

The retained items reflect several negative experiential states, including discomfort, anxious arousal, tension, subjective stress, and privacy related concern. These responses appear heterogeneous at first glance, yet they share a common situational anchor: the actual or anticipated experience of being recorded while exercising. Their tendency to converge on a single underlying factor suggests that they may not represent fully independent psychological dimensions. Rather, they likely function as different expressions of one broader aversive reaction to recording-related stimuli. The possibility of a more differentiated factor structure cannot be ruled out. Future research should therefore examine whether this unidimensional solution replicates in larger and more demographically diverse samples. It should also be determined whether the affective and privacy-related components eventually emerge as empirically separable factors.

Conclusion

Exploratory and confirmatory factor analyses were conducted to test the factor structure and internal reliability of the Recording-Related Discomfort in Exercise Environments Scale, which showed the 7-item scale was best understood as a unidimensional measure. Internal consistency estimates using Cronbach's alpha and McDonald's omega coefficients also showed the scale had good reliability.

The scale therefore provides preliminary evidence of factorial validity and internal consistency for measuring recording-related discomfort in exercise environments, including discomfort, anxiety, tension, stress, and privacy-related concern associated with being recorded or potentially recorded while exercising.

Together, these findings suggest that within sport and exercise settings, digital technologies may contribute to psychosocial experiences related to recording, visibility, and privacy. This study thus provides a further contribution to knowledge of the psychosocial aspects of digitalized exercise environments.

Future studies should explore the scale's applicability among different population groups in terms of age, geographic location, and level of sport participation. Additional studies should investigate the relationship between the scale and related variables such as social physique anxiety, body image, psychological safety, and psychological well-being. More broadly, future research could examine the role of recording-related discomfort in other exercise contexts and in relation to other psychological outcomes.

Recommendations

Overall, sport facilities should consider developing and communicating clear policies on recording and social media posting, as they may help protect the privacy of their members and reduce recording-related discomfort, even if they are not effective at stopping unauthorized recording.

Gym management and personal trainers need to be aware of how actual or potential recording may contribute to discomfort among gym members, and should therefore seek to create exercise environments in which members' privacy and preferences regarding recording are respected.

Research on the scale could be conducted in different city environments, with other age groups, in different exercise environments, and in relation to theoretically relevant variables (e.g., social physique anxiety, body image, exercise motivation, psychological safety, and psychological wellbeing). Such research could help educators understand the role of recording-related discomfort in people's experiences in sport and exercise environments.

Limitations and Strengths

Thus, this study adds to the literature by providing a new scale for measuring recording-related discomfort in exercise settings. Most of the literature on digital visibility focuses on other areas, such as social media use, privacy, and online self-presentation. In the present study, the construct was operationalized in terms of exercise-specific experiences of being recorded or potentially recorded and the associated discomfort, anxiety, tension, stress, and privacy-related concern. Exploratory and confirmatory factor analyses supported the scale's unidimensional factor structure, while Cronbach's alpha and McDonald's omega indicated good internal consistency.

The sample of the study consisted of individuals who were members of fitness centers located on the European side of Istanbul. Thus, generalizability may be limited to other cities, cultures, and exercise settings. Furthermore, because the study used a cross-sectional design, definitive causal conclusions cannot be drawn. Additionally, as the data were collected through self-report measures, the results may have been affected by participant bias. The relatively small pilot sample used during the exploratory item-reduction stage should also be considered a methodological limitation. In addition, the complete factor analytic results for the original 32-item pilot version could not be retrieved for retrospective inspection. This limits both the transparency and the reproducibility of the initial item reduction phase. Future research should seek to retest the scale with other samples and in different exercise contexts and further examine its convergent and discriminant validity using theoretically related measures.

Several retained items are similar in both phrasing and semantic content, particularly those addressing discomfort caused by others recording or by filming intended for social media. This overlap may partly explain the notably high factor loadings observed for certain items, as well as the strong fit indices obtained in the confirmatory factor analysis. These items were retained on the grounds that they refer to distinct, if closely related, recording scenarios. This rationale, however, does not rule out the possibility of item redundancy.

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Authors' Contribution

Conceptualization – O.K.; **Data curation** – Y.Ş.; **Formal analysis** – M.U.; **Funding acquisition** – İ.B.; **Investigation** – O.K.; **Methodology** – Y.Ş.; **Project administration** – İ.B.; **Resources** – İ.B.; **Software** – M.U.; **Supervision** – İ.B.; **Validation** – M.U., Y.Ş.; **Visualization** – M.U.; **Writing – original draft** – O.K.; **Writing – review & editing** – M.U., İ.B. All authors read and approved the final manuscript.

Ethical Approval Information

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