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The Impacts of Mass Sports Event Participation on Residents' Sustained Exercise Behavior: A Longitudinal Study on the Chain-Mediating Roles of Event Satisfaction and Exercise Self-Efficacy

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Research Article

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Abstract

This study aims to explore the medium-term effect of participation in mass sports events on residents' sustained exercise behavior and reveal the chain-mediating mechanisms of event satisfaction and exercise self-efficacy. Adopting a two-wave longitudinal tracking design, this research targeted residents who participated in urban mass sports events in China. Valid sample data were collected via two rounds of questionnaire surveys, and structural equation modeling was applied for empirical analysis. The results indicate that participation in mass sports events exerts a significant positive effect on residents' sustained exercise behavior. Event satisfaction partially mediates the relationship between event participation and sustained exercise behavior. Exercise self-efficacy plays a chain-mediating role across the paths from event participation and event satisfaction to sustained exercise behavior. The findings confirm that mass sports events generate more than transient exercise engagement; they foster stable and sustainable exercise habits by improving participants' experiential satisfaction and strengthening their self-perceived exercise competence. This study enriches the theoretical framework for motivating persistent public physical activity, provides empirical evidence and practical implications for governments to regularly organize mass sports events, promote lifestyle-oriented national fitness, and build a 15-minute fitness circle.

1 Introduction

1.1 Research Background

The *National Fitness Plan (2021–2025)* explicitly promotes the normalization and daily application of mass sports events, stimulates public enthusiasm for physical activity, and cultivates lifelong exercise habits. Currently, more than 500 million Chinese residents regularly engage in physical exercise, and public sports have entered a new era of universal participation, diversified development and community-embedded scenarios. Low-threshold mass events such as road running, brisk-walking races, community ball games and folk sports have become core carriers for residents to take part in physical activity. Distinct from elite competitive tournaments, mass sports events feature inclusiveness, entertainment and accessibility. They adopt lenient entry requirements without prioritizing competitive performance, covering participants of all ages and fitness levels. Such events effectively lower barriers to public sport participation and activate residents' willingness to exercise.

Existing literature predominantly focuses on the short-term outcomes of mass sports events, analysing immediate effects on one-off engagement and behavioural intention, while neglecting long-term habit formation. In practice, most participants experience a "participation-then-dropout" pattern: they stay active during events but cease exercising afterwards. Converting episodic event participation into regular, sustained physical activity has become a critical challenge for high-quality development of national fitness programmes. Previous studies have demonstrated that long-term behavioural maintenance depends not merely on external event stimuli but also on individual affective experiences and self-cognition. Event satisfaction and exercise self-efficacy may serve as pivotal psychological

mediators bridging external event exposure and persistent behaviour. Nevertheless, their sequential chain mechanism lacks rigorous longitudinal empirical validation.

1.2 Research Significance

1.2.1 Theoretical Significance

Moving beyond cross-sectional limitations, this study employs a two-wave longitudinal design to dynamically examine the enduring effects of mass sports event participation on sustained exercise behaviour, filling the research gap that prioritises short-term outcomes over long-term adherence in public sport studies. Furthermore, a chain-mediation model *event participation → event satisfaction → exercise self-efficacy → sustained exercise behaviour* is constructed to systematically unpack the sequential pathway from situational external stimulation, experiential evaluation and self-perception to long-term habit formation. This work extends the application of the theory of planned behaviour and self-efficacy theory to public sport contexts and improves the theoretical system explaining how mass sports events empower national fitness initiatives.

1.2.2 Practical Significance

This research clarifies the core psychological pathways through which mass sports events facilitate sustained resident exercise. It delivers quantitative evidence for local authorities to optimise event provision, innovate operational modes and enhance service quality. Focusing on behavioural transformation among physically inactive or low-activity populations, this study generates actionable strategies for neighbourhood-based regular physical activities and the construction of 15-minute fitness circles, ultimately advancing the normalisation and daily integration of national fitness.

1.3 Literature Review

1.3.1 Mass Sports Events and Exercise Behaviour

International scholars have long investigated behavioural empowerment induced by mass sports events. Prior evidence shows that community-based public tournaments increase short-term physical-activity rates, and event inclusiveness and participant experience substantially predict subsequent exercise intentions. One longitudinal study on community running events reported that over80 % of previously inactive participants increased weekly physical-activity frequency after event attendance, with more than half maintaining long-term healthy behavioural changes. Domestic Chinese studies mostly validate short-term motivational effects, confirming that mass events boost sport interest and diversify activity settings. However, few Chinese longitudinal studies explore post-event behavioural persistence and unpack the underlying transformation mechanisms.

1.3.2 Event Satisfaction and Exercise Behaviour

Event satisfaction represents a comprehensive affective evaluation of venue conditions, services, atmosphere and organisational management, functioning as a critical emotional mediator linking event

contexts to individual behaviour. High satisfaction generates positive sport-related affect, reduces psychological resistance to exercise and increases willingness for repeated participation. Research on marathon and community sport events demonstrates a positive association between experiential satisfaction and participant retention. Nonetheless, most existing evidence relies on static cross-sectional surveys without testing long-term effects on sustained exercise adherence.

1.3.3 Exercise Self-Efficacy and Sustained Exercise Behaviour

Derived from Bandura's self-efficacy theory, exercise self-efficacy describes individuals' confidence in maintaining regular physical activity, overcoming barriers and accomplishing exercise goals. Sport-behaviour research consistently identifies self-efficacy as a robust psychological predictor of exercise persistence, training frequency and habit consolidation. International longitudinal evidence suggests that positive sport experiences enhance exercise self-efficacy, thereby translating short-term intentions into long-term adherence. Still, the sequential chain effect of satisfaction followed by self-efficacy within mass-event contexts remains empirically under-examined.

1.4 Research Innovations

First, methodological innovation: unlike conventional static cross-sectional designs, this two-wave longitudinal tracking avoids reverse-causation bias and captures enduring behavioural consequences of mass-event participation. Second, mechanistic innovation: a chain-mediation framework simultaneously tests the independent and sequential indirect effects of event satisfaction and exercise self-efficacy, elaborating the complete causal chain from situational stimulation, affective experience and psychological empowerment to durable behaviour. Third, contextual innovation: the study focuses on inclusive community-centred mass sports rather than elite competitions. Findings possess stronger generalisability for ordinary residents' everyday physical-activity scenarios.

2 Theoretical Foundations and Hypotheses

2.1 Definition of Core Constructs

2.1.1 Mass Sports Event Participation

In this study, mass sports event participation refers to residents' voluntary engagement in non-elite, inclusive tournaments hosted by governments, communities or social organisations. It covers three dimensions: participation frequency, depth of involvement and affective investment. Distinguished from elite competitive participation, it features low barriers, universal accessibility, recreational orientation and recurring organisation.

2.1.2 Event Satisfaction

Event satisfaction denotes participants' holistic affective assessment of event organisation, venue facilities, on-site atmosphere, service provision and overall competition experience after attending mass sports events. Subjective feedback ranges from satisfied, neutral to dissatisfied, acting as the primary affective mediator connecting event contexts to psychological and behavioural outcomes.

2.1.3 Exercise Self-Efficacy

Exercise self-efficacy reflects residents' self-judgement and confidence in sustaining regular workouts, overcoming laziness, coping with difficulties and achieving personal fitness objectives. It comprises three sub-dimensions: persistence efficacy, barrier-coping efficacy and goal-achievement efficacy.

2.1.4 Sustained Exercise Behaviour

Distinct from episodic or temporary activity, sustained exercise behaviour in this study describes medium-term adherence observed over a three-month follow-up window after event participation. It captures stable regular physical-activity patterns measured by long-term weekly frequency, training duration, behavioural consistency and preliminary habit consolidation. Longer follow-up periods in future research may verify permanent habit formation.

2.2 Theoretical Foundations

2.2.1 Self-Efficacy Theory

Bandura's self-efficacy theory posits that behavioural persistence depends not only on external environmental triggers but also on self-efficacy beliefs. Favourable mastery experiences strengthen self-efficacy and subsequently improve behavioural maintenance. Mass sports events offer low-pressure participatory environments; rewarding tournament experiences and positive on-site perceptions enhance exercise self-efficacy, facilitating the transition from one-off event attendance to persistent home-based physical activity, which underpins the mediation analysis of the current study.

2.2.2 Theory of Planned Behaviour

The theory of planned behaviour maintains that behavioural intention and sustained behaviour are jointly shaped by attitude, subjective norms and perceived behavioural control. Positive event-participation experiences foster favourable attitudes toward exercise; high event satisfaction reinforces positive sport-related cognitions; elevated exercise self-efficacy improves perceived behavioural control. Collectively, these psychological constructs drive the formation of sustained exercise habits and establish the logical basis for hypothesised variable relationships.

2.3 Research Hypotheses

H1: Participation in mass sports events positively predicts residents' sustained exercise behaviour. H2: Event satisfaction mediates the association between mass-event participation and sustained exercise behaviour; event participation improves event satisfaction, which in turn promotes sustained exercise behaviour. H3: Exercise self-efficacy mediates the association between mass-event participation and

sustained exercise behaviour; event participation enhances exercise self-efficacy, which subsequently facilitates sustained exercise behaviour. H4: Event satisfaction and exercise self-efficacy exert a significant chain-mediating effect between mass-event participation and sustained exercise behaviour, validating the sequential pathway: event participation → event satisfaction → exercise self-efficacy → sustained exercise behaviour.

3 Methodology

3.1 Research Methods

This study adopts a longitudinal tracking design, questionnaire surveys and quantitative statistical analysis. Two measurement time-points were established: Time 1 (T1), one week after event closure, measured event participation, event satisfaction and baseline exercise self-efficacy; Time 2 (T2), three months post-event, tracked sustained exercise behaviour and changes in exercise self-efficacy. SPSS 26.0 and AMOS 24.0 software were used for reliability and validity testing, correlation analysis, structural equation modelling and mediation effect evaluation.

3.2 Participants

Matched two-wave sampling was conducted across four eastern, central and southern Chinese cities: Suzhou, Wuhan, Guangzhou and Changsha. Investigated event types included community fun sports meetings, city-wide brisk-walking leagues, public fun runs and community basketball/badminton team tournaments. Events were sponsored by local bureaus of culture, tourism and sports, street administrations and non-profit sport-focused social organisations, open to ordinary residents without elite-athlete qualification requirements. A total of 450 paired questionnaires were distributed; 412 complete matched responses were retained, yielding an effective longitudinal response rate of91.56 %. Demographic characteristics were well-distributed, ensuring sample representativeness (Table 1).

Table 1
Demographic characteristics of participants (N = 412)

Variable	Category	n	Percentage (%)
Gender	Male	204	49.51
	Female	208	50.49
Age	18–25 years	96	23.30
	26–40 years	152	36.89
	41–55 years	114	27.67
	Over 55 years	50	12.14
Baseline exercise level	Inactive (< 10 times/year)	138	33.49
	Moderately active (10–50 times/year)	186	45.15
	Highly active (> 50 times/year)	88	21.36
Educational attainment	Junior high school or below	42	10.19
	Senior high school / technical secondary school	98	23.79
	Junior college / undergraduate	216	52.43
	Master's degree or above	56	13.59

3.3 Measurement Instruments

All scales used in this study were adapted from previously published validated instruments, with minor contextual revisions to fit the research scenario of Chinese residents participating in mass sports events. No scale was originally developed for the current study. All items adopted a 5-point Likert scoring format (1 = strongly disagree; 5 = strongly agree). A pre-investigation with 80 participants was performed to screen low-quality items; items with factor loading < 0.7 or corrected item-total correlation (CITC) < 0.4 were removed.

Mass Sports Event Participation Scale Adapted from Zhang et al. (2024). This scale contains 8 items covering three dimensions: participation frequency, depth of involvement, and emotional investment. It evaluates residents' objective behavioural investment in mass-sports-event participation. Higher total scores indicate higher degrees of event-participation engagement.

Event Satisfaction Scale Revised from Zhou (2024). The 7-item scale includes four dimensions: event organization, venue facilities, on-site atmosphere, and convenience services. It reflects participants' comprehensive subjective evaluation of their event-attending experience. Higher scores represent greater event satisfaction.

Exercise Self-Efficacy Scale Modified from Li (2023) and Bandura's classic self-efficacy scale (Bandura, 1977). Nine items compose three sub-dimensions: persistence efficacy, barrier-coping efficacy, and goal-achievement efficacy. The scale assesses participants' self-confidence in regular exercise, overcoming exercise barriers, and achieving fitness goals.

Sustained Exercise Behaviour Scale Adapted from the validated scale reported by Wang & Li (2025). Minor item-wording adjustments were implemented to accommodate our three-month longitudinal follow-up setting, while retaining the original dimensional framework and core measurement content. Eight items measure four dimensions: weekly-frequency stability, exercise-duration continuity, habit consolidation, and spontaneous post-event physical activity. Higher scores stand for better medium-term sustained-exercise performance.

Reliability results: Cronbach's α values for mass-sports-event participation, event satisfaction, exercise self-efficacy, and sustained exercise behaviour were 0.892, 0.885, 0.901, and 0.897 respectively, demonstrating satisfactory internal consistency for all scales. Confirmatory factor analysis supported good convergent and discriminant validity.

3.4 Exploratory Factor Analysis and KMO Test

Exploratory factor analysis (EFA), the Kaiser-Meyer-Olkin (KMO) test and Bartlett's sphericity test were performed to evaluate structural validity. The overall KMO value reached 0.912; sub-scale KMO values for event participation (0.876), event satisfaction (0.859), exercise self-efficacy (0.893) and sustained exercise behaviour (0.881) all exceeded the excellent threshold of 0.8. Bartlett's sphericity test yielded $\chi^2 = 8962.374$, $p < 0.001$, rejecting the identity-matrix hypothesis and confirming factor-analysis suitability. Principal-component analysis with varimax rotation extracted four factors with eigenvalues greater than 1, perfectly matching the four hypothesised latent constructs. Item factor loadings ranged from 0.712 to 0.905 (> 0.7). The cumulative explained variance reache 73.26 %, surpassingthe 60 % criterion, demonstrating clear structural dimensions and satisfactory convergent validity.

3.5 Reliability and Validity Assessment

Cronbach's α coefficients for event participation, event satisfaction, exercise self-efficacy and sustained exercise behaviour were 0.892, 0.885, 0.901 and 0.897 respectively, all exceeding 0.8, indicating good internal consistency. Confirmatory factor analysis showed composite reliability (CR) values above 0.8 and average variance extracted (AVE) values above 0.5 for every construct, supporting convergent validity. The square root of each AVE exceeded pairwise correlation coefficients between latent variables, confirming adequate discriminant validity for subsequent structural-equation modelling.

3.6 Control Variables

Following conventions in public-sport-behaviour research, gender, age and baseline exercise level were incorporated as covariates to eliminate confounding demographic and pre-existing fitness effects. Gender was coded as a dummy variable (1 = male, 2 = female); grouped age values were standardised; annual baseline exercise frequency was centred. Covariates were fully controlled for paths predicting

both mediators (event satisfaction, exercise self-efficacy) and the outcome variable (sustained exercise behaviour) to enhance causal-effect precision and result robustness.

4 Empirical Results

4.1 Common-Method Bias Test

The two-wave longitudinal design mitigates common-method variance. Harman's single-factor test was additionally implemented for bias evaluation. Unrotated exploratory factor analysis extracted 12 factors with eigenvalues > 1. The first unrotated factor explained only 2367 % of total variance, well below the critical threshold of40 %, ruling out severe common-method bias.

4.2 Correlation Analysis

Pearson correlation analysis revealed significant positive associations between all focal variables ($p < 0.001$): mass-event participation correlated positively with event satisfaction, exercise self-efficacy and sustained exercise behaviour; event satisfaction correlated positively with exercise self-efficacy and sustained exercise behaviour; exercise self-efficacy correlated positively with sustained exercise behaviour. Correlation patterns conformed to theoretical expectations, laying a foundation for hypothesis testing.

After controlling for gender, age and baseline exercise level, the hypothesised structural-equation model exhibited excellent fit indices: $\chi^2/df = 1.796$, RMSEA = 0.042, IFI = 0.965, CFI = 0.964, TLI = 0.960. Competing models (parallel dual-mediation model and reversed chain-mediation model: exercise self-efficacy → event satisfaction → sustained exercise behaviour) were compared using Akaike information criterion (AIC) and Bayesian information criterion (BIC) values to avoid subjective path-ordering bias. The hypothesised sequential model (event satisfaction → exercise self-efficacy) yielded AIC = 286.352 and BIC = 312.671, substantially lower than competing specifications with superior fit statistics, verifying the statistical plausibility of the experience-then-belief temporal sequence. Path analysis demonstrated that mass-event participation remained a significant positive predictor of medium-term sustained exercise behaviour after covariate adjustment ($\beta = 0.382$, $p < 0.001$). Hypothesis H1 was supported. Among covariates, baseline exercise level positively predicted sustained exercise behaviour ($\beta = 0.211$, $p < 0.01$); age exhibited a weak negative effect ($\beta = -0.083$, $p < 0.05$); gender displayed no significant effect. Pre-existing exercise habits constitute a foundational individual resource, yet mass-sport-event participation independently facilitates behavioural upgrading beyond initial fitness disparities.

4.4 Mediation Analysis

Bootstrap resampling (5 000 iterations, 95% confidence intervals) was adopted to evaluate individual and chain-mediation effects.

1. The independent mediating effect of event satisfaction was significant (indirect effect = 0.183, 95% CI [0.115, 0.264], excluding zero). Hypothesis H2 was supported. Improved tournament experiences

and elevated satisfaction foster positive sport-related affect, transforming episodic attendance into sustained physical activity. High-quality inclusive events reduce psychological resistance and deliver affective resources for medium-term adherence.

2. The independent mediating effect of exercise self-efficacy was significant (indirect effect = 0.215, 9 % CI [0.142, 0.293], excluding zero). Hypothesis H3 was supported. Rewarding event-based experiences build confidence in personal exercise capacity and improve persistence, particularly for physically inactive populations for whom low-threshold mass events reshape negative self-perceptions and establish exercise-related self-beliefs.
3. The sequential chain-mediating effect of event satisfaction followed by exercise self-efficacy was significant (chain indirect effect = 0.127, 5 % CI [0.073, 0.191], excluding zero). Hypothesis H4 was validated. The complete causal pathway is confirmed: mass-sports-event participation enhances event satisfaction, which in turn strengthens exercise self-efficacy and finally promotes residents' sustained exercise behaviour. Affective empowerment through satisfactory experiences serves as the foundation; psychological empowerment via improved self-efficacy represents the core driver. The two constructs operate in a sequential reinforcing mechanism converting short-term participation into medium-term stable exercise habits.

5 Discussion

Rooted in the theory of planned behaviour and self-efficacy theory, the temporally ordered chain-mediation model follows a natural behavioural-development sequence: individuals first generate participatory behaviours and immediate experiential feedback (event satisfaction), then reconstruct sport-related self-cognition and self-efficacy beliefs on the basis of affective evaluations, ultimately consolidating sustained physical-activity patterns. Competing-model comparisons statistically eliminate reverse-causation concerns and validate the unique plausibility of the pathway *event participation → event satisfaction → exercise self-efficacy → medium-term sustained exercise behaviour*.

5.1 Direct Effect of Mass-Event Participation on Sustained Exercise Behaviour

Longitudinal evidence confirms enduring positive impacts of mass-sport-event participation on residents' sustained exercise behaviour, extending previous research limited to short-term effects. Mass events construct low-cost, well-adapted public physical-activity settings and break down everyday situational and social barriers to exercise for sedentary individuals. Collective tournament atmospheres foster a sense of belonging, motivating post-event spontaneous workouts and gradual habit formation, shifting national fitness from externally-mandated engagement toward self-directed persistence.

5.2 Affective Mediation of Event Satisfaction

Event satisfaction functions as the primary affective mediator translating external event stimuli into long-term individual behaviour. Well-organised tournaments, comfortable venues, vibrant fitness

atmospheres and comprehensive support services generate pleasant participatory memories. Positive affective impressions counteract subjective fatigue and laziness, lowering psychological barriers to subsequent workouts. Conversely, dissatisfactory event experiences produce negative emotions, erode exercise motivation and lead to post-event dropout without habit consolidation.

5.3 Core Mediating Role of Exercise Self-Efficacy

Exercise self-efficacy represents the central psychological determinant of long-term adherence and bridges affective experiences and durable behaviour. Satisfactory participatory experiences create feelings of mastery and overcome self-defeating beliefs about personal fitness capability. Enhanced self-efficacy improves individuals' capacity to resist inactivity, manage workout obstacles and uphold personal fitness objectives, converting temporary tournament involvement into a lasting lifestyle. This finding corroborates the core proposition of self-efficacy theory: behavioural sustainability ultimately relies on empowered self-perception and psychological conviction.

5.4 Underlying Logic of the Chain-Mediation Mechanism

The validated chain-mediation model integrates the theory of planned behaviour and self-efficacy theory to reveal a multi-stage empowerment mechanism: *external situational stimulation → affective attitude formation → self-cognitive upgrading → medium-term behavioural maintenance*. This sequential framework addresses the explanatory limitations of single-mediator models. From the attitude-formation perspective of the theory of planned behaviour, mass-sport-event contexts differ from fragmented unstructured home workouts; standardised collective environments deliver intense positive external stimulation that optimise experiential evaluations and build favourable exercise attitudes, completing the initial transition from situational exposure to positive affect. Drawing on the mastery-experience activation mechanism of self-efficacy theory, satisfying participatory episodes deliver successful performance experiences, positive emotional arousal and social validation, reinforcing exercise self-efficacy and transforming superficial affective enjoyment into deep-rooted sport-related self-beliefs. Elevated self-efficacy improves perceived behavioural control, enabling individuals to overcome inactivity and avoid behavioural discontinuation, eventually consolidating episodic event participation into stable medium-term physical-activity routines. The overall chain presents nested progressive empowerment: satisfying tournament experiences provide affective foundations for persistence, while self-efficacy upgrades constitute the critical prerequisite for habit stabilisation. Together they form a complete psychological transmission channel through which mass sports events cultivate sustained exercise habits, refining the staged theoretical framework of public-sport-behaviour formation.

6 Conclusions and Implications

6.1 Conclusions

First, participation in mass sports events significantly predicts residents' medium-term sustained exercise behaviour, demonstrating durable empowering effects as a critical public intervention fostering

fitness habits and regular national-fitness implementation. Second, both event satisfaction and exercise self-efficacy independently and partially mediate the relationship between event participation and sustained exercise behaviour. Event attendance promotes long-term adherence by improving experiential quality and strengthening sport-related self-confidence respectively. Third, event satisfaction and exercise self-efficacy exert a significant sequential chain-mediating effect, validating the causal pathway: mass-sports-event participation → event satisfaction → exercise self-efficacy → sustained exercise behaviour, uncovering the internal psychological mechanism through which mass events facilitate medium-term exercise maintenance.

6.2 Practical Recommendations

1. Deliver regular and inclusive mass-sport-event provision. Sport administrations and neighbourhood authorities should build diversified low-barrier tournaments for participants of all ages and fitness levels under the 15-minute fitness-circle policy, enriching daily physical-activity resources and avoiding sporadic one-off event arrangements to lay the contextual foundation for sustained exercise habits.
2. Improve event quality and boost participant satisfaction. Optimise organisational management, venue infrastructure and on-site service provision, cultivate an inclusive and joyful tournament climate, downplay competitive pressure and prioritise entertainment and participation to meet ordinary residents' experiential demands and accumulate positive affective memories that support long-term adherence.
3. Prioritise psychological empowerment to enhance exercise self-efficacy. Integrate on-site fitness guidance, experience-sharing sessions and achievement-display activities during event operations to support physically inactive participants, foster feelings of accomplishment and eliminate negative self-evaluation. Repeated positive participatory experiences across recurring tournaments gradually stabilise exercise-related self-efficacy beliefs.
4. Establish a long-term cultivation system linking event experience, psychological empowerment and behavioural continuity. Move beyond the "host-and-abandon" operational paradigm. Post-event community groups, ongoing fitness counselling and serial mini-events maintain the motivational momentum generated by tournaments, translating transient affective experiences into durable psychological resources and eventually cultivating lifelong exercise habits.

6.3 Limitations and Future Directions

Despite the longitudinal design, covariate adjustment and competing-model comparisons that strengthen analytical robustness, several limitations remain. First, follow-up duration is constrained to a three-month medium-term window; longer-term tracking (6 months to 1 year) is required to examine permanent habit consolidation and behavioural decay trajectories. Second, self-reported exercise behaviour may introduce recall bias, with participants potentially overestimating training frequency and duration. Third, longitudinal attrition disproportionately affects younger participants with low baseline exercise motivation, limiting representativeness for extremely inactive populations and generating mild

sample-selection bias. Fourth, the current model only tests core sequential mediation without incorporating moderators (e.g. social support, sport motivation, event attachment) that could capture heterogeneous effects across demographic subgroups and tournament types. Fifth, geographical coverage is restricted to four eastern-central Chinese cities; rural and western-region samples are absent, restricting external validity for grassroots rural mass-sport-event contexts. Future research should adopt extended longitudinal tracking exceeding one year to contrast medium- and long-term behavioural trajectories, integrate objective activity data (wearable devices, check-in logs) to reduce subjective measurement bias, expand sampling into rural western China for improved generalisability, and incorporate moderators and additional exogenous predictors to identify boundary conditions and heterogeneous mechanisms of mass-event-driven sustained exercise behaviour.

Declarations

Ethics declaration:

This study was reviewed by the Institutional Research Ethics Committee of Anhui Science and Technology University and was granted an ethics review waiver. The study was a low-risk, anonymous questionnaire survey that collected only non-sensitive self-reported behavioural and psychological data from human participants, without involving biological specimens, clinical intervention, or private identifiable information. According to the ethical regulations for social-science questionnaire research in China, formal IRB ethics approval was deemed unnecessary for this completely anonymous, non-interventional survey. No reference number was assigned for this ethics review waiver. All participants were informed of the research objectives, anonymous data processing rules, and their right to voluntary participation prior to data collection. Written informed consent was obtained from each participant. This study was performed in accordance with the Declaration of Helsinki.

Consent to Participate declaration:

Informed consent was obtained from all individual participants included in the study.

Consent to Publish declaration:

Not applicable. The manuscript does not contain any individual person’s data in a form that requires consent to publish.

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Author Contributions declaration:

As the sole author, Jiakai Qiu was responsible for all aspects of this study, including conceptualization, methodology, investigation, data curation, formal analysis, validation, writing—original draft, and writing—review and editing. The author has read and approved the final manuscript and agrees to be accountable for all aspects of the work.

Competing Interest declaration:

The authors declare that they have no competing interests.

Data Availability declaration:

The datasets generated and analysed during the current study are not publicly available due to participant privacy protection restrictions but are available from the corresponding author on reasonable request.

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