State-of-the-art of exergames - An umbrella scoping review

Project Factsheet Beweeggames KCSB

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Contents

1 Introduction

This umbrella scoping review aims to synthesize existing evidence from systematic reviews, meta-analyses, and scoping reviews on (1) the effects of exergaming on physical activity (PA), sedentary behaviour, energy expenditure (EE), fitness or other physical health outcomes (2) the factors (such as psychological factors) that (positively and negatively) influence these, and (3) the target groups most likely to benefit from exergames.

To guide this synthesis, the following questions are addressed:

1. **What are exergames?**

What are exergames, and how are they defined? What types of exergames and technologies exist (e.g., gaming consoles, virtual reality, augmented reality, mobile devices)?

2. **How are exergames used in practice?**

What are the practical applications of exergames in various settings, such as schools, fitness centers, or community sports programs?

3. **What is the effect of exergames on physical activity?**

What do studies say about the effectiveness of exergames in promoting physical activity, sedentary behavior, energy expenditure, fitness, other physical outcomes, and related psychological outcomes?

4. **Which factors influence the effectiveness of exergames?**

What are the factors that influence the success of exergames in achieving their goals?

5. **Which target groups can (or cannot) benefit from exergames?**

For which target groups are exergames most appropriate (e.g., children, adolescents, adults, older adults)?

6. **What advantages do exergames offer compared to traditional sports and physical activity?**

What are the key advantages of exergames, such as accessibility, increased motivation, at-home convenience, or fun?

7. **What are the limitations or disadvantages of exergames?**

What are the possible limitations of exergames, such as lower exercise intensity, risk of strain injuries, or financial costs?

2 Methods

This scoping umbrella review followed the JBI methodology for scoping reviews and the PRISMA-ScR guidelines. The review protocol was pre-registered on the Open Science Framework (OSF) (https://doi.org/10.17605/OSF.IO/57YQW).

Eligibility criteria were defined based on the PCC framework. Included were systematic reviews, scoping reviews, and meta-analyses published between 2015 and 2025, focusing on the effects of exergames on physical activity (PA), sedentary behavior (SB), energy expenditure (EE), physical fitness, body composition, and related psychological outcomes (e.g., motivation, engagement). Only studies targeting healthy populations—including inactive or overweight individuals across all age groups—were included. Reviews on patient populations, cognitive disorders, rehabilitation, or purely mental health outcomes were excluded. Studies had to focus on leisure, educational, or community settings; interventions in care or revalidation settings were excluded.

Search strategy. A comprehensive three-step search was conducted in April 2025 across Scopus, PubMed, APA PsycInfo, Psychology & Behavioral Sciences Collection, and IEEE Xplore. Search strategy development was supported by Microsoft Copilot, ChatGPT, and SearchSmart. Only English and Dutch publications were included.

Screening and selection. All citations were imported into EndNote for deduplication and then screened in ASReview, a machine learning-based tool that supports active learning in systematic reviews. After an initial title/abstract screening, full texts were assessed against inclusion criteria by multiple reviewers. Conflicts were resolved through discussion or by a third reviewer.

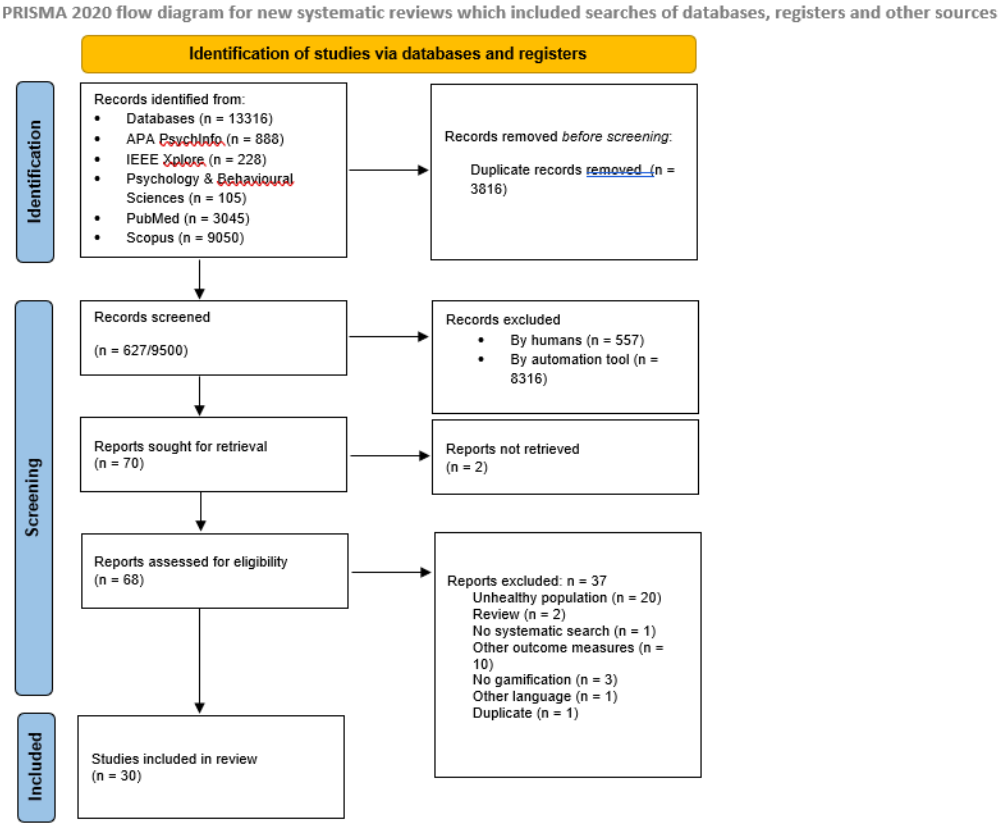
Data extraction. Data from the included reviews were extracted using a standardized form, with assistance from AI tool ChatGPT (where copyright permitted). Extracted information included review characteristics, participant details, intervention features (e.g., type of exergame, setting, duration), outcomes, and key findings on effects, influencing factors, and user perspectives. Two reviewers independently verified the extracted data. One reviewer assessed all copyright materials manually, and the other reviewer assessed all ChatGPT generated materials.

Data synthesis. Findings were summarized in tables and narratively synthesized in alignment with the review objectives, capturing both quantified effects and qualitative insights.

3 Results

Study Selection and PRISMA Flowchart

A total of 13,316 records were identified through database searches from *Scopus, PubMed, APA PsychInfo, Psychology & Behavioural Sciences Collection,* and *IEEE Xplore*. After removing 3,816 duplicates, 627 records were screened. An automated relevance ranking tool and human reviewers screened the abstracts, resulting in 70 full-text reports being retrieved. Of these, 30 reviews met all eligibility criteria and were included in the final analysis. The full PRISMA 2020 flow diagram is provided below:



Study Characteristics

- **Publication Timeline:**
  The reviews span a publication range from 2015 to 2025, with the highest concentrations in 2020 and 2024, suggesting these were peak years of academic interest in exergame research.
- **Countries of Origin:**
  Most reviews were conducted in the United States. Among the reviews that specified the origin of included studies, the most frequently represented countries were the USA, Canada, and Australia, followed by Spain, the UK, and the Netherlands. However, 13 of the 30 reviews did not report this information.
- **Scope of Evidence Synthesized:**
  The number of included studies per review ranged from 6 to 47. Total sample sizes ranged from 234 to 16687. Four reviews did not report a total sample size.

- **Publication Range of Included Studies:**
  The earliest included primary studies dated back to 2003 and 2006, though several reviews did not specify the publication range of the studies they included.

Note on Presentation of Results

In the following sections, the results are synthesized across all reviews regardless of setting, duration, or target group. This approach ensures a comprehensive overview of the current evidence base on exergames rather than stratifying prematurely by subpopulations or contexts.

4 What are exergames

Exergames, also referred to as active video games (AVGs) or exercise-based video games are most commonly defined by the following core elements:

Tabel 1. Definitions of exergames

Category	Common Words/Phrases	Summary Definition
Technology/Format	interactive, digital, video game, avatars, motion-tracking, virtual reality (VR)	Digital or video games that use interactive technology to enable gameplay through physical movement.
Physical Engagement	physical activity, body movement, gross motor skills, exercise, exertion	Require players to actively engage their bodies (e.g., jumping, dancing, boxing) to participate.
Purpose/Function	promote PA, simulate real environments, motivate exercise, health literacy	Aim to improve health and encourage physical activity through engaging, game-based experiences.
Gamification	game mechanics, feedback, points, goals, rewards, leaderboards, narratives	Often include motivational game elements to increase user engagement and support behavior change.

Synthesis Definition
Exergames are interactive digital or video games that require physical movement to play. They encourage gross motor activity (e.g., jumping, running, dancing), often using motion sensors or VR systems. Exergames aim to promote physical activity and simulate real-life environments, often incorporating gamified features such as points, rewards, and feedback to boost motivation and engagement.

Categories of Exergame Technologies

Exergames are implemented across a range of technological platforms, which can be grouped into five categories:

1. Console-Based Exergames

Most frequently reported and reliant on motion-sensing peripherals.

- **Examples**: Wii Fit, Dance Dance Revolution (DDR), Kinect Sports
- **Platforms**: Nintendo Wii, Xbox Kinect, Sony EyeToy

2. Mobile and Tablet-Based Exergames

Designed for smartphones and tablets, increasing accessibility.

- **Examples**: Zombies, Run!; Fit, Food, Fun (FFF)
- **Technologies**: Mobile apps, wearables, tablet-based games

3. Serious Games and Gamified Interventions

Developed for educational or health-related behavior change.

- **Examples**: Squire's Quest!, FoodRateMaster, Escape from Diab

4. VR/AR-Based Exergames

Rely on immersive technologies like VR headsets and motion controllers.

- **Examples**: BOX VR, Enhance VR, SteamVR
- **Platforms**: Oculus, HTC Vive, Meta Quest

5. Fitness Equipment + Game Integration

Combine traditional exercise equipment with interactive gameplay.

- **Examples**: Exerbike, GameBike, Treadwall

Summary:
Exergames span a wide array of formats, from console-based games to mobile apps, VR-based environments, and integrated fitness systems. They serve various functions, from general fitness to health education and are increasingly supported by accessible and immersive technology.

Also these games can be group in commercial-developed versus research-developed games. Commercial-developed games are publicly available, developed for entertainment, fitness, or general consumer use. Research-led exergames are custom-designed for education, behavior change, or research, often linked to health outcomes. Commercial exergames make up the large majority and are commonly based on Nintendo Wii, Xbox Kinect, or VR platforms.

Tabel 2. Commercial Exergames

Game / Platform	Notes
Wii Fit, Wii Sports, Wii Boxing, Wii Tennis, Wii Balance Board, Wii U games	Nintendo Wii / Wii U – widely used commercial AVGs
Just Dance, Just Dance for Kids, Just Dance 3	Xbox Kinect, Nintendo Wii
Dance Dance Revolution (DDR, DDR X, DDR MAX2)	PlayStation, Wii, platforms not always specified
Kinect Adventures, Kinect Sports (Season 1 & 2), Kinect Sports Boxing	Xbox Kinect
Zumba Fitness, Zumba Kids	Xbox Kinect, Wii
EyeToy games (Sports Active, EyePet, Sports Champions, Dance Factory)	PlayStation 2/3
EA Sports Active, Active Life: Extreme Challenge	Nintendo Wii
Gold's Gym Cardio Workout, NBA Baller Beats	Xbox Kinect, Wii
Sonic Free Riders, Virtua Tennis 4, Sega Rally, FIFA 09, Pro Evolution Soccer, Lego Batman	Xbox 360 with Gamercize
GameBike, Exerbike, Gamercize Power Stepper, Treadwall	Commercial exercise-bike or treadmill platforms
BKOOL Interactive Cycling Simulator	Tablet-based
Cooking Mama, Mario & Sonic at the Olympic Games	Nintendo Wii

BOX VR, Enhance VR, Maestro Game VR, Virtual Shop VR, VR Gait Training, Multitasking VR Motion Game	HTC Vive, Oculus, Valve Index – commercial VR titles
Zombies, Run!; Get Running; iDance; MobileKids Monster Manor	Mobile fitness and PA apps
Kinect Dance Central 2, Kinect Zumba Fitness, Nike Kinect Training	Xbox Kinect commercial fitness games
LeapTV games	Children's console, educational but commercial
Motion Sports, Wipeout, Your Shape Fitness Evolved, The Biggest Loser	Xbox 360, Kinect, Wii
River Rush, Reflex Ridge	Xbox 360 Kinect minigames
DDR Dance Mats, StepMania (used commercially in some contexts)	Varying platforms
EyeToy camera & dance mats (Play 3, Kinetic)	PlayStation 2/3
Sega Superstars Tennis, NSC50	Gamercize-integrated games
Hola Hoop, Jogging, Rhythm Kung-Fu	Wii U
Tennis / Punch Out / Tightrope / Heading	Wii U
Dance Revolution, Wii Yoga, Ski Jump, Table Tilt, Penguin Slide	Wii platform
Makoto Interactive Arena, Lightspace Play Floor, Cybex Trazer, Xavix Step System	Commercial or fitness tech tools; ambiguous use in studies

Tabel 3. Research-Developed Exergames

Game / Platform	Description
Squire's Quest! I & II	Multimedia nutrition games (computer-based)
Escape from Diab, Nano Swarm: Invasion from Inner Space	Obesity-prevention narrative games
FoodRateMaster, FIT Game, Foodbot Factory	Nutrition games (tablet/TV/PC-based)
Alien Health Game	SMALLab mixed-reality platform
Creature-101, Quest to Lava Mountain	MMO/online virtual worlds for behavior change
Kalédo	Lifestyle-focused board game
iFitQuest	Mobile iPhone health game
Kids Obesity Prevention (KOP)	Tablet + motion-controlled health education
Mole's Veggie Adventures	Educational mobile game

Spaceship Launch (Fitbit + web app)	School intervention using wearables
Gustavo in Gnam’s Planet	Computer game
Memory Match, Silverbalance, Panda Peek, River Gems, Under Pressure, Iger Games	Custom Dutch exergames
Modified StepMania, Unity3D exergames	Used in experimental studies
Balance It, Aging with Grace	Likely project-specific interventions
Kinesético	Explicitly research-developed or uncertain, not available commercially

5 How are exergames used in practice?

Although not explicitly tested for effectiveness across settings, the majority of reviews reported the settings in which exergames were applied. However, often reviews included a combination of settings (e.g., school and laboratory), which made it impossible to outline the effects along the setting.

Tabel 4. Exergames in different settings

Setting	Mentions
Home	15
School / PE classes	12
Laboratory	11
Community / Outdoor / Gyms	4
Health Centers / Clinics	3
Research Centers	1
Field (Combined Settings)	1
Not Reported	10

Note: In many reviews, the exact context of implementation was not described or evaluated for effectiveness.

6 What is the effect of exergames?

Table 1. Summary Table of Effects

Outcome	↑	↓	↕	Total	Summary
Physical Activity (PA)	16	1	4	21	Strong positive effects on PA reported in most studies.
Sedentary Behavior (SB)	1			1	Very limited evidence; one study suggested reduced sedentary time.
Motor / Balance	11		3	14	Strong benefits, especially on dynamic balance and mobility.
Body Composition	4	2	5	11	Mixed results; some reductions in BMI/adiposity, but inconsistent.
Psychosocial Outcomes	7		1	8	Generally positive; includes self-esteem, motivation, and socialization.

↑ *Positive effect,* ↓ *Negative effect,* ↕ *Mixed effect*

Key Observations

- **Strongest evidence**: Found for PA, motor skills, and psychosocial outcomes.
- **Mixed effects**: Noted for body composition, likely influenced by intervention duration and design.
- **Limited research**: On sedentary behavior, with only one review explicitly addressing this outcome.

Duration of Exergaming Interventions

- **Range**: Single sessions to long-term interventions (up to 12 months).
- **Typical Format**: 6–12 weeks, 2–3 times per week, 30–60 minutes per session.
- **Reported Gameplay Totals**: Varied from 240 to over 2,000 minutes.

Influence of Duration: It was not possible to match the duration to the effectiveness, as all individual reviews included studies with a large intervention duration range. One review found that interventions (≥8 weeks) tend to yield more consistent benefits in PA. The general impression is that shorter interventions can reveal changes in psychosocial outcomes and some health outcomes. However, outcomes such as body composition require a longer implementation. Included reviews were inconclusive with regard to intervention durations, session length, and frequency to reveal positive effects.

Physical Activity (PA)

Exergames generally had positive effects on increasing physical activity across a variety of age groups. About 16 studies reported improvements in PA, often in terms of increased moderate-to-vigorous physical activity (MVPA), heart rate (HR), VO2max, and step count. These effects were stronger when using full-body or lower-body movement-sensing systems and when interventions were of sufficient intensity and duration. However, 4 studies showed mixed results, often noting no differences between intervention and control groups after longer durations, while 1 study found no improvement in PA, measuring only attitudes and intention post-game.

Sedentary Behavior (SB)
Only one study addressed sedentary behavior, suggesting that exergames can contribute to a reduction in sedentary time. For example, substituting non-active games with active ones led to increased daily step counts and light activity, particularly during school breaks.

Motor Skills & Balance
This was one of the most positively affected domains, with 11 studies reporting improvements in balance, coordination, functional mobility, and motor skill acquisition, especially among older adults and youth. Notably, virtual reality (VR) exergames further enhanced mobility outcomes. Three studies reported mixed findings, indicating non-significant improvements in static balance or lower limb strength, suggesting that effects may depend on duration, intensity, and population.

Body Composition
Evidence on body composition was mixed. While 4 studies reported positive outcomes (e.g., reduction in BMI z-score, weight, adiposity), 5 studies found neutral or unclear effects, and 2 studies found no significant or negative outcomes, such as greater improvements in the control group or no changes in anthropometric measures. Some reviews noted that longer interventions tended to yield more favorable effects.

Psychosocial Outcomes
Seven studies reported positive psychosocial benefits, such as increased self-esteem, motivation, enjoyment, social engagement, and emotional well-being. VR and collaborative gameplay were particularly effective in enhancing intrinsic motivation and reducing negative affect. One study reported neutral findings, with improvements in self-regulation and engagement but no significant PA behavior change.

Tabel 5. Summary of Tested Health Outcome

Domain	Outcome Measures
PA	MVPA, HR, VO2max, METs, step count, activity duration, PA motivation
SB	Sedentary time, screen time, leisure-time sitting
Body Comp.	BMI, BMI z-score, body fat, weight, waist circumference, lean body mass
Motor/Balance	Static/dynamic balance, gait, mobility, FMS, Chair Stand, agility, strength
Psychosocial	Self-esteem, motivation, enjoyment, confidence, cognitive function, engagement
Other	Cybersickness, game appeal, bone density (BMD), implementation metrics

***Note**: Some outcomes were infrequently reported or lacked clear categorization.*

7 Which factors influence the effectiveness of exergames?

Several design and implementation factors appeared to influence the effectiveness of exergames, although most studies did not explicitly test or report these factors. Where tested, findings were mixed, and reporting was often incomplete.

Design Factors
Design features that were tested (n=9) and found to influence outcomes include:

- Multiplayer mode (led to higher energy expenditure)
- Game genre and movement type is mixed as some found and some did not find effects (e.g., boxing and full-body movement games were more effective)
- Game mode and console type is mixed as some found and some did not find effects (e.g., Kinect and VR-based games showed greater immersion and better outcomes)
- Use of visual feedback and motion sensors (enhanced motor and balance outcomes)
- Type of motion-sensing technology (e.g., handheld vs. body sensing)

Many potentially important design elements were mentioned but not tested (n=7), such as:

- Behavior change techniques (goal-setting, self-monitoring)
- Narrative elements (storylines, character-based design)
- Gamification features (progression levels, rewards, game currency)
- Game mode preferences (competition vs. cooperation)
- Real-time feedback, interface design, difficulty levels

However, in 14 out of 30 reviews, design factors were not reported at all.

Implementation Factors
A few implementation features were tested (n=3) and showed potential influence, such as:

- Supervised vs. unsupervised delivery (supervision often enhanced outcomes)
- Intervention duration (≥8 weeks more effective on PA)

Most implementation elements were only discussed conceptually but not tested (n=12), such as:

- Mode of delivery (e.g., teacher-led vs. autonomous)
- Parent involvement
- Access to infrastructure and equipment (e.g., VR headsets, balance boards)
- Integration into school curricula or community settings
- Technical support and onboarding

Critically, implementation factors were not reported in 15 out of 30 reviews.

Conclusion
While some factors have been experimentally tested and found to enhance exergame effectiveness, particularly regarding game type, mode, and intervention duration the majority of design and implementation factors remain underreported or untested. This gap highlights a clear need for more

rigorous evaluation and transparent reporting on how such factors influence the success of exergame interventions.

8 Which target groups can (or cannot) benefit from exergames?

This section summarizes the effects of exergames by target group, based on the five key outcome domains:

- PA = Physical Activity
- Body comp = Body Composition
- Psycho = Psychosocial Outcomes
- Motor/balance = Motor Skills & Balance
- SB = Sedentary Behavior

Tabel 6. Target groups of exergames

Target Group	Effect Summary
Children & Adolescents	- PA: 9 positive, 4 mixed, 1 negative - SB: 1 positive - Motor/Balance: 5 positive, 1 mixed - Psychosocial: 4 positive - Body Composition: 3 positive, 5 mixed, 1 negative
Adults	- PA: 3 positive - SB: 0 - Motor/balance: 0 - Psychosocial: 0 - Body composition: 1 positive
Older Adults	- PA: 1 positive - SB: 0 - Motor/Balance: 6 positive, 2 mixed - Psychosocial: 3 positive - Body Composition: 0
General Population	- PA: 3 positive - SB: 0 - Motor/balance: 0 - Psychosocial: 1 positive - Body Composition: 0

Children and Adolescents were the most frequently studied population across the reviews. The strongest evidence for this group was found in the domain of physical activity (PA), with nine reviews reporting positive effects. Nonetheless, some variability was observed, with four reviews reporting mixed findings and one reporting a negative effect on PA. Sedentary behavior (SB) was assessed in only one review, which found a positive effect in reducing sedentary time.
For motor skills and balance, five reviews reported positive outcomes, and one review noted mixed results. The evidence for body composition was more mixed, with three reviews showing positive changes (e.g., weight reduction or improved BMI), five reporting mixed effects, and one indicating a negative outcome. Psychosocial outcomes—such as motivation, enjoyment, and self-esteem—were consistently positive in four reviews.
Adults were less commonly examined. Nevertheless, all three reviews focusing on this group reported positive effects on physical activity. No reviews assessed sedentary behavior, motor/balance, or psychosocial outcomes in this population. One review reported a positive impact on body composition, suggesting some potential for exergames to contribute to weight-related health improvements in adult populations.
Older Adults primarily benefited in the domain of motor skills and balance, with six reviews reporting positive effects and two reporting mixed outcomes. No reviews examined sedentary behavior or body composition in this group. Three reviews indicated positive psychosocial outcomes, particularly improved confidence, enjoyment, and social engagement. In addition, one review reported a positive effect on physical activity, though this outcome was less commonly assessed for older adults.

General Population reviews, those spanning broad age ranges consistently reported positive effects on physical activity across different subgroups. No reviews in this category addressed sedentary behavior, motor/balance, or body composition. One review reported a positive psychosocial effect, particularly related to increased enjoyment and motivation during gameplay.

9 What advantages do exergames offer compared to traditional sports and physical activity?

Across multiple reviews, exergames were frequently reported, though not always empirically tested, as offering several advantages over traditional forms of physical activity. These advantages are often described in discussion sections and author reflections, rather than rigorously assessed in studies.

Increased Motivation & Engagement: Multiple sources highlight that exergames can boost motivation and enjoyment, especially for populations less inclined to engage in conventional exercise, such as children and older adults.

Accessibility & Convenience: Exergames are often praised for being usable at home, making them accessible to individuals who may face barriers to traditional exercise (e.g., weather, transportation, or cost).

Adherence & Acceptability: Reviews frequently note high adherence rates and greater acceptance of exergames, suggesting they are a more appealing alternative, particularly when delivered in familiar settings.

Social & Cooperative Play: Some reviews mention that exergames encourage cooperative gameplay and can be enjoyed in family or school environments, enhancing social engagement.

Versatility Across Settings: When implemented with whole-body movement and for durations of at least 8 weeks, exergames were reported as effective across home, school, and more controlled contexts (e.g. health centre, lab-based setting).

Complement or Substitute Traditional Exercise: Exergames may be used as a complement to, or even substitute for, traditional physical activity—particularly when tailored to user needs and contexts.

Note: While these advantages are promising and frequently discussed, they are largely based on narrative or author opinion rather than consistent empirical testing. This highlights the need for more robust evidence examining how these advantages translate to sustained health outcomes in real-world implementation.

10 What are the limitations or disadvantages of exergames?

While exergames offer promising benefits, several limitations were identified across the reviews—though often inconsistently reported and rarely tested in detail. Below is a synthesis of the most commonly cited disadvantages:

Lower Exercise Intensity and Uncertain Efficacy: Many exergames do not consistently reach moderate to vigorous intensity levels, especially compared to traditional physical activity or sports. Some studies reported no improvement in physical activity levels or even better results in control conditions. While short-term engagement and improvements are noted, sustainability and long-term impact are unclear.

Dropout, Boredom, and Engagement Challenges: High dropout rates were mentioned in studies without consistent supervision or novelty. Boredom and loss of interest over time were frequently reported, especially with repeated sessions or limited variation. Exergames require frequent updates and engaging content to maintain user interest, particularly among youth.

Methodological and Design Issues: Several reviews pointed to poor study quality, short duration, and low-intensity sessions as key limitations. Lack of personalization, instruction, and adaptation of commercial games for therapeutic or exercise purposes. Technical issues included complex setups, equipment costs, and infrastructure requirements, which can limit accessibility.

Implementation and Equity Barriers: Access to technology (e.g., VR headsets, gaming consoles) can be a barrier, particularly in low-resource settings or schools with limited funding. Challenges include curriculum time pressure, lack of supervision, and inconsistent integration into structured physical activity programs. Some populations—such as individuals with cognitive impairments or mobility limitations—were underrepresented, raising concerns about inclusivity.

Health and Safety Concerns: While no severe adverse events were reported, cybersickness, improper use, and potential for overexertion or injuries were flagged. Some interventions lacked safety monitoring or expert feedback mechanisms, which are critical when implementing in vulnerable populations.

Note: While these disadvantages are promising and frequently discussed, they are largely based on narrative or author opinion rather than consistent empirical testing. This highlights the need for more robust evidence examining how these disadvantages translate to sustained health outcomes in real-world implementation.

11 Final remarks

While this report provides a comprehensive synthesis of the current evidence on exergames and gamified interventions, a few initially proposed elements were not completed. Specifically, the planned backward and forward citation tracking to identify additional relevant studies was not carried out due to time constraints. Additionally, the use of Elicit was omitted due to associated costs and time limitations. However, this review included relevant reviews of the last 10 years (starting 2015), instead of originally promised of the last 5 years (starting 2020). The use of AI tools throughout the process presented both advantages and challenges, often resulting in more work than initially anticipated. This report, together with the extraction file provides the basis for answering all research questions in detail and drafting the factsheet, including question 1 and 2. As agreed, question 8 (where to find more information) is not answered in this report. As outlined in the umbrella scoping review protocol, this report was developed with the support of AI tools to enhance efficiency and consistency in the review process. In particular, drafting and refining of this report were conducted in collaboration with ChatGPT.

12 Appendices

1. Review protocol (https://doi.org/10.17605/OSF.IO/57YQW)
2. Extraction table (excel)
3. ChatGPT prompts for writing the report (accessible via https://chatgpt.com/share/68624291-857c-8003-9a9a-c1d9272d693c)

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