

What is the best estimate of how quickly adults who currently have low levels of physical activity can expect to see an improvement in life satisfaction if they increase their level of physical activity?

Adults with low physical activity can expect to see modest but significant improvements in life satisfaction within 4 weeks when exercising 2-3 times per week.

Abstract

Adults with low physical activity may experience measurable improvements in life satisfaction within 4 weeks of increasing exercise. One study of adults aged 18–64 reported that participation in fitness club classes (at least 2–3 times per week for 30 minutes) led to a rise in the Satisfaction With Life Scale from 4.80 to 5.12, yielding a modest but significant effect (Cohen's $d = 0.38$, $p = 0.036$) over 4 weeks. Similar benefits were observed in self-selected samples undertaking twice-weekly strength exercises. In sedentary postmenopausal women, a 6-month regimen of cycle or treadmill exercise produced statistically significant improvements across several Short Form-36 health domains ($p < 0.0001$ to 0.04), and another investigation in older adults noted changes by 1 year. Factors such as baseline activity, exercise dose, and self-efficacy were reported to influence the speed and magnitude of these improvements.

Paper search

Using your research question "What is the best estimate of how quickly adults who currently have low levels of physical activity can expect to see an improvement in life satisfaction if they increase their level of physical activity?", we searched across over 126 million academic papers from the Semantic Scholar corpus. We retrieved the 50 papers most relevant to the query.

Screening

We screened in sources that met these criteria:

- **Population Age:** Does the study include only adult participants (aged 18 or older)?
- **Baseline Activity:** Do study participants have baseline low physical activity levels (less than 150 minutes of moderate activity per week)?
- **Intervention Type:** Does the study examine an intervention involving increased physical activity with measured baseline activity levels?
- **Outcome Measurement:** Does the study measure life satisfaction using validated assessment tools?
- **Study Duration:** Does the study have a minimum follow-up period of 4 weeks or longer?
- **Study Design:** Is the study either a randomized controlled trial or a prospective cohort study?
- **Intervention Isolation:** Can the effects of physical activity be isolated from other interventions in the study?
- **Population Specificity:** Does the study focus on the general population rather than exclusively on specific clinical populations or elite athletes?

We considered all screening questions together and made a holistic judgement about whether to screen in each paper.

Data extraction

We asked a large language model to extract each data column below from each paper. We gave the model the extraction instructions shown below for each column.

- **Study Design:**

Identify the type of study design used. Specify whether it is:

- Randomized controlled trial
- Observational study
- Longitudinal study
- Intervention study

Look in the methods section for explicit description of the study design. If multiple design elements are present, list all relevant characteristics. If the design is not clearly stated, note "Design not clearly specified".

- **Participant Characteristics:**

Extract the following details about participants:

- Total sample size
- Age range or mean age
- Gender distribution (percentage or number of males/females)
- Physical activity level at baseline (if reported)
- Inclusion/exclusion criteria

Locate this information in the methods or participants section. If any details are missing, note "Not reported". Use exact numbers or percentages when possible. If a range is given, record both the minimum and maximum values.

- **Physical Activity Intervention Details:**

Describe the physical activity intervention:

- Type of physical activity
- Frequency (times per week)
- Duration of each session
- Total intervention period
- Intensity (if specified)

Extract precise details from the methods section. If multiple intervention groups exist, extract details for each group separately. Use specific units (e.g., minutes, hours) and quantitative descriptions. If any details are unclear or missing, note "Not fully specified".

- **Life Satisfaction Measurement:**

Identify:

- Specific tool/instrument used to measure life satisfaction
- Timing of measurements (baseline, follow-up points)
- How life satisfaction was quantified (scale, scoring method)

Look in methods and results sections for measurement details. If multiple measurement points exist, list all. Record the exact name of the measurement tool and any scoring interpretations. If measurement method is not clearly described, note "Measurement method not clearly specified".

- **Time to Life Satisfaction Improvement:**

Extract:

- Earliest time point showing statistically significant improvement in life satisfaction
- Magnitude of improvement (if quantified)
- Statistical significance of the change

Carefully review results section, focusing on statistical analyses related to life satisfaction changes over time. If multiple time points show improvement, list all. Use exact p-values and effect sizes if reported. If no clear improvement is found, note "No significant improvement observed".

- **Follow-up Duration:**

Record:

- Total study follow-up period
- Number and timing of follow-up assessments

Locate follow-up information in methods or results sections. Specify exact duration in months or years. If follow-up periods vary between participant groups, note all variations. If follow-up is not clearly reported, note "Follow-up duration not specified".

Results

Characteristics of Included Studies

Study	Study Design	Population Characteristics	Intervention Duration	Measurement Tools	Full text retrieved
McAuley et al., 2000	Randomized controlled trial; Longitudinal; Intervention	Sample size: 174; Mean age 65.5; Formerly sedentary older adults; Gender not reported	12 months	No mention found	No
Iwon et al., 2021	Longitudinal; Intervention; Observational	Sample size: 217; Age 18–64 (mean 29.6); 57.1% women; Active, beginner, and inactive groups	4 weeks	Satisfaction With Life Scale (SWLS)	Yes

Study	Study Design	Population Characteristics	Intervention Duration	Measurement Tools	Full text retrieved
Elavsky et al., 2005	Randomized controlled trial; Longitudinal	Sample size: 174; Mean age 66.7; Gender not reported	6 months intervention, 4-year follow-up	No mention found	No
Wicker et al., 2014	Intervention; Longitudinal; Observational	Sample size: 10,386; Mean age 46.4; 69.9% female; Self-selected adults	4 weeks	No mention found	No
Arslan et al., 2019	Observational (design not clearly specified)	Sample size: 109; Office workers; Age/gender not reported; Group I: regular activity 8 weeks, Group II: none	8 weeks	World Health Organization Quality of Life-BREF (WHOQOL-BREF)	No
Martin et al., 2009	Randomized controlled trial; Intervention; Longitudinal	Sample size: 430; Age 45–75; All female; Sedentary, over-weight/obese, post-menopausal	6 months	Short Form-36 Health Survey (SF-36)	Yes

Study design:

- Three studies were randomized controlled trials.
- Five studies were longitudinal.
- Four studies were described as interventions.
- Three studies were observational.
- We didn't find mention of any study that was only cross-sectional among the included studies.

Population characteristics:

- Two studies included older adults (mean age 65).
- Three studies included adults (mean age 18–64).
- One study included office workers.
- Two studies included sedentary populations.
- One study included active, beginner, and inactive groups.
- One study included self-selected adults.

- One study included overweight/obese, postmenopausal women.
- One study included only women; two studies reported the percentage of women (57.1%, 69.9%); we didn't find gender information for three studies.
- We didn't find age information for one study.

Intervention duration:

- Two studies had a 4-week intervention.
- Two studies had a 6-month intervention.
- One study had a 12-month intervention.
- One study had an intervention of at least 8 weeks.
- One study included a 4-year follow-up.

Measurement tools:

- Measurement tools were specified in three studies: Satisfaction With Life Scale (SWLS) in one study, World Health Organization Quality of Life-BREF (WHOQOL-BREF) in one study, and Short Form-36 Health Survey (SF-36) in one study.
 - We didn't find mention of the measurement tool in three studies.
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Effects of Physical Activity on Life Satisfaction

Short-Term Effects (4 weeks)

Study	Intervention Type	Initial Effect Size	Time to First Improvement	Population Type
McAuley et al., 2000	Aerobic vs. stretching/toning; details not fully specified	No mention found	No mention found	Older, formerly sedentary adults
Iwon et al., 2021	Fitness club/gym classes, at least 2–3 times per week, at least 30 minutes	Mean SWLS: 4.80→5.12 (Cohen's d = 0.38, p = 0.036)	4 weeks	Adults 18–64, beginners
Elavsky et al., 2005	No mention found	No mention found	No mention found	Older adults
Wicker et al., 2014	Six strength exercises, twice per week, 30 minutes	No quantified effect; improvement reported	4 weeks	Self-selected adults, mean age 46.4
Arslan et al., 2019	No mention found, at least 8 weeks	No mention found	No mention found	Office workers
Martin et al., 2009	Cycle/treadmill, 3–4 times per week, 6 months	Not applicable (no 4-week data)	Not applicable	Sedentary postmenopausal women

Intervention type:

- Aerobic interventions were reported in two studies (McAuley et al., 2000; Martin et al., 2009), but Martin et al., 2009 did not report short-term (4-week) effects.
- One study reported a strength-based intervention (Wicker et al., 2014).
- One study reported a fitness club/gym class intervention (Iwon et al., 2021).
- Two studies did not mention the intervention type (Elavsky et al., 2005; Arslan et al., 2019).

Initial effect size:

- One study reported a modest, statistically significant effect size (Iwon et al., 2021; Cohen's $d = 0.38$, $p = 0.036$).
- One study reported an improvement but did not quantify the effect (Wicker et al., 2014).
- We didn't find mention of effect size in the available abstracts or full texts of three studies (McAuley et al., 2000; Elavsky et al., 2005; Arslan et al., 2019).
- Effect size was not applicable for Martin et al., 2009 in the short-term period.

Time to first improvement:

- Two studies reported improvement at 4 weeks (Iwon et al., 2021; Wicker et al., 2014).
 - We didn't find mention of time to first improvement in three studies (McAuley et al., 2000; Elavsky et al., 2005; Arslan et al., 2019).
 - Not applicable for Martin et al., 2009.
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Medium-Term Effects (>4 weeks to 6 months)

Study	Intervention Type	Effect Size	Time to First Improvement	Population Type
McAuley et al., 2000	Aerobic vs. stretching/toning	No mention found	No mention found	Older, formerly sedentary adults
Iwon et al., 2021	Fitness club/gym classes	No mention found	No mention found	Adults 18–64
Elavsky et al., 2005	No mention found	No mention found	1 year	Older adults
Wicker et al., 2014	Six strength exercises	No mention found	No mention found	Self-selected adults
Arslan et al., 2019	No mention found, at least 8 weeks	No mention found	No mention found	Office workers

Study	Intervention Type	Effect Size	Time to First Improvement	Population Type
Martin et al., 2009	Cycle/treadmill, 3–4 times per week, 6 months	Short Form-36 Health Survey (SF-36): Physical Functioning +5.7, Role Physical +10.4, General Health +6.2, Mental Health +3.6, etc. ($p < 0.0001\text{--}0.04$)	6 months	Sedentary postmenopausal women

Intervention types:

- One study used aerobic versus stretching/toning (McAuley et al., 2000).
- One study used fitness club/gym classes (Iwon et al., 2021).
- One study used strength exercises (Wicker et al., 2014).
- Two studies did not mention the intervention type (Elavsky et al., 2005; Arslan et al., 2019).
- One study used cycle/treadmill exercise (Martin et al., 2009).

Effect size:

- One study reported quantitative effect sizes (Martin et al., 2009; SF-36 subscales improved with p-values ranging from <0.0001 to 0.04).
- We didn't find mention of effect size in the available abstracts or full texts of the other five studies.

Time to first improvement:

- Two studies reported time to first improvement: one at 1 year (Elavsky et al., 2005), one at 6 months (Martin et al., 2009).
- We didn't find mention of time to first improvement in the other four studies.

Populations studied:

- Older adults in two studies.
- Adults (18–64 or self-selected) in two studies.
- Office workers in one study.
- Sedentary postmenopausal women in one study.

Factors Influencing Speed of Improvement

Study	Mediating Factor	Direction of Influence	Evidence Strength	Time Impact
McAuley et al., 2000	Social relations, exercise frequency	Positive (buffers decline, increases satisfaction)	Moderate (randomized controlled trial, but only abstract available)	No mention found
Iwon et al., 2021	Baseline activity, engagement	Positive (beginners improve most)	Moderate (longitudinal, attrition)	4 weeks
Elavsky et al., 2005	Self-efficacy, positive affect	Positive (mediate quality of life improvement)	Moderate (randomized controlled trial, but only abstract available)	1 year
Wicker et al., 2014	Motivation, performance	Positive (controlled in regression)	Weak (observational, self-selected)	4 weeks
Arslan et al., 2019	No mention found	No mention found	Weak (observational, only abstract available)	No mention found
Martin et al., 2009	Exercise dose	Positive (dose-response)	Strong (randomized controlled trial, clear reporting)	6 months

Mediating factors:

- Behavioral factors (exercise frequency, engagement, dose) were identified in four studies.
- Psychological factors (self-efficacy, positive affect, motivation) were identified in two studies.
- Social/interpersonal factors (social relations) were identified in one study.
- We didn't find mention of a mediating factor in one study.

Direction of influence:

- Five studies reported a positive direction of influence for the mediating factor(s).
- We didn't find mention of direction of influence in one study.

Evidence strength:

- One study provided strong evidence (randomized controlled trial with clear reporting).
- Three studies provided moderate evidence (randomized controlled trial or longitudinal, but with limitations such as only abstract available or attrition).
- Two studies provided weak evidence (observational or only abstract available).

Synthesis and Limitations

Key findings:

- Iwon et al. (2021) and Wicker et al. (2014) reported improvements in life satisfaction as early as 4 weeks after increased physical activity in adults with low baseline activity. The improvement reported by Iwon et al. (2021) was modest but statistically significant (Cohen's $d = 0.38$, $p = 0.036$). Both studies have methodological limitations, including attrition and self-selected samples.
- Martin et al. (2009) reported further improvements in life satisfaction and related quality of life domains with longer interventions (6 months or more), with a dose-dependent pattern. This study provided the strongest evidence among those reviewed, with clear reporting and a randomized controlled trial design.
- Psychological and social factors, such as self-efficacy, motivation, and social relations, may mediate the speed and magnitude of improvement, but the evidence is limited by incomplete reporting and reliance on abstracts for several studies.

Limitations affecting generalizability:

- Incomplete reporting of intervention and measurement details in many studies.
- Reliance on self-selected or specific populations (such as postmenopausal women or office workers).
- Lack of mention of adverse effects in the available abstracts or full texts.
- Only a subset of studies provided clear, quantitative estimates of timing and effect size.
- The overall quality of evidence is moderate, with the strongest support for rapid improvement coming from studies with some methodological limitations.

Summary:

- The best available evidence from the included studies indicates that improvements in life satisfaction can be reported within 4 weeks of increased physical activity in adults with low baseline activity, but the magnitude and durability of these effects, as well as their generalizability to all adult populations, remain uncertain due to limitations in study design, reporting, and sample selection.

: No mention found in abstract. : Satisfaction With Life Scale (SWLS) used. : World Health Organization Quality of Life-BREF (WHOQOL-BREF) used. : Short Form-36 Health Survey (SF-36) used.

References

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