The Impact of AI-Assisted Coaching on Fitness Plan Adherence: A Comparative Study

Introduction

The integration of artificial intelligence (AI) into fitness coaching presents a novel opportunity to enhance engagement and adherence in structured exercise programs. While human coaching has long been the standard in guiding individuals through fitness regimens, AI-driven enhancements promise to personalize, adapt, and optimize coaching interventions. However, the effectiveness of AI-assisted coaching remains an open question, particularly in relation to its influence on adherence over critical dropout periods. This study investigates whether individuals working with a fitness trainer who integrates AI-assisted tools demonstrate higher adherence to a 3-month fitness plan compared to those working with a trainer alone.

Literature Review

Adherence to structured fitness programs has been a persistent challenge, with dropout rates reaching as high as 50% within the first three to six months of participation (Dishman, 1982). Traditional coaching methods rely on human engagement and motivation, yet even with direct supervision, many individuals struggle to maintain consistent exercise habits. The introduction of AI into coaching frameworks offers a potential solution by enabling personalized, adaptive interventions that dynamically respond to user behavior and progress.

AI's capacity to enhance agility and responsiveness has been well-documented in organizational settings (Wamba, 2022), suggesting that similar benefits could be applied to fitness coaching. Through real-time tracking and data-driven personalization, AI has the potential to sustain engagement by continuously modifying workout plans based on individual needs. However, its effectiveness in behavioral adherence depends significantly on user perception and trust. Research on AI adoption in healthcare contexts highlights trust as a crucial determinant of sustained engagement, where users may disengage if they perceive AI as impersonal or intrusive (Rana et al., 2024).

Beyond trust, motivation plays a critical role in adherence. Ryan's (2000) Self-Determination Theory posits that intrinsic motivation—stemming from autonomy, competence, and relatedness—is key to sustaining long-term behavioral change. If AI-assisted coaching successfully fosters personalization that aligns with an individual's intrinsic motivations, it could reinforce adherence. Conversely, if AI overemphasizes external rewards (such as gamification and progress tracking), it risks undermining intrinsic motivation, leading to disengagement over time (Reddy Danda, 2024).

Taken together, these insights suggest that AI's role in coaching is not inherently beneficial or detrimental but contingent on its ability to enhance engagement while preserving user trust and motivation. This study aims to investigate whether AI-assisted coaching can effectively increase adherence by addressing these factors or whether it introduces new barriers to sustained participation.

**Research Question and Hypotheses**

Research Question

Does AI-assisted coaching improve adherence to a 3-month fitness plan compared to human coaching alone?

Hypotheses

- **H1:** Individuals working with a fitness trainer who partners with AI will demonstrate higher adherence to their fitness plan over a 3-month period compared to those working with a trainer alone.

- **H0 (Null Hypothesis):** There will be no significant difference in adherence rates between individuals working with a trainer alone and those working with a trainer partnered with AI.

- **H2:** Individuals working with a fitness trainer who partners with AI will demonstrate lower adherence to their fitness plan over a 3-month period if AI interventions reduce trust, replace human connection, or over-rely on external motivators.

Conceptual Model

Simplified Conceptual Model: AI-Assisted Coaching & Fitness Adherence

Coaching Type (IV)

Trainer Alone

Trust in AI (Moderator)

Trainer + AI

AI Mechanisms
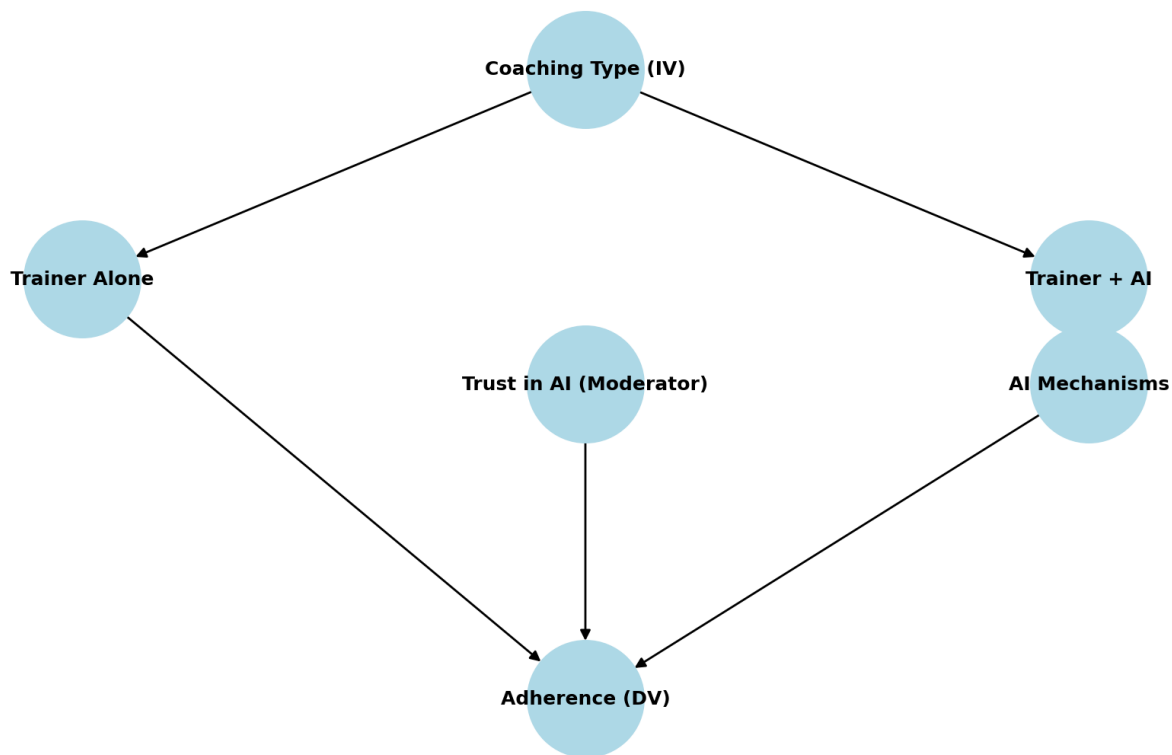
Adherence (DV)

The study conceptualizes adherence as influenced by coaching type (Trainer Alone vs. Trainer + AI). AI mechanisms—including personalization, adaptation, gamification, and engagement detection—are hypothesized to impact adherence, with trust in AI acting as a moderating variable. If trust is high, AI may enhance motivation and adherence; if trust is low, AI may undermine engagement and lead to early dropout.

Methodology

A comparative study design will be employed, tracking adherence metrics across two groups: those working solely with a trainer and those receiving AI-assisted coaching. Key adherence measures include session attendance, goal completion rates, and program retention over the 3-month period. Trust in AI will also be assessed through participant surveys.

Conclusion and Future Research Directions

This study will contribute to the ongoing discussion on AI's role in fitness coaching by providing empirical insights into its impact on adherence. By integrating AI as a behavioral management tool, this research aims to inform future applications of AI in coaching while acknowledging potential risks related to trust and motivation.

Future research should consider several open questions. What, for example, would the impact of AI-assisted coaching be beyond 3 months? Would trust in AI increase over time as users become accustomed to its interventions, or might concerns about privacy and automation reduce engagement? How do different AI coaching features influence specific user demographics, and could AI-driven personalization be tailored to sustain motivation across varied populations? Additionally, ethical considerations in AI-assisted behavioral interventions warrant deeper exploration. As AI continues to evolve, addressing these questions will be crucial in determining its long-term viability in fitness coaching and beyond.

References

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