

The “Game of Being” Framework: A Mechanism- and Theory-Informed Approach to Therapeutic Gamification

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ABSTRACT

This narrative review reframes therapeutic gamification and serious games from engagement optimization to a mechanism- and theory-informed intervention paradigm. It synthesizes evidence from reward-based learning neuroscience, behavior-change frameworks, wellbeing–health links, clinical trials in mental/behavioral health, and philosophy of play, prioritizing systematic reviews, meta-analyses, randomized controlled trials, and canonical models. Impact is most likely when mechanics are mapped to self-determination theory and COM-B/Behaviour Change Wheel, implemented via behavior change techniques, and assessed with wellbeing measures alongside clinical/behavioral endpoints. Reported effects are small-to-moderate, with stronger benefits in theory-aligned designs and structured serious-game therapeutics (e.g., adolescent depression; pediatric ADHD). The “Game of Being” framework positions gamification as a layered vehicle for neurobehavioral learning, capability expansion, and meaning-making, advocating ethical-by-design transparency and hypothesis-driven trials.

INTRODUCTION

Digital technologies have made game-like interfaces ubiquitous, from education to health services. Within this landscape, "gamification" is commonly defined as the use of game design elements in non-game contexts and is often contrasted with serious games, which are full-fledged games designed for purposes beyond entertainment. Across these settings, engagement is typically a means rather than an end: the central question is whether gameful systems can reliably support learning, behavior change, and therapeutic outcomes.

However, therapeutic gamification research remains fragmented, with limited mechanism-testing and scarce controlled comparisons of gamified versus non-gamified isomorphic interventions, thereby constraining causal inference, replicability, and translation to durable clinical and wellbeing outcomes.

In this manuscript, we propose "The Game of Being" as a synthesizing concept. This approach treats game mechanics as a scaffold for neurobehavioral learning and wellbeing, while using philosophical reflection as a safeguard against reducing human growth to points and leaderboards. The aim is not to "gamify life" as a productivity contest but to design experiences that cultivate autonomy, competence, relatedness, and meaning.

THEORETICAL REVIEW

Reward-Based Learning: Reward Prediction Error and Incentive Salience

Reinforcement-learning accounts posit that dopaminergic reward prediction error (RPE)—the discrepancy between expected and obtained outcomes—updates value estimates and action policies, thereby shaping learning from feedback. In parallel, incentive salience distinguishes motivational "wanting" from hedonic "liking," explaining how well-calibrated uncertainty, immediate feedback, and progress cues can energize persistence and repeated practice. In therapeutic contexts, these mechanisms imply that gameful feedback loops can function as neurocomputational scaffolds for skill rehearsal and practice-dependent plasticity, provided that challenge is tuned to competence to avoid stress-related disengagement.

Prior evidence indicates small-to-moderate average effects of serious games/gamification on learning and health outcomes, with substantial heterogeneity; effects appear stronger in structured, protocol-embedded serious games than in superficial reward architectures.

H1: Interventions with higher fidelity to RPE-consistent design (timely feedback, calibrated uncertainty, and mastery-contingent progression) will predict greater sustained engagement and skill consolidation than isomorphic non-gamified comparators.

Self-Determination Theory

Self-determination theory (SDT) argues that durable, high-quality motivation is most likely when environments satisfy autonomy, competence, and relatedness. Accordingly, gamified elements (e.g., points, badges, leaderboards) should be subordinated to autonomy-supportive choice architectures, competence feedback that signals mastery rather than surveillance, and social features that cultivate belonging rather than coercive competition. SDT further

predicts that overreliance on extrinsic contingencies may crowd out intrinsic motivation and produce short-lived engagement without durable change.

In mental health, protocol-embedded serious games (e.g., CBT-based implementations) have demonstrated clinically meaningful effects, whereas non-specific gamification shows mixed results across wellbeing applications.

H2: Satisfaction of SDT needs (autonomy, competence, relatedness) will mediate the association between game mechanics and downstream behavioral/clinical outcomes.

COM-B, Behaviour Change Wheel, and the Behavior Change Technique Taxonomy

The COM-B model and Behaviour Change Wheel (BCW) provide a diagnostic-to-design pipeline in which target behaviors are decomposed into capability, opportunity, and motivation constraints, which then guide selection of intervention functions (e.g., training, enablement, environmental restructuring). The Behavior Change Technique Taxonomy (BCTTv1) operationalizes these functions into testable “active ingredients” (e.g., goal setting, self-monitoring, prompts/cues, feedback on behavior, social support). Mapping game mechanics onto COM-B/BCW and explicit BCTs enables a falsifiable account of how “fun” is translated into durable behavioral change and facilitates isomorphic contrasts that isolate the incremental contribution of game elements.

Systematic reviews of gamification for health and wellbeing report mixed-to-positive effects and emphasize methodological limitations, especially the scarcity of controlled comparisons against non-gamified versions of identical content.

H3: Mechanic-to-construct alignment (explicit COM-B diagnosis plus BCT-specified implementation) will moderate effectiveness, such that theory-aligned designs yield larger and more durable improvements in target behaviors than poorly specified designs.

Broaden-and-Build Theory of Positive Emotions and Wellbeing-Health Links

Broaden-and-build theory proposes that positive affect broadens attentional scope and cognitive flexibility and, over time, accumulates durable psychological resources that support coping and resilience. Complementarily, epidemiological and experimental literatures link higher subjective wellbeing to improved health trajectories via behavioral, neuroendocrine, and immunological pathways. Consequently, therapeutic gamification should treat wellbeing as both an outcome and a plausible mediator, measured with validated instruments (e.g., WEMWBS, WHO-5) alongside clinical and behavioral endpoints.

H4: Improvements in validated wellbeing measures will partially mediate the effect of theory-aligned gamified interventions on clinical symptom reduction and/or health behavior maintenance.

Conceptual Framework

Figure 1 synthesizes the proposed “Game of Being” logic model. Game mechanics are specified as an implementation layer that (i) engages neurocomputational learning signals (Layer 1), (ii) instantiates theory-specified

behavior change processes via SDT and COM-B/BCW with BCT-level “active ingredients” (Layer 2), and (iii) targets wellbeing and meaning-making as mediators and endpoints (Layer 3), all constrained by ethical-by-design governance (Layer 4). Engagement is treated as a proximal mediator rather than a primary endpoint, and distal outcomes include behavior, clinical symptoms, and wellbeing.



Figure 1. Conceptual Framework

METHODOLOGY

This article constitutes a narrative, theory-driven review. We conducted targeted searches of peer-reviewed literature and authoritative volumes using key terms related to gamification, serious games, digital therapeutics, reward prediction error, dopamine, neuroplasticity, self-determination theory, the COM-B model and Behaviour Change Wheel, behavior change techniques, wellbeing, psychoneuroimmunology, the philosophy of play, and experiential learning. We prioritized evidence from systematic reviews, meta-analyses, randomized controlled trials, and widely cited theoretical frameworks. The objective was integrative synthesis rather than exhaustive enumeration; consequently, this work does not adhere to a formal PRISMA protocol.

RESULTS

Neuroscience: How Gameful Systems Tune Attention, Motivation, and Learning

At the neurocomputational level, gamification can be interpreted through the lens of reward prediction error (RPE)—the difference between expected and received outcomes that drives reinforcement learning. Dopaminergic signals encode RPE and support learning by updating value estimates and action policies. This mechanism makes immediate feedback, calibrated uncertainty, and meaningful progress cues potent design levers. Critically, dopamine’s role extends beyond hedonic “liking” to include incentive saliency—the motivational “wanting” that energizes pursuit and persistence in the face of difficulty. This property aligns closely with the principle of iterative rehearsal in therapeutic and educational contexts. When challenges are calibrated to an individual’s current ability, repeated attempts can recruit neuroplastic mechanisms, consolidating

skills through practice-dependent changes in synaptic strength. Affective context is equally consequential. Positive emotions can broaden attentional scope and enhance cognitive flexibility, thereby facilitating exploration, creativity, and resilient coping. This effect may partially explain why well-designed playful contexts can "unlock" learning in situations where anxiety, fatigue, or perceived incompetence would otherwise narrow attention and increase avoidance.

Behavior Change: Converting "Fun" into Durable Change

The therapeutic value of gamification depends on whether its mechanics instantiate evidence-based change processes. Self-determination theory (SDT) posits that supporting autonomy, competence, and relatedness fosters higher-quality motivation. This principle implies that points and badges should be subordinate to facilitating meaningful choice, skill mastery, and social connection. The COM-B model and Behaviour Change Wheel (BCW) provide a pragmatic design framework. Their workflow involves defining the target behavior, diagnosing barriers in capability, opportunity, and motivation, and then selecting appropriate intervention functions—such as education, training, environmental restructuring, enablement, and persuasion. At the component level, the Behavior Change Technique Taxonomy (BCTTv1) operationalizes these functions into "active ingredients," including goal setting, self-monitoring, prompts/cues, feedback on behavior, and social support. These techniques can be mapped onto a game system's features to audit whether engagement mechanics are genuinely linked to theorized change mechanisms. Classic psychological constructs remain highly relevant. For instance, self-efficacy is a known determinant of behavioral initiation and persistence. Furthermore, the process of habit formation—whereby repeated actions in stable contexts become automated—reduces the cognitive load of self-control. Gamification can support this process through consistent contextual cues, small rewards, and the progressive shaping of routines.

Wellbeing and Health: When "Feeling Better" Matters Biologically

A growing body of literature correlates subjective wellbeing with objective health outcomes across the lifespan. Systematic reviews indicate that higher positive wellbeing is associated with reduced mortality risk and improved long-term health trajectories. However, the causal pathways involved are complex and context-dependent, encompassing behavioral, neuroendocrine, and immunological mediators. Experimental research supports the plausibility of these psychobiological pathways. For instance, studies using controlled exposure paradigms have shown that a positive emotional style can predict greater resistance to viral illness. To ensure evaluative rigor, especially for interventions that explicitly aim to "heal through happiness," wellbeing should be measured using validated instruments such as the WEMWBS or WHO-5.

Evidence Base: Gamification and Serious Games as Therapeutic or Quasi-Therapeutic Interventions

In professional education and training, meta-analyses indicate that serious games and gamification can improve knowledge and skills more effectively than conventional instruction, albeit with typically small-to-moderate and heterogeneous effect sizes. The magnitude of these effects often depends on factors such as feedback clarity, alignment with learning objectives, and implementation context. Within health and wellbeing applications, systematic reviews reveal a pattern of mixed-to-positive findings. This literature is characterized by significant methodological variability, underscoring a need for more rigorous, controlled comparisons between gamified and non-gamified versions of the same core intervention. Such comparisons are crucial to avoid over-attributing outcomes to game elements rather than to underlying content, dosage, or support structures. The evidence is most compelling for mental health when game-based systems directly embed established therapeutic protocols. For example, a prominent randomized controlled trial demonstrated that SPARX—a computerized serious game based on cognitive behavioral therapy (CBT)—was non-inferior to treatment-as-usual for adolescents with depression. Meta-analyses corroborate that serious games can, on average, alleviate depressive symptoms, though effects vary considerably across populations and specific designs. In pediatric neurodevelopmental disorders, targeted digital therapeutics show promise. A randomized controlled trial of STARS-ADHD, a digital intervention designed to improve attention in children with ADHD, reported clinically meaningful reductions in parent-rated symptom severity. This illustrates the potential for translating evidence-based cognitive training principles into engaging, game-like formats. Finally, usability-focused development work points to a feasible pathway for integration. Projects such as BlueLine, a gamified mobile system embedding CBT-based micro-interventions for youth anxiety, demonstrate the importance of feasibility, adherence, and acceptability as proximal indicators. This iterative approach provides a foundation for future trials to test specific, mechanism-targeted hypotheses. Across meta-analyses and randomized trials, the small-to-moderate average benefits and substantial heterogeneity are more parsimoniously attributable to variation in mechanistic fidelity and implementation dose than to the mere presence of 'game elements.' Interventions that embed validated therapeutic protocols and explicitly operationalize SDT/COM-B/BCT constructs appear to yield a more coherent clinical signal, whereas predominantly extrinsic reward architectures may undermine autonomous motivation and produce transient engagement without durable change. Accordingly, future evaluations should model engagement as a proximal mediator, preregister mechanism-linked hypotheses (including mediation/moderation), and report transparent mechanic-to-construct mappings to enable cumulative translation.

Philosophical lenses: play as a way of knowing and becoming

A robust therapeutic framing benefits from philosophy, because it clarifies what "progress" means beyond metrics. Pragmatist education theory treats learning as experience: knowledge emerges from doing, reflecting, and iterating which aligns naturally with well-designed game loops. Philosophies of play

emphasize that play is not trivial; it is a cultural form with rules, rituals, and meaning-making and thus can be harnessed to cultivate ethical social interaction and shared interpretation. Suits famously reframed games as voluntary attempts to overcome unnecessary obstacles, underscoring the paradox that constraint can generate freedom and joy a principle relevant to therapeutic exercises that must be repeated despite discomfort. Contemporary human development ethics asks whether an intervention expands real capabilities: practical reason, affiliation, self-regulation, and agency rather than merely producing compliance. Meanwhile, social critiques warn that gamification can reproduce a "performance society" that exhausts the self and that a healthy life requires resonant relationships rather than relentless acceleration suggesting that therapeutic gamification should be designed to restore attention, connection, and meaning.

The "Game of Being" Framework

Synthesizing the above streams, the Game of Being framework proposes a layered approach to therapeutic gamification. Layer 1 (Neurocognitive engine) uses feedback, uncertainty, and achievable challenges to engage learning signals and attention. Layer 2 (Behavioral mechanics) maps game elements to SDT, COM-B, and explicit BCTs to ensure that engagement translates into change. Layer 3 (Wellbeing and meaning) integrates validated wellbeing measurement and reflective practices that support self-understanding and identity shift. Layer 4 (Ethics and governance) constrains design to protect autonomy, privacy, fairness, and clinical safety.

Design heuristics

Practical heuristics follow naturally: (1) specify a therapeutic objective and a measurable target behavior; (2) diagnose COM-B barriers and select BCTs; (3) design mechanics that support autonomy, competence, and relatedness; (4) calibrate challenge and feedback to sustain RPE-driven learning without inducing stress overload; (5) include reflective pauses and mindfulness-compatible prompts where appropriate; and (6) evaluate with both proximal engagement metrics and distal health or wellbeing outcomes. Mindfulness-informed design can be justified neurobiologically and clinically; mindfulness meditation is associated with measurable changes in brain networks implicated in attention and emotion regulation supporting the inclusion of "pause and observe" mechanics that reward awareness rather than impulsive reactivity.

Table. 1 Integrative mapping table

Gamification element	Neurocognitive / psychological mechanism	Behavior-change operationalization (examples)	Philosophical lens	Therapeutic translation and example outcomes	References
Daily quests / micro-challenges	Repetition with feedback; RPE-driven reinforcement; self-efficacy growth	Goal setting; action planning; prompts/cues; graded tasks	Pragmatism (learning by doing)	Adherence to small routines (sleep hygiene, 10-min walk); outcomes: habit strength, step count, self-efficacy	2, 26, 34, 36, 7, 19, 20, 11, 15
Immediate feedback and progress bars	Error-based learning; attention stabilization; mastery motivation	Feedback on behavior/outcome; self-monitoring; review goals	Hermeneutics (meaning from interpretation)	CBT skill rehearsal with performance feedback; outcomes: skill accuracy, symptom change	18, 25, 9, 26, 17, 28
Badges / achievements (meaningful, not arbitrary)	Positive reinforcement; identity signaling; competence satisfaction	Reward (outcome); social reward; self-affirmation	Capability approach (expanding agency)	Recognition of capability gains (emotion labeling, communication); outcomes: competence ratings, wellbeing scores	24, 2, 22, 8, 4, 29, 35
Social guilds / cooperative play	Relatedness; social support; social learning	Social support (practical/emotional); comparison and commitment	Play as culture (shared rules/ethos)	Peer accountability for self-management; outcomes: retention, perceived support, health behaviors	24, 14, 15, 10, 11, 5
Narrative framing and role identity (avatar)	Self-representation; identity-based motivation; future self	Identity associated with changed behavior; reframing; problem solving	Games as voluntary obstacles (Suits)	Reframing therapy as a hero's journey; outcomes: adherence, self-concept clarity	30, 6, 18, 21, 1, 35
Pause-and-observe mechanic (mindful checkpoint)	Top-down regulation; interoceptive awareness; reduced reactivity	Self-monitoring of emotion; coping planning; instruction on regulation	Critique of performance society; resonance	Mindfulness micro-practice during stress; outcomes: emotion regulation, stress scores, WHO-5	31, 12, 23, 13, 33, 32

Ethical and Clinical Considerations

Therapeutic gamification must be ethical-by-design. First, avoid dark patterns that exploit variable rewards for compulsive use; prioritize autonomy-supportive design and informed consent. Second, protect privacy and minimize sensitive data collection, especially in mental health contexts. Third, mitigate bias by auditing personalization algorithms and ensuring accessibility across diverse literacy and neurodiversity profiles. Fourth, clarify clinical boundaries: for moderate-to-severe conditions, gamified tools should be adjunctive and integrated with professional care pathways when appropriate.

Limitations and Future Directions

This review is narrative and selective; it does not quantify overall effect sizes beyond what is reported in cited meta-analyses. Future research should (i) compare gamified versus non-gamified versions of identical content, (ii) test theory-mapped mechanisms (e.g., autonomy support, specific BCTs), (iii) incorporate wellbeing outcomes alongside clinical endpoints, and (iv) evaluate long-term maintenance and potential harms (fatigue, over-competition, privacy risks).

CONCLUSIONS AND RECOMMENDATIONS

Gamification can support therapeutic learning when it is grounded in neuroscience and behavior change science and constrained by humane philosophical goals. The Game of Being framework positions game mechanics as scaffolds for capability expansion, emotion regulation, and meaning-making rather than as superficial incentives and invites researchers and practitioners to design interventions that heal without hijacking attention.

Synthesizing the convergent strands of evidence reviewed here, therapeutic benefit appears most likely when gamification is positioned as an implementation layer that calibrates feedback, uncertainty, and practice to potentiate reinforcement-based learning, while concurrently operationalizing theory-specified behavior change processes that support autonomy, competence, and relatedness. This integration suggests that engagement is best treated as a proximal mediator—not a primary endpoint—and that translational evaluation should couple validated wellbeing instruments with clinical or behavioral outcomes, alongside transparent mappings from mechanics to constructs (e.g., BCTs/COM-B). The framework further specifies ethical boundary conditions—eschewing dark patterns, protecting agency, and ensuring privacy—so that play remains a humane therapeutic vehicle rather than an attention-extractive technology. On this basis, the Game of Being proposes a falsifiable design hypothesis: interventions with higher mechanistic fidelity and stronger theoretical alignment will produce more durable effects than superficial incentive architectures, testable via isomorphic contrasts, mediation/moderation analyses, and extended follow-up.

FURTHER STUDY

Future research should test the Game of Being Framework through preregistered randomized controlled trials that model engagement, neurocognitive activation, and wellbeing outcomes as mechanism-linked mediators to determine its long-term therapeutic efficacy across diverse populations.

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