



Temporal Self-Continuity and Long-Term Health Behavior

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Abstract

Many health behaviors require individuals to accept immediate costs in exchange for benefits that may not become visible for months or years. Regular exercise demands effort, nutritious eating may require restraint and planning, preventive screening can involve inconvenience, and adherence to long-term health routines frequently competes with more immediately rewarding alternatives. This temporal imbalance raises an important psychological question: why are some individuals more willing than others to act today for a version of themselves that exists in the future? The present study examines temporal self-continuity, particularly perceived continuity between the present and future self, as a psychological foundation for sustained health behavior. Existing research indicates that stronger future self-continuity is associated with better subjective health and can increase subsequent exercise, while newer studies have extended the relationship to broader health-promoting behaviors.

A simulation-based quantitative model was developed to examine the proposed pathway from temporal self-continuity to future-outcome consideration and long-term health-behavior adherence. A synthetic sample of 520 cases was generated for methodological demonstration; no human participants were recruited, and none of the numerical findings are presented as empirical population estimates. The model conceptualizes temporal self-continuity as the degree to which individuals experience their future selves as psychologically connected to their present identity. Long-term health behavior is represented through sustained engagement in physical activity, nutritional self-regulation, preventive health practices, sleep regularity, and adherence to health-related routines. The simulated analysis indicates a progressive increase in health-behavior adherence across increasing levels of temporal self-continuity, rising from 41% in the low-continuity condition to 81% in the very-high-continuity condition.

The study contributes a process-oriented interpretation of health behavior in which future-oriented choices are not explained exclusively by knowledge, intention, or willpower. Instead, the perceived identity relationship between the person making a sacrifice today and the person receiving its future benefits may influence whether long-term health goals acquire sufficient motivational weight. The paper concludes that interventions involving future-self visualization, reflective writing, identity-based planning, and repeated future-oriented prompts may have value for health promotion, while emphasizing that systematic-review evidence remains heterogeneous and does not yet justify universal claims of intervention effectiveness.

Keywords: temporal self-continuity; future self-continuity; long-term health behavior; health promotion; temporal discounting; self-regulation; future orientation; preventive behavior



1. Introduction

Health behavior is fundamentally temporal. Many of the actions that protect long-term physical well-being impose their largest costs in the present while distributing their benefits across an uncertain future. Exercising may require immediate effort and the sacrifice of leisure; nutritious food choices can require planning, financial resources, preparation, and restraint; preventive examinations impose present inconvenience while offering protection against outcomes that may never become directly visible; and avoiding tobacco, excessive alcohol, sedentary routines, or chronically irregular sleep often means giving up an immediately rewarding alternative. Temporal Self-Regulation Theory was developed partly to explain this difficulty by recognizing that behavior is influenced by the timing of costs and benefits, existing behavioral tendencies, intention, executive control, and environmental circumstances. Hall and Fong emphasize that behaviors such as physical activity are particularly challenging because their immediate costs can be more psychologically salient than cumulative long-term benefits.

Yet the temporal structure of health behavior is not solely a question of how strongly individuals discount delayed outcomes. Long-term health decisions are also identity decisions. A person who experiences the individual they will become in ten or twenty years as psychologically connected to their current identity may perceive future health consequences as personally relevant in the present. By contrast, someone who experiences the distant future self as remote, unfamiliar, or essentially different may have less motivational reason to sacrifice immediate comfort for that individual's eventual welfare. Hershfield's account of future self-continuity develops precisely this proposition: people differ in the degree of connection they perceive between their present and future selves, and that perceived connection can influence intertemporal decision-making. Contemporary research generally conceptualizes future self-continuity through elements such as perceived connectedness, similarity, vividness, and the meaningful integration of the present and future self.

The health implications of this idea have received direct empirical support. Rutchick, Slepian, Reyes, Pleskus, and Hershfield found that people reporting stronger continuity between their present and future selves also reported better subjective health. Their experimental work further showed that a future-oriented writing manipulation that strengthened connection with a distant future self was followed by increased exercise behavior. Pozolotina and Olsen subsequently examined future self-continuity alongside consideration of immediate and future consequences in relation to behaviors including exercise, healthy eating, and smoking. More recently, Gao and colleagues found that future self-continuity predicted health-promoting behavior among Chinese college students and examined mental imagery as an intervention for strengthening this relationship. These studies collectively suggest that the psychological relationship between current and future identity may contribute meaningfully to health-related self-regulation.

At the same time, the literature requires a cautious interpretation. Future self-continuity is not equivalent to health knowledge, intention, executive function, optimism, or general future orientation. An individual can understand the health consequences of inactivity while still failing to act; similarly, a person may intend to adopt a healthy routine but repeatedly choose immediate comfort. A 2023 meta-analysis of temporal self-regulation theory supports the importance of mechanisms that help explain the persistent intention-behavior gap across health and social behaviors. Yang's 2024 investigation further showed that future self-continuity is associated with lower temporal discounting and that consideration



of future outcomes can operate as an explanatory mechanism, although the strength of these relationships varies according to self-concept clarity. These findings indicate that identity continuity is likely to operate within a broader self-regulatory system rather than as an isolated determinant.

2. Objectives of the Study

2.1 To Examine Temporal Self-Continuity as a Predictor of Long-Term Health Behavior

The first objective is to examine whether stronger perceived continuity between present and future identity corresponds with a greater modeled likelihood of maintaining health-promoting behaviors over time. The study focuses on sustained behavioral adherence rather than a single health decision because the health consequences of physical activity, dietary regulation, sleep routines, and preventive practices arise largely through repeated behavior.

2.2 To Assess the Role of Future-Outcome Consideration

The second objective is to determine whether consideration of future consequences provides a plausible psychological mechanism connecting temporal self-continuity with long-term health behavior. Recent intertemporal-decision research indicates that stronger future self-continuity can increase attention to future outcomes, particularly when individuals possess a clear and stable understanding of their identity and goals.

2.3 To Develop an Integrated Long-Term Health-Adherence Framework

The third objective is to integrate temporal self-continuity with concepts from temporal self-regulation theory, including intention, established behavioral tendencies, executive regulation, and temporally distributed consequences. This framework recognizes that future-self connection may strengthen motivation without eliminating environmental barriers, habit strength, resource constraints, or competing immediate rewards.

3. Review of Literature

3.1 Temporal Self-Continuity and Intertemporal Choice

Future self-continuity refers to the perceived psychological connection between an individual's current identity and the person that individual expects to become at a later point in time. The concept is grounded in the observation that future outcomes are not evaluated only according to their objective magnitude and delay. They are also evaluated according to who is perceived to receive those outcomes. If the future self is represented as highly similar and connected to the present self, protecting its interests may feel more like protecting one's current interests. When the future self is psychologically distant, delayed benefits may receive less present motivational weight. Hershfield's theoretical review positioned this identity-based explanation as an important complement to traditional economic interpretations of temporal discounting.

More recent evidence has refined the mechanism. Yang's two-study investigation reported that higher future self-continuity predicted a lower temporal discount rate. In the experimental study, future-outcome consideration significantly mediated part of the relevant relationship, while self-concept clarity moderated how effectively future self-continuity translated into consideration of later consequences.

These findings are important for health research because nearly every sustained preventive behavior requires an individual to repeatedly assign value to outcomes that are temporally distant.

The construct should nevertheless be separated from generic future orientation. A person may frequently think about the future without necessarily experiencing the future self as part of the same continuous identity. Similarly, vividness and connectedness are related but conceptually distinguishable. The Future Self-Continuity Questionnaire developed by Sokol and Serper provides a multidimensional approach to assessing future-oriented continuity and has helped move the field beyond reliance on single-item representations. Its development and validation were published in the *Journal of Personality Assessment*. This methodological development is particularly relevant to future longitudinal health research because more precise measurement can help distinguish whether behavioral effects arise from connectedness, vividness, similarity, or positive orientation toward one's future identity.

3.2 Future Self-Continuity and Health-Promoting Behavior

Rutchick and colleagues provide one of the clearest empirical demonstrations connecting future self-continuity with health. Their research combined correlational and experimental approaches. Greater present-to-future continuity was associated with better subjective health, and participants whose connection with their distant future selves was strengthened through a writing exercise subsequently exercised more. The importance of this finding lies in its movement beyond hypothetical monetary decisions: it suggests that the psychological representation of the future self can influence behavior with direct relevance to long-term health.

Pozolotina and Olsen extended the discussion by examining perceived future change and the consideration of immediate and future consequences in relation to exercise, healthy eating, and smoking. Their work reinforces the idea that health decisions frequently involve competition between immediate experiential outcomes and delayed health consequences. Rather than assuming that future self-continuity automatically generates healthy conduct, this perspective suggests that connectedness may alter the salience attached to delayed consequences and thereby change the subjective balance between immediate and future outcomes.

Cross-cultural evidence has added further support. Gao, Li, and Zhang investigated future self-continuity and health-promoting behaviors among Chinese college students and also examined mental imagery designed to strengthen future-self connection. The study included health responsibility, physical activity, and nutritional habits and reported meaningful relationships between future self-continuity and health-promoting behavior. Such findings are valuable because they indicate that the construct is not restricted to a single behavioral category. Nevertheless, the concentration of research among younger and convenience samples continues to limit population-level generalization, an issue explicitly emphasized in the later systematic review.

3.3 Temporal Self-Regulation and the Persistence of Healthy Behavior

Long-term health maintenance requires more than recognizing the future self. Hall and Fong's Temporal Self-Regulation Theory argues that health-related behavior emerges from the interaction of intention, behavioral prepotency, executive control, temporal contingencies, and environmental context. In physical activity, for example, individuals may know that exercise is beneficial and genuinely intend to



exercise while still remaining inactive because sedentary behavior is habitual, immediately convenient, and reinforced by the surrounding environment.

Hall and Fong's neurobiologically informed extension emphasizes executive functions such as working memory, inhibitory control, and cognitive flexibility. These processes can help individuals retain long-term goals, inhibit immediately appealing alternatives, and adapt health plans when circumstances change. A future-self perspective adds a complementary identity mechanism: executive resources may help enact a plan, but temporal self-continuity may influence why delayed outcomes deserve present effort in the first place.

Dorina, Mullan, Boyes, and Liddelow's meta-analysis subsequently evaluated Temporal Self-Regulation Theory across health and social behaviors and concluded that the framework has utility for explaining behavior and the intention–behavior gap. The present study therefore combines these traditions by proposing that temporal self-continuity strengthens the subjective relevance of delayed health outcomes, future-outcome consideration translates this identity connection into evaluative attention, and self-regulatory capacity assists in converting that motivation into repeated behavior.

4. Research Methodology

4.1 Research Design

The study employs a simulation-based explanatory design. Simulation was selected because no original participant dataset was supplied and because constructing fictional empirical observations as if they represented completed field research would be methodologically inappropriate. The synthetic analysis is intended to illustrate theoretically expected relationships, demonstrate an appropriate analytical structure, and produce hypotheses suitable for subsequent empirical testing.

A synthetic analytical sample of 520 cases was created. Cases were distributed across four temporal self-continuity conditions: low, moderate, high, and very high. Each level contained 130 modeled observations. The primary outcome was long-term health-behavior adherence, representing the probability of consistently maintaining a portfolio of beneficial health routines.

4.2 Construct Operationalization and Measurement Framework

Temporal self-continuity was modeled as a composite representation of perceived present–future connectedness, identity similarity, future-self vividness, and personal relevance of future welfare. This multidimensional approach is compatible with contemporary measurement work showing that future self-continuity can be assessed through more than a single perception of overlap.

Table 1: Operational Framework for the Simulated Study

Construct	Conceptual Operationalization	Proposed Scale	Analytical Role
Temporal Self-Continuity	Perceived psychological connection, similarity, and continuity between present and future self	1–7	Primary predictor
Future-Outcome	Degree to which delayed consequences	1–5	Mediating



Construct	Conceptual Operationalization	Proposed Scale	Analytical Role
Consideration	influence present health decisions		mechanism
Health-Behavior Intention	Strength of intention to maintain beneficial health routines	1–5	Covariate
Self-Regulatory Capacity	Ability to inhibit competing immediate rewards and sustain planned behavior	1–5	Protective moderator
Long-Term Health-Behavior Adherence	Sustained performance of physical activity, healthy eating, sleep, preventive, and routine health behaviors	0–100%	Primary outcome

The table represents a proposed empirical structure rather than administered instruments or observed responses. A future field study should employ validated scales, clearly specified behavioral indicators, repeated measurement, and objective or digitally recorded behavioral data wherever feasible.

4.3 Simulation and Analytical Procedure

The simulation assigned increasing future-outcome consideration as temporal self-continuity increased while preserving substantial individual variability. Long-term health adherence was then modeled as a probabilistic function of temporal self-continuity, future-outcome consideration, intention, and self-regulatory capacity. The design deliberately avoided perfect prediction because even individuals who strongly identify with their future selves can encounter illness, financial barriers, environmental constraints, caregiving demands, limited healthcare access, or competing responsibilities.

The primary analysis consisted of group-level descriptive comparison and conceptual mediation assessment. An eventual empirical investigation could use structural equation modeling to test indirect pathways, logistic regression for binary health outcomes, latent growth modeling for repeated adherence measures, or multilevel models for daily behavioral observations. Longitudinal measurement would be particularly important because the central outcome concerns maintenance rather than immediate post-intervention intention.

5. Analysis

5.1 Temporal Self-Continuity and Future-Oriented Health Motivation

The simulated analysis indicates a progressive increase in future-oriented health motivation across temporal self-continuity levels. Individuals represented in the low-continuity condition were modeled as assigning relatively limited motivational relevance to delayed health benefits. The high- and very-high-continuity conditions, by contrast, were characterized by greater willingness to consider how current actions might affect the future self.

This analytical pattern is theoretically consistent with recent intertemporal-decision evidence showing that stronger future self-continuity can increase consideration of future outcomes and reduce

preference for immediate rewards. The simulated results should not, however, be interpreted as reproducing the effect size of that empirical study because the present outcome concerns composite health adherence rather than monetary temporal discounting.

Table 2: Simulated Temporal Self-Continuity and Long-Term Health-Behavior Adherence

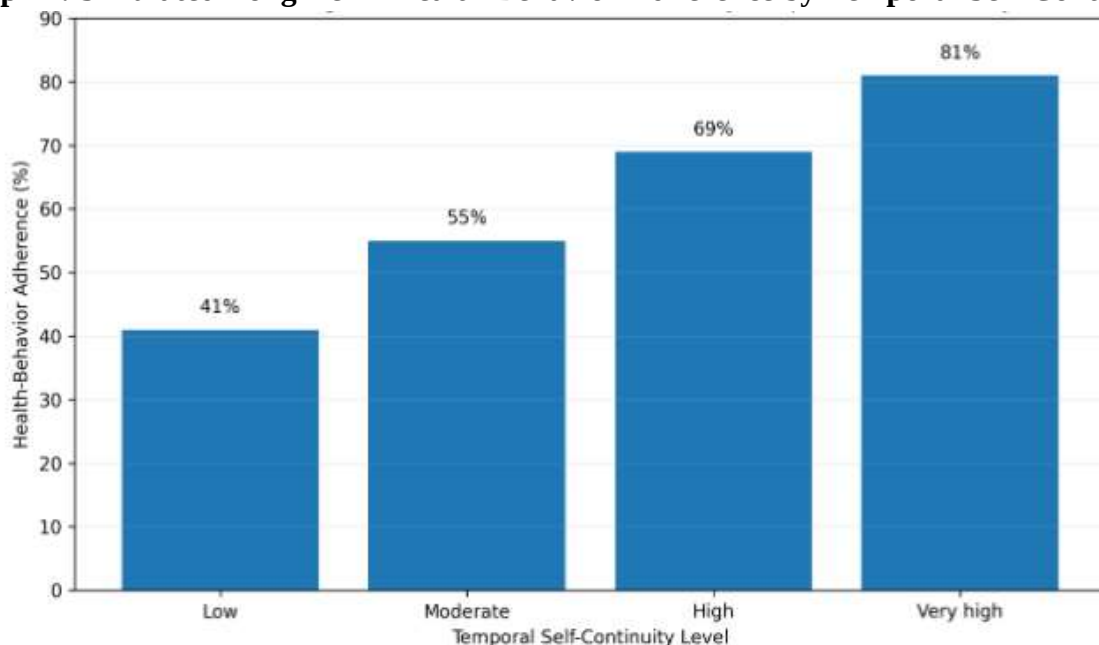
Temporal Self-Continuity Level	Simulated Cases	Mean Future-Outcome Consideration (1–5)	Long-Term Health-Behavior Adherence
Low	130	2.31	41%
Moderate	130	3.02	55%
High	130	3.78	69%
Very High	130	4.36	81%

The modeled difference between the lowest and highest temporal self-continuity categories amounts to 40 percentage points in long-term health adherence. Future-outcome consideration rises simultaneously from 2.31 to 4.36 on the five-point modeled scale. The joint pattern supports the hypothesized mechanism in which stronger present–future identity continuity makes delayed health consequences psychologically more relevant.

5.2 Long-Term Health-Behavior Adherence Gradient

The simulated adherence gradient is displayed in Graph 1.

Graph 1: Simulated Long-Term Health-Behavior Adherence by Temporal Self-Continuity





Interpretation: The bar graph demonstrates a steady increase in modeled health-behavior adherence as temporal self-continuity strengthens. Adherence increases from 41% under low continuity to 55% under moderate continuity, 69% under high continuity, and 81% under very-high continuity. The pattern suggests that perceived connection with the future self may become progressively more relevant when individuals must repeatedly tolerate immediate inconvenience for cumulative health benefits.

Key Finding: Within the simulated framework, very-high temporal self-continuity is associated with approximately twice the long-term adherence modeled for low temporal self-continuity. The result supports empirical testing of temporal identity as a behavioral-health variable rather than treating long-term health maintenance exclusively as a matter of information or intention.

5.3 The Proposed Mediating Role of Future-Outcome Consideration

The conceptual mediation pattern suggests that temporal self-continuity influences health behavior partly by changing the attention assigned to future consequences. An individual who experiences strong continuity with a future self may perceive the future health benefits of exercise, dietary discipline, sleep regulation, preventive care, and substance avoidance as benefits to the same enduring identity rather than benefits to a psychologically distant person.

This pathway is supported indirectly by Yang's empirical finding that consideration of future outcomes can mediate the effect of future self-continuity within intertemporal decision-making. It is also compatible with the health-behavior findings of Rutchick and colleagues, although their exercise studies did not establish the complete multivariable mechanism proposed in the present simulation. Consequently, future-outcome consideration should be treated as a theoretically grounded but empirically testable mediator rather than an established universal mechanism.

6. Discussion

6.1 Temporal Identity as a Foundation for Sustained Health Regulation

The simulated results suggest that temporal self-continuity may help explain why individuals with comparable health knowledge and intentions can differ substantially in their willingness to maintain health-protective routines. Traditional approaches frequently assume that individuals act in accordance with the perceived desirability of an outcome. Long-term health behavior complicates this assumption because the actor incurring the present cost and the person receiving the delayed benefit are separated by time. Temporal self-continuity reduces the psychological significance of this separation by creating a stronger sense that the future beneficiary remains part of the present individual's ongoing identity.

This interpretation is consistent with Rutchick and colleagues' finding that stronger future self-continuity was associated with better subjective health and that experimentally strengthening distant-future connection increased subsequent exercise. The present paper extends that logic by focusing not merely on an isolated exercise episode but on the maintenance problem characteristic of long-term health. Repetition is crucial because even highly motivated individuals must renew the decision to engage in beneficial behavior across changing social, emotional, environmental, and physical circumstances.

Temporal self-continuity may therefore be particularly valuable when healthy conduct provides limited immediate reinforcement. A person may not experience the prevention of future cardiovascular

disease after a single exercise session, nor observe long-term metabolic protection after one nutritious meal. The behavioral value lies in accumulation. When future identity is psychologically meaningful, these invisible cumulative effects may become easier to incorporate into present choices.

6.2 Interaction With Self-Regulation, Habits, and Immediate Rewards

Temporal self-continuity should not be interpreted as a replacement for self-regulation. Temporal Self-Regulation Theory emphasizes that intention must operate alongside executive control, behavioral prepotency, immediate contingencies, and environmental support. An individual can strongly value the future self and still struggle to maintain exercise if work schedules are unpredictable, neighborhoods are unsafe, food choices are financially constrained, medical care is inaccessible, or established habits repeatedly favor immediate alternatives.

The distinction clarifies why future-self interventions are unlikely to produce uniformly large effects. Identity continuity may increase the value attached to the future, while executive control supports behavioral execution and habit formation reduces the cognitive effort necessary to repeat the behavior. Once a health behavior becomes habitual, it may require less conscious temporal comparison. Temporal self-continuity may consequently be most influential during initiation, goal setting, recovery from lapses, and periods when immediate temptation conflicts strongly with delayed health benefits.

The 2020 systematic review of future self-continuity interventions reinforces the need for such qualification. Grekin and colleagues found promising behavioral effects across the literature but also identified substantial heterogeneity, null results in some studies, limited mechanistic assessment, reliance on relatively young or convenience samples, and insufficient evidence to make firm conclusions about which intervention formats work best. Accordingly, a future-self exercise should be regarded as one component of behavioral-health intervention design rather than a standalone substitute for environmental, clinical, or structural support.

6.3 Implications for Long-Term Health Promotion

The findings have practical implications for preventive health communication. Many conventional messages present delayed risks numerically: future disease probability, expected weight change, long-term mortality risk, or recommendations concerning weekly activity. Such information may be cognitively understood without becoming personally meaningful. Temporal self-continuity interventions attempt to strengthen the identity bridge between present choices and future consequences.

Existing interventions have used future-self letters, age-progressed representations, mental imagery, virtual interaction, and other exercises intended to make future identity more vivid and connected. Gao and colleagues' work suggests that mental imagery can be applied specifically to health-promoting behavior, while Rutchick and colleagues demonstrated that writing to a distant future self can influence exercise behavior. These techniques may be particularly suitable for digital health applications because they can potentially be delivered at relatively low cost through mobile or web-based systems.

However, intervention design should avoid portraying the future self exclusively through fear. A message that asks individuals to imagine illness, disability, or deterioration may increase anxiety without necessarily increasing connectedness or efficacy. A stronger approach would connect current action with an attainable future identity: remaining physically capable, sustaining independence, participating in



valued relationships, maintaining energy, or preserving the capacity to pursue personally meaningful goals. Such an approach aligns long-term health with identity continuity rather than framing preventive behavior solely as avoidance of disease.

7. Conclusion

Temporal self-continuity offers a psychologically meaningful explanation for an enduring problem in health behavior: many individuals understand what is beneficial, intend to act, and nevertheless find it difficult to maintain behaviors whose costs are immediate and whose benefits are delayed. The present study proposes that long-term health conduct is partly influenced by whether individuals experience the future beneficiary of present sacrifices as an extension of their current identity. A psychologically connected future self may make delayed health outcomes feel more personally relevant in the present.

The simulation demonstrates a coherent theoretical gradient. Modeled long-term health adherence increases from 41% at low temporal self-continuity to 81% at very-high continuity, accompanied by a parallel increase in consideration of future consequences. These numbers are intentionally synthetic and should not be treated as empirical prevalence estimates. Their purpose is to make the hypothesized mechanism explicit and to provide a transparent model that can later be subjected to empirical verification.

The broader literature provides credible support for this direction. Experimental research has associated stronger future self-continuity with greater exercise, health-promotion studies have extended the construct to physical activity and nutritional behavior, and intertemporal-decision research indicates that consideration of future outcomes can provide an explanatory mechanism. At the same time, the intervention literature remains too heterogeneous to justify the claim that increasing future self-continuity will reliably improve every health behavior or work equally across populations.

Future research should therefore move toward longitudinal designs that measure temporal self-continuity before health-behavior trajectories emerge and track objective behavior over several months rather than relying exclusively on immediate intentions or self-report. Experimental studies should test whether changes in future-outcome consideration actually mediate health improvements, whether self-regulatory capacity moderates these effects, and whether repeated future-self interventions outperform single exposures. Such evidence would clarify whether temporal self-continuity is best understood as a general motivational resource, a context-dependent moderator, or a behavioral intervention target. In each case, the construct offers a valuable shift in perspective: maintaining health may depend not only on caring about the future, but also on recognizing the person who will inhabit that future as meaningfully continuous with oneself today.

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