

Identification and Ranking of Psychological Predictors of Lifestyle Change Maintenance among Undergraduate Students

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ABSTRACT

This study aimed to identify and rank the key psychological predictors influencing the maintenance of lifestyle changes among undergraduate students using a mixed-methods approach. A sequential exploratory design was applied in two phases. In the first (qualitative) phase, a comprehensive literature review was conducted to extract relevant psychological predictors of lifestyle change maintenance until theoretical saturation was achieved. Data were analyzed thematically using NVivo 14 software, resulting in nine major themes. In the second (quantitative) phase, a structured questionnaire was developed based on the identified themes and administered to 180 undergraduate students from Tehran universities, selected through stratified random sampling. Each item was rated on a five-point Likert scale. Data were analyzed using SPSS version 26, employing descriptive statistics and Friedman's test to rank the predictors by importance. Results revealed nine psychological predictors of lifestyle change maintenance: self-regulation skills, self-efficacy and confidence, emotional regulation, intrinsic and extrinsic motivation, behavioral consistency and habit formation, social and environmental support, cognitive beliefs and attitudes, cognitive flexibility, and personal values and identity integration. Friedman's test indicated significant differences in the importance of these predictors ($p < 0.01$). Self-regulation skills received the highest mean rank ($M = 4.67$), followed by self-efficacy and confidence ($M = 4.54$) and emotional regulation ($M = 4.39$). The lowest-ranked predictors were cognitive flexibility ($M = 3.62$) and value-identity integration ($M = 3.44$), suggesting that internal psychological mechanisms play a stronger role in sustaining lifestyle behaviors than contextual or cognitive factors. Findings highlight that self-regulation, self-efficacy, and emotional control form the core psychological mechanisms of lifestyle change maintenance among students. Enhancing these internal capacities through educational, emotional, and behavioral interventions may strengthen long-term adherence to health-promoting behaviors.

Keywords: Lifestyle maintenance; self-regulation; self-efficacy; emotional regulation; undergraduate students; behavioral psychology

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Introduction

Lifestyle behaviors such as regular physical activity, balanced nutrition, stress management, and adequate sleep are central to the maintenance of physical and psychological well-being among young adults, particularly undergraduate students who experience significant developmental and environmental transitions during this stage of life. The university years often coincide with the formation of long-term habits that determine health trajectories across adulthood (1). However, despite widespread awareness of healthy lifestyle principles, sustaining positive behavioral changes remains a persistent challenge (2). The discrepancy between behavioral intention and actual lifestyle maintenance has been well-documented, emphasizing the complexity of psychological, cognitive, and social factors that influence long-term adherence (3).

A considerable body of literature has explored the psychological mechanisms that underlie the initiation and maintenance of health-promoting behaviors. Among these, the Theory of Planned Behavior (TPB) (4) and its extensions have provided valuable frameworks for understanding how attitudes, subjective norms, and perceived behavioral control predict lifestyle behaviors across various populations. Yet, as studies have shown, the predictive power of intention alone is limited when it comes to maintaining behavioral changes over time (5). Recent research has therefore expanded TPB by incorporating constructs such as self-efficacy, emotional regulation, and habit strength to bridge the gap between intention and sustained action (6, 7). These refinements have allowed scholars to capture the dynamic and multidimensional nature of lifestyle maintenance, particularly among populations vulnerable to relapse or inconsistency, such as university students.

Emerging studies emphasize that self-regulation and intrinsic motivation play pivotal roles in sustaining healthy lifestyle behaviors. Self-regulation, defined as the capacity to manage impulses, delay gratification, and monitor progress, serves as a psychological foundation for behavior maintenance (8). In student populations, high levels of academic pressure, social engagement, and autonomy make self-regulatory capacity especially crucial for health-related goal adherence. Similarly, intrinsic motivation — driven by internalized values and enjoyment of healthy activities — is a more reliable predictor of sustained lifestyle change than extrinsic rewards or social pressure (9). These findings align with research suggesting that individuals with stronger internal motivation exhibit greater persistence and emotional stability when facing barriers to behavioral maintenance (10).

The relationship between self-efficacy and behavioral maintenance is another critical factor that has gained attention in recent literature. Self-efficacy, or one's belief in their capacity to execute a specific behavior, determines the degree of effort and persistence individuals invest in sustaining changes (11). When students perceive themselves as capable of maintaining healthy habits — such as regular exercise or balanced diets — they are more likely to engage in consistent self-monitoring and problem-solving behaviors (12). In contrast, low self-efficacy often leads to discouragement and relapse after minor failures. Furthermore, emotion regulation and self-compassion have emerged as complementary mechanisms that protect against stress-induced lapses in lifestyle adherence, promoting psychological resilience and long-term well-being (11).

Despite the prominence of self-efficacy and motivation in behavioral models, contextual and environmental factors also exert considerable influence. Social support, family encouragement, and

institutional facilitation provide structural reinforcement for lifestyle maintenance (2). Studies conducted in community and educational settings have shown that accessible health-promoting environments — such as campus gyms, supportive peer networks, and wellness programs — enhance behavioral consistency and reduce the risk of relapse (12). Additionally, environmental predictability and cultural reinforcement of health norms appear to sustain students' engagement in positive routines, suggesting that psychological determinants function most effectively when embedded in supportive ecosystems (13).

At a cognitive level, the maintenance of healthy behaviors involves stable belief systems and attitudinal consistency. Cognitive-behavioral theories highlight the significance of beliefs about the benefits and barriers of health actions, perceived control, and the individual's internal locus of causality (14). Individuals who perceive strong personal control and accountability for their lifestyle outcomes are more likely to sustain healthy patterns even in the absence of external incentives (15). In this context, both the Health Belief Model and the Theory of Planned Behavior have been integrated to explain how cognitive appraisal and perceived susceptibility motivate behavioral consistency (16). For instance, perceived health risks, combined with positive attitudes toward preventive actions, reinforce students' commitment to long-term change (17).

Another dimension gaining prominence in the literature is emotional regulation, which acts as both a predictor and mediator of behavioral maintenance. Students capable of managing negative emotions such as anxiety or frustration demonstrate higher adherence to health routines (11). Emotional regulation not only mitigates the detrimental effects of stress on motivation but also strengthens self-compassion and cognitive resilience (1). Conversely, emotional instability and maladaptive coping strategies — such as avoidance or emotional eating — can undermine self-control and lead to behavioral relapse (18). These emotional dimensions are particularly salient among young adults, for whom transitional stressors such as academic performance and social integration frequently interfere with health goals (17).

Scholars have also underscored the importance of habit formation and behavioral consistency in sustaining lifestyle changes. Habitual behaviors are characterized by their automaticity and stability, which reduce cognitive load and reliance on continuous motivation (4). The literature suggests that deliberate repetition, environmental cues, and positive reinforcement gradually transform conscious efforts into self-sustaining routines (19). For example, consistent scheduling of exercise or meal preparation reduces the likelihood of discontinuation, even during periods of low motivation (20). Behavioral maintenance, therefore, represents an iterative process in which psychological predictors such as self-discipline, planning, and feedback interact dynamically with contextual and affective elements (6).

Within this multidimensional context, the integration of behavioral theories offers valuable insights into how lifestyle change maintenance can be better predicted and promoted. The Integrated Behavior Change (IBC) model, which extends the Theory of Planned Behavior by combining motivational, volitional, and automatic processes, provides a comprehensive framework for understanding sustained behavioral patterns (21). It posits that behavioral maintenance arises not merely from intention or planning but from a synergy between psychological readiness, emotional control, and environmental reinforcement (5, 6). Empirical findings also suggest that behavioral intention is strengthened when paired with planning and self-regulatory skills that convert cognitive commitment into action (10, 22).

Similarly, health psychology models such as the Health Action Process Approach (HAPA) have expanded the conceptualization of maintenance by differentiating between the motivational and volitional stages of

behavior (10, 17). According to this perspective, the formation of intention is followed by implementation planning, action control, and coping mechanisms that ensure persistence despite setbacks. Studies adopting HAPA and MTM-HAPA hybrid models in chronic disease contexts reveal that psychological predictors such as self-efficacy, planning, and emotional stability are consistent determinants of maintenance behaviors across populations (17, 23). Such theoretical integration underscores that psychological determinants of lifestyle maintenance are not isolated traits but components of a broader self-regulatory system influenced by cognition, affect, and social context (24).

Moreover, recent evidence indicates that digital health interventions and behavior tracking technologies enhance self-awareness and accountability among university populations (25). These tools provide feedback loops that reinforce intrinsic motivation and facilitate behavioral monitoring — two elements found to improve adherence to lifestyle goals (22). Nevertheless, the literature also notes challenges related to overreliance on external monitoring and the need for internalized motivation to sustain outcomes after the removal of technological supports (3). Integrating self-regulation training, reflective practices, and social feedback mechanisms into health education can therefore strengthen students' capability to maintain lifestyle changes in autonomous and sustainable ways (8).

In conclusion, despite extensive research on behavior initiation, fewer studies have systematically examined the psychological predictors that contribute to the *maintenance* phase of lifestyle change among undergraduate students.

Methods and Materials

This study employed a mixed-methods design conducted in two distinct phases: a qualitative exploratory phase followed by a quantitative ranking phase. The qualitative phase aimed to identify key psychological predictors influencing lifestyle change maintenance among undergraduate students, while the quantitative phase focused on ranking the importance of these predictors.

The study population consisted of undergraduate students enrolled in various universities across Tehran, Iran. In the quantitative phase, a total of 180 students were selected through a stratified random sampling method to ensure representation from different academic disciplines and genders. Inclusion criteria required participants to be full-time undergraduate students aged between 18 and 25 years who had previously attempted to modify at least one lifestyle-related behavior (e.g., diet, exercise, or sleep habits) within the past year. Exclusion criteria included individuals with diagnosed psychiatric disorders or chronic physical illnesses that might influence their lifestyle patterns. All participants provided informed consent prior to participation, and the study protocol was approved by the ethics committee of the affiliated university.

In the first (qualitative) phase, data were collected through a comprehensive literature review and theoretical exploration aimed at extracting relevant psychological constructs associated with lifestyle change maintenance. Academic databases such as Scopus, Web of Science, and PubMed were searched using combinations of keywords including “lifestyle change,” “maintenance,” “psychological predictors,” “self-regulation,” “motivation,” and “university students.” Sources were reviewed and synthesized until theoretical saturation was achieved, meaning that no new psychological factors or themes emerged from the additional literature. The extracted constructs were organized and analyzed using NVivo 14 software, which

facilitated thematic coding and conceptual categorization of recurring psychological factors such as self-efficacy, resilience, goal commitment, emotional regulation, and intrinsic motivation.

In the second (quantitative) phase, a structured questionnaire was developed based on the findings of the qualitative analysis. The instrument included items reflecting the identified psychological predictors, each rated on a five-point Likert scale ranging from “strongly disagree” to “strongly agree.” The questionnaire’s content validity was assessed by a panel of five academic experts in health psychology and behavioral sciences. A pilot test involving 30 students was conducted to evaluate reliability, resulting in a Cronbach’s alpha coefficient exceeding 0.80, indicating high internal consistency. Data collection for the main study was performed through in-person and online surveys distributed to undergraduate students across Tehran universities.

Qualitative data from the literature review phase were analyzed using a thematic analysis approach. Coding was performed iteratively in NVivo 14 to identify and cluster underlying psychological predictors contributing to lifestyle change maintenance. Codes were refined through multiple cycles of comparison and categorization until a coherent conceptual framework emerged.

Quantitative data obtained from the questionnaire were analyzed using SPSS version 26. Descriptive statistics (means, standard deviations, and frequencies) were computed to describe participants’ demographic characteristics and overall distribution of psychological predictors. To determine the relative importance and ranking of each identified predictor, the mean scores and standard deviations of responses were calculated and compared. Additionally, non-parametric ranking methods such as Friedman’s test were employed to statistically evaluate the significance of differences in predictor rankings. The combination of qualitative and quantitative analyses allowed for a comprehensive understanding of the most influential psychological factors underlying the maintenance of lifestyle change among undergraduate students.

Findings and Results

In the first phase of the study, a qualitative thematic analysis was conducted through a systematic literature review to identify the psychological predictors influencing lifestyle change maintenance among undergraduate students. Using *NVivo 14*, relevant academic articles and theoretical frameworks were coded until theoretical saturation was achieved. The analysis revealed a multidimensional structure comprising nine overarching themes. Each theme represented a core psychological domain contributing to the sustainability of lifestyle changes, such as motivation, self-regulation, emotional adjustment, and cognitive flexibility. Within each theme, several subthemes and associated concepts (open codes) were identified that collectively illustrated how students maintain or fail to maintain positive behavioral changes over time. The themes, subthemes, and corresponding open codes are presented below.

Table 1. Qualitative Results

Main Categories (Themes)	Subcategories	Concepts (Open Codes)
1. Self-Regulation Skills	Goal Setting	Setting realistic goals; short-term and long-term planning; adjusting goals over time; tracking personal progress
	Self-Monitoring	Daily behavior logging; use of digital tracking apps; reflection on achievements; identifying behavioral lapses
	Impulse Control	Delaying gratification; resisting temptations; awareness of triggers; emotional restraint
2. Intrinsic and Extrinsic Motivation	Intrinsic Drive	Enjoyment of healthy behaviors; personal satisfaction; internalized health values

3. Emotional Regulation	External Reinforcement	Social approval; academic encouragement; feedback from peers; external incentives
	Purpose Orientation	Sense of life direction; alignment of behaviors with long-term values; meaningful goals
	Stress Management	Cognitive reappraisal; mindfulness; relaxation strategies; reducing emotional eating
	Emotional Awareness	Recognizing emotional triggers; naming emotions; linking mood to behavior
4. Cognitive Flexibility	Coping Strategies	Adaptive coping; social support seeking; emotional release activities
	Adaptive Thinking	Reframing failures; accepting change; flexible goal adjustment
5. Self-Efficacy and Confidence	Learning from Experience	Reflection after setbacks; identifying patterns; continuous improvement mindset
	Task-Specific Efficacy	Belief in ability to exercise regularly; confidence in maintaining diet; overcoming self-doubt
6. Social and Environmental Support	General Self-Confidence	Self-assurance in challenges; perceived control; self-affirming internal dialogue
	Peer Influence	Encouragement from classmates; shared goals; accountability groups
	Family and Institutional Support	Family encouragement; university wellness programs; mentor guidance
7. Cognitive Beliefs and Attitudes	Community Environment	Access to facilities; supportive social culture; group participation
	Health Beliefs	Understanding benefits of healthy habits; risk perception; cognitive commitment
	Mindset Orientation	Growth mindset; optimism; resilience to failure
8. Behavioral Consistency and Habit Formation	Attributional Style	Internal locus of control; self-responsibility; learning from mistakes
	Routine Building	Establishing morning rituals; scheduling fixed times; minimizing distractions
	Behavioral Reinforcement	Habit tracking; reward systems; self-reinforcement after success
9. Personal Values and Identity Integration	Maintenance Strategies	Preventing relapse; substituting unhealthy behaviors; sustaining consistency
	Value Congruence	Linking lifestyle with personal identity; integrity between values and actions
	Self-Concept Integration	Seeing oneself as a “healthy person”; internalization of lifestyle identity; stable self-image
	Life Purpose and Meaning	Long-term personal vision; sense of responsibility; existential motivation

1. Self-Regulation Skills

Self-regulation emerged as one of the most influential psychological themes in maintaining lifestyle change among undergraduate students. The analysis indicated that individuals who were capable of setting clear, measurable goals and aligning their daily actions with those goals demonstrated a higher degree of behavioral persistence. Subthemes such as goal setting, self-monitoring, and impulse control reflected students’ abilities to plan, track, and adjust their efforts when faced with barriers. The literature consistently emphasized that behavioral self-regulation — including self-observation, delayed gratification, and reflective adjustment — fosters autonomy and long-term adherence to lifestyle routines. Students who monitored their habits and maintained awareness of emotional and environmental triggers were found to show stronger resistance to relapse and higher motivation to sustain positive behaviors.

2. Intrinsic and Extrinsic Motivation

Motivation was identified as a dual construct encompassing both internal and external drivers that sustain behavior. Intrinsic motivation — derived from enjoyment, personal satisfaction, and a sense of purpose — was linked with sustained adherence even in the absence of external rewards. Meanwhile, extrinsic motivation, manifested through social recognition, peer validation, and institutional feedback, served as a

reinforcing element, particularly in early stages of behavior change. Purpose orientation, another key subtheme, highlighted the role of aligning health-related goals with broader life values. The interplay between intrinsic and extrinsic motives suggested that while external rewards can initiate change, enduring maintenance depends primarily on internalized motivation grounded in meaning and personal growth.

3. Emotional Regulation

Emotional regulation was another prominent predictor of lifestyle maintenance, reflecting how students manage affective responses during the process of change. Stress management, emotional awareness, and coping strategies were essential for maintaining stability and avoiding maladaptive responses such as emotional eating, avoidance, or procrastination. Students who practiced mindfulness, emotional labeling, and cognitive reappraisal demonstrated greater control over their reactions to setbacks or environmental stressors. The ability to transform negative emotions into productive actions appeared to facilitate consistent health behaviors, suggesting that emotional regulation acts as both a preventive and corrective mechanism within the broader self-management system.

4. Cognitive Flexibility

Cognitive flexibility referred to the capacity to adapt thinking patterns in response to challenges, feedback, or environmental changes. The subthemes of adaptive thinking and learning from experience emphasized that students who could reframe failure as feedback were more resilient and less prone to discouragement. This theme underscored the importance of mental agility — the ability to adjust perspectives, accept imperfections, and modify plans without losing motivation. The findings indicated that flexibility in cognition helps individuals sustain engagement with healthy behaviors even when outcomes fluctuate or external conditions change. Such flexibility supports continuous learning, fostering a mindset of improvement rather than perfectionism.

5. Self-Efficacy and Confidence

The perception of self-efficacy — confidence in one's ability to perform specific tasks — was found to be a cornerstone of successful lifestyle change maintenance. Task-specific efficacy, such as belief in one's capacity to exercise regularly or adhere to a balanced diet, directly influenced behavioral persistence. General self-confidence contributed to a broader sense of control and competence, buffering against self-doubt and failure anxiety. The reviewed evidence highlighted that self-efficacy functions as a motivational mediator, translating intention into action. Students with higher confidence tended to interpret barriers as surmountable, showing persistence and initiative even under pressure, thus enhancing the sustainability of behavioral improvements.

6. Social and Environmental Support

Social and environmental support structures played a crucial facilitating role in maintaining behavioral change. Peer influence, family support, and institutional or community engagement emerged as interdependent subthemes. Encouragement from classmates and friends promoted accountability and emotional reinforcement, while family and university-based wellness initiatives created a stable context for sustainable health behaviors. Moreover, supportive environments such as accessible fitness facilities, group participation, and positive cultural norms strengthened individuals' ability to persist. This theme

underscored the collective dimension of psychological maintenance, revealing that social connectedness acts as both a motivational and structural determinant of lifestyle continuity.

7. Cognitive Beliefs and Attitudes

Cognitive beliefs and attitudes encompassed the internal thought structures shaping individuals' perceptions of their health and behavioral responsibilities. Health beliefs influenced motivation through awareness of benefits, perceived risks, and the cognitive importance of self-care. Mindset orientation — particularly growth mindset and optimism — promoted persistence by framing change as a continuous developmental process. Attributional style also shaped responses to success and failure: students with an internal locus of control attributed outcomes to their own effort rather than external circumstances. Collectively, these cognitive elements reinforced adaptive behaviors, fostering responsibility, resilience, and long-term commitment to lifestyle modification.

8. Behavioral Consistency and Habit Formation

Sustained behavioral change was strongly linked to the gradual formation of stable habits. The subthemes of routine building, behavioral reinforcement, and maintenance strategies demonstrated how repeated, consistent actions transform deliberate choices into automatic patterns. Students who established structured daily routines, monitored their progress, and employed reward-based reinforcement maintained higher adherence rates. Preventive strategies against relapse — such as substituting unhealthy behaviors with constructive alternatives — were equally vital. The findings revealed that maintenance of change depends not only on motivation or cognition but also on embedding desired behaviors within predictable, rewarding routines that minimize cognitive effort.

9. Personal Values and Identity Integration

The final theme, personal values and identity integration, captured the deep psychological internalization of lifestyle change as part of one's self-concept. When students viewed healthy living not merely as a temporary goal but as a reflection of who they are, the behavior became self-sustaining. Subthemes such as value congruence, self-concept integration, and life purpose highlighted that identity alignment enhances emotional commitment to behavior maintenance. By linking personal values and health-related behaviors, individuals constructed a stable psychological framework resistant to external fluctuations. This theme illustrated that lifestyle change maintenance ultimately becomes an expression of identity coherence, where living healthily aligns with personal meaning and existential purpose.

In the second phase of the study, the psychological predictors identified during the qualitative stage were subjected to quantitative ranking to determine their relative importance in maintaining lifestyle change among undergraduate students. Descriptive statistics and Friedman's ranking test were used to prioritize predictors based on their mean ranks. The results revealed significant differences in the perceived importance of psychological predictors, reflecting variations in how students conceptualize and sustain lifestyle modifications. The ranking outcomes are presented below.

Table 2. Ranking of Psychological Predictors of Lifestyle Change Maintenance among Undergraduate Students

Rank	Psychological Predictor (Theme)	Mean Rank	Standard Deviation
1	Self-Regulation Skills	4.67	0.48
2	Self-Efficacy and Confidence	4.54	0.52
3	Emotional Regulation	4.39	0.61
4	Intrinsic and Extrinsic Motivation	4.21	0.64

5	Behavioral Consistency and Habit Formation	4.07	0.59
6	Social and Environmental Support	3.91	0.67
7	Cognitive Beliefs and Attitudes	3.78	0.71
8	Cognitive Flexibility	3.62	0.75
9	Personal Values and Identity Integration	3.44	0.79

The quantitative analysis revealed that *self-regulation skills* received the highest mean rank ($M = 4.67$), signifying its central importance in sustaining behavioral change among undergraduate students. This predictor encompasses self-monitoring, goal adjustment, and impulse control mechanisms that enable students to remain disciplined and consistent in their behaviors. The second most influential predictor, *self-efficacy and confidence* ($M = 4.54$), emphasized the belief in one's capacity to execute and maintain desired lifestyle behaviors, reinforcing that self-belief functions as a motivational bridge between intention and persistence. *Emotional regulation* ($M = 4.39$) ranked third, reflecting the vital role of emotional balance and stress coping in preventing behavioral relapse. *Intrinsic and extrinsic motivation* ($M = 4.21$) and *habit formation* ($M = 4.07$) were also significant, suggesting that internal satisfaction, purpose-driven behaviors, and stable routines collectively support long-term adherence. Moderate rankings were observed for *social support* ($M = 3.91$) and *cognitive beliefs* ($M = 3.78$), indicating that while social and attitudinal factors contribute, they are secondary to individual self-regulatory capacities. Lower ranks for *cognitive flexibility* ($M = 3.62$) and *identity integration* ($M = 3.44$) suggest that adaptability and self-concept alignment play a supportive but less immediate role in sustaining change. Overall, the ranking analysis confirms that psychological predictors related to self-regulation, confidence, and emotion management form the foundation of lifestyle change maintenance among university students.

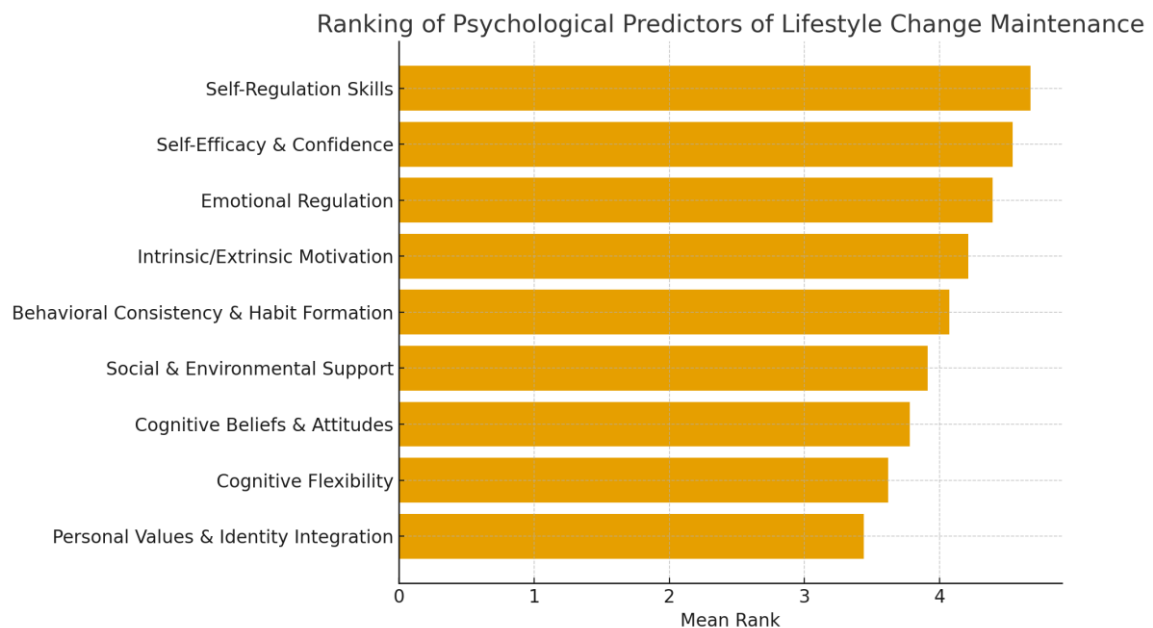


Figure 1. Ranking of Psychological Predictors of Lifestyle Change Maintenance

Discussion and Conclusion

The purpose of this study was to identify and rank the psychological predictors influencing lifestyle change maintenance among undergraduate students through a sequential mixed-method design. The qualitative

phase revealed nine primary psychological themes: self-regulation skills, self-efficacy and confidence, emotional regulation, intrinsic and extrinsic motivation, behavioral consistency and habit formation, social and environmental support, cognitive beliefs and attitudes, cognitive flexibility, and personal values and identity integration. The quantitative phase further ranked these predictors using data collected from 180 undergraduate students in Tehran. Results indicated that self-regulation skills, self-efficacy and confidence, and emotional regulation were the three strongest predictors of lifestyle change maintenance, while cognitive flexibility and value–identity integration ranked lowest. These findings highlight that the sustainability of health-related behaviors among students is predominantly determined by individual-level psychological mechanisms rather than external or contextual factors.

The prominence of self-regulation skills as the most influential predictor aligns with extensive literature emphasizing its centrality in maintaining lifestyle changes. Self-regulation involves planning, self-monitoring, and impulse control, which allow individuals to maintain consistent behaviors even in the presence of obstacles (8). University students, often managing multiple responsibilities and stressors, benefit from these self-regulatory competencies in translating intention into sustained action. Previous studies have consistently demonstrated that self-regulation mediates the relationship between motivation and behavioral adherence (6, 17). Furthermore, behavioral maintenance models such as the Health Action Process Approach (HAPA) highlight the role of planning and action control as essential volitional constructs supporting behavior persistence (10). The current findings strengthen these theoretical claims by empirically ranking self-regulation as the top determinant in a student population, suggesting that training interventions focused on goal setting, behavioral tracking, and impulse control may be pivotal in reinforcing sustainable health practices.

The second-highest ranked factor, self-efficacy and confidence, also corroborates prior evidence from social-cognitive and behavioral models. Self-efficacy, as conceptualized by Bandura and extended in health behavior research, represents the belief in one's capability to organize and execute actions required to manage situations (11). In the context of health maintenance, strong self-efficacy enables students to perceive challenges not as threats but as opportunities for mastery. Findings from the Theory of Planned Behavior (TPB) confirm that perceived behavioral control—conceptually similar to self-efficacy—is among the strongest predictors of intention and behavioral persistence (4, 7). Likewise, Hakobjanyan (9) found that intrinsic motivation combined with self-efficacy significantly predicts healthy lifestyle intentions among adolescents, reinforcing that confidence interacts with motivation to sustain behavioral engagement. The integration of these insights suggests that lifestyle interventions for students must enhance not only behavioral competence but also perceived mastery through positive feedback, peer modeling, and success reinforcement.

Emotional regulation, which ranked third, emerged as another critical determinant of lifestyle change maintenance. Emotionally regulated individuals demonstrate greater resilience against stress and are more capable of sustaining adaptive behaviors (11). This aligns with evidence showing that emotion regulation and self-compassion protect individuals from lapses by buffering against the psychological strain of setbacks (1). In a related study, Hughes et al. (20) underscored that interdisciplinary health interventions that integrate emotional management strategies result in longer-term adherence compared to behaviorally focused approaches alone. For students, who often face fluctuating emotional states due to academic and

social pressures, the ability to manage emotional responses directly supports sustained engagement with healthy behaviors. The interplay between self-regulation and emotion control therefore appears to form a synergistic foundation for long-term behavioral stability.

The moderately ranked factors—*intrinsic and extrinsic motivation* and *habit formation*—further underscore the importance of motivational persistence and behavioral automation. Motivation remains an enduring focus in behavioral science, particularly as it relates to internalization and autonomy (9). Consistent with the findings of Takalapeta and Huwae (8), *intrinsic motivation* predicted adherence to healthy routines among student-athletes, suggesting that self-determined goals rooted in enjoyment and personal meaning enhance sustainability. Similarly, habit formation theory explains that through consistent repetition and reinforcement, behaviors transition from intentional to automatic patterns (19). This transformation reduces cognitive effort and dependence on fluctuating motivation levels, leading to greater consistency in health maintenance (12). Therefore, students who establish structured habits—such as fixed exercise schedules or regular meal planning—are more likely to sustain health-promoting routines even when faced with competing academic or social demands.

Social and environmental support, ranking sixth, played a facilitative though less dominant role compared to individual psychological constructs. While intrinsic mechanisms drive most behavioral maintenance, external factors such as supportive peer networks, family encouragement, and institutional programs serve as reinforcements that enhance persistence (2). The present findings align with those of Rizqi et al. (13), who reported that social norms and perceived behavioral control influence health behaviors, but their effects diminish over time unless internal motivation is concurrently strengthened. Furthermore, Dee and Sakinah (23) highlighted that educational interventions grounded in theory-based models yield more sustainable health outcomes when combined with community or institutional support. Therefore, although social reinforcement provides an initial motivational boost, enduring change relies on the individual's self-regulatory capacity and emotional stability.

The lower-ranked predictors—*cognitive beliefs and attitudes*, *cognitive flexibility*, and *value–identity integration*—while significant, reflected secondary influences in the current study. Cognitive belief systems, including attitudes toward health and internal locus of control, are foundational to behavioral initiation but may decline in predictive strength over time as behaviors become habitual (14, 16). These beliefs influence the cognitive appraisal of benefits and barriers, aligning with the cognitive–behavioral perspective that perceived control mediates sustained adherence (15). Cognitive flexibility, although less emphasized, remains essential in adapting behaviors to changing contexts. Students with adaptive thinking and learning orientation exhibit better long-term outcomes when environmental or personal conditions fluctuate (5). Finally, the low ranking of value–identity integration suggests that while self-concept alignment and personal meaning are relevant to the internalization of health behaviors, they may play a more distal role in maintenance among young adults, whose identities are still evolving (3). Nonetheless, over longer periods, identity-based motivation could become more prominent as individuals solidify their value systems and life goals.

These collective findings contribute to the growing body of literature emphasizing the dynamic interplay between motivational, volitional, and affective processes in sustaining health-related behaviors. The results corroborate the Integrated Behavior Change (IBC) model's assumption that behavior maintenance emerges

from a synergy of intention, self-regulation, and habitual control (21). This model provides a comprehensive framework for understanding how motivational and self-regulatory systems jointly sustain behaviors over time. Moreover, the study's ranking outcomes are consistent with the multi-stage frameworks such as HAPA, which differentiate between motivational formation and volitional execution phases (10, 17). These theoretical alignments reinforce that self-efficacy and emotion regulation function as bridging mechanisms, converting abstract intentions into concrete, sustained actions (6, 7). In this regard, lifestyle change maintenance among students can be conceptualized as a self-regulatory continuum, where intention transforms into habit through iterative cycles of planning, feedback, and emotional control.

An additional noteworthy implication of the findings lies in the potential for digital and behavioral tracking tools to enhance self-regulation and motivation. Recent studies indicate that mobile health applications and self-monitoring technologies significantly improve behavioral adherence by providing real-time feedback and reinforcing intrinsic motivation (25). However, as noted by Zhang et al. (22), technological facilitation must be balanced with internalized motivation to prevent dependency on external cues. The sustainability of behavioral change ultimately depends on integrating these digital tools within a broader framework of self-awareness, emotional literacy, and goal-driven reflection (24). Therefore, the practical application of these findings suggests that combining digital monitoring with self-regulatory and motivational interventions could provide a holistic strategy for sustaining lifestyle behaviors in student populations.

Collectively, the findings support a conceptual hierarchy wherein individual-level psychological constructs—self-regulation, self-efficacy, and emotional control—constitute the core of lifestyle maintenance, while social, cognitive, and identity-related factors exert contextual influence. This hierarchy reinforces the argument that while environmental and social interventions can facilitate change, sustainable maintenance depends primarily on strengthening internal psychological resources (6, 9). From a theoretical perspective, this study contributes to refining the understanding of how behavioral maintenance mechanisms operate in transitional populations such as undergraduate students, whose behavioral stability is still in development. The empirical prioritization of self-regulatory factors highlights the need for health promotion programs to incorporate cognitive-behavioral and emotional regulation training as foundational components rather than secondary supplements.

This study, despite its comprehensive design, is not without limitations. The primary limitation concerns the reliance on self-reported data in the quantitative phase, which may introduce response bias due to social desirability or self-perception inaccuracies. Although confidentiality was assured, participants might have overestimated their self-regulatory or motivational capabilities. Another limitation relates to the cross-sectional nature of the ranking analysis, which restricts causal inference regarding the directionality between psychological predictors and lifestyle maintenance. Furthermore, while the sample of 180 undergraduate students from Tehran universities provided sufficient diversity, cultural and contextual factors specific to this population may limit generalizability to other regions or age groups. The qualitative phase, which relied on literature synthesis rather than primary interviews, may also have constrained the depth of experiential insights. Finally, the study focused primarily on psychological factors, leaving physiological or environmental determinants of lifestyle maintenance unexplored.

Future research should aim to expand upon these findings through longitudinal and cross-cultural studies to establish causal relationships and examine the temporal stability of psychological predictors. Employing mixed methodologies that include in-depth interviews or focus groups could enrich understanding of students' lived experiences and contextual barriers to lifestyle maintenance. Additionally, future studies might integrate physiological measures such as fitness indicators or biometrics to triangulate self-reported data and enhance objectivity. Comparative studies across educational levels, cultural backgrounds, and socioeconomic contexts could reveal variations in the relative influence of psychological predictors. Furthermore, exploring the interaction between digital health technologies and psychological mechanisms would provide valuable insights into how technological engagement supports or undermines autonomous motivation over time.

From a practical standpoint, the findings highlight the importance of developing health promotion interventions centered on strengthening self-regulation, self-efficacy, and emotional management among students. University wellness programs should incorporate structured self-monitoring activities, goal-setting workshops, and reflective practices to foster sustained health behavior. Training students in emotion regulation strategies such as mindfulness, stress management, and self-compassion can enhance resilience and prevent behavioral relapse. Academic institutions might also benefit from integrating digital self-tracking tools with personalized feedback systems that reinforce internal motivation. Finally, creating supportive peer environments and campus cultures that value well-being can amplify individual efforts, ensuring that lifestyle maintenance becomes both a personal and communal norm.

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Authors' Contributions

All authors equally contributed to this study.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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