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Designing for Self-Tailoring in Adolescent Health Behavior Change

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Abstract: Digital behavior change tools increasingly use system-driven tailoring to guide users toward healthier choices. While well-intentioned, such approaches may undermine autonomous behavior change by removing users from decision-making processes and limiting opportunities to develop self-knowledge: a practical understanding of what works for oneself that can help regulate current and future behaviors. This is particularly consequential for adolescents, who are developing personal autonomy at a time when the health behaviors they establish can have long-term consequences. We propose that self-tailoring can enhance autonomy by actively involving users in constructing and adapting approaches to their own contexts. Through two studies, we investigated how adolescents can be supported in constructing their own behavior change strategies. Study 1 shows that adolescents are capable of self-tailoring and that doing so can build self-knowledge through experience. Study 2 shows how a strategy menu at moments of goal (re)setting can scaffold self-knowledge to inform behavioral choices.

Keywords: self-tailoring; self-knowledge; adolescent health; health behavior change

1. Introduction

Digital behavior change technologies promise to transform how people manage their health. Health applications have become ubiquitous, with millions using apps for everything from step counting to meal planning. These technologies increasingly employ tailoring to provide a personalized experience by adjusting content, features, and interface of interventions to improve fit with user needs and increase effectiveness and engagement (Lustria et al., 2013).

The dominant approach in digital behavior change interventions (DBCIs) has been system-driven tailoring (Rivera-Romero et al., 2023), where interventions automatically adapt based on predefined rules and algorithms that process user data (Kreuter & Skinner, 2000). Health experts design the intervention logic using behavior change techniques (BCTs), which the system then adjusts algorithmically according to user demographics, personality traits, goal types, or ongoing usage patterns (Klooster et al., 2024). For example, a step counter might send a notification that a daily goal has not yet been reached, prompting the user to take action based on the system's real-time monitoring.

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However, this technological sophistication in system-driven tailoring may undermine autonomous and effective behavior change. By processing user data and automatically presenting adapted content, algorithmic systems place users outside the decision-making loop, creating a separation between the user (as data source) and the system (as decision-maker). Just-in-time interventions, for instance, deliver motivational messages at moments when users are deemed the most "receptive" (Nahum-Shani et al., 2018).

This creates two problems. First, it concentrates ethical responsibility with designers to determine what constitutes "desired" behavior change and whether interventions align with users' self-interests and values (Jun et al., 2018). Second, while system-driven tailoring intentionally reduces cognitive load to lower barriers to action (Nahum-Shani et al., 2018), users outsource their decision-making to algorithms that detect patterns and suggest interpretations on their behalf. By handling this interpretive work, and with it the choices about what to do and when, system-driven tailoring risks producing cognitive offloading. This limits the opportunity for users to develop self-knowledge: a practical, personal understanding of what works for oneself in one's own context, built through engagement with behavior rather than received from an external system (Heyen, 2020).

This tension between convenience and capacity building is reflected in how engagement is conceptualized in DBCI research. Researchers in digital health distinguish between micro-engagement (engagement with the tool itself: clicks, time spent in-app) and macro-engagement (engagement with actual behavior change process) (Villegas Mejía et al., 2024; Yardley et al., 2016). This distinction raises questions about how technology should support health behavior change. Should health behavior change technologies be designed for continuous use, or to stimulate independent regulation of health behaviors? While system-driven tailoring excels at creating convenient user experiences, it can undermine users' autonomy and active engagement in the behavior change process itself.

This concern is particularly acute for adolescents. It is a period of rapid physical, cognitive, and social change, during which young people are developing personal autonomy and taking greater responsibility over their own choices (Dahl et al., 2018). The behaviors they establish during this period often last into adulthood and have long-term consequences for their wellbeing and disease risk (Campbell et al., 2020). Because their motivations and barriers around health behavior are diverse and shifting (Houtman et al., 2025), adolescence is a window of opportunity to supporting young people in learning to navigate health decisions and accumulating experiences from which self-knowledge can grow. If adolescents come to rely on digital tools to manage their health decisions during this time, it can come at the cost of developing the capacities they will need beyond adolescence to regulate their own behaviors autonomously.

In order to move beyond engagement with the screen toward engagement with behavior change itself, behavior change tools must account for users' personal context and adopt a transfer of learning rationale (Villegas Mejía et al., 2024). While passive sensing data can capture behavioral frequencies and environmental context such as step count and GPS location (Nahum-Shani et al., 2018), it reduces understanding of the self to individual tracked parameters and does not capture the subjective experiences and personal meanings through which people actually construct an understanding of their own behavior (Krippendorff, 2005; Rapp & Tirassa, 2017). When people come to rely too heavily on these numeric accounts, they risk displacing their own felt sense of their behavior with an externalized, numeric one

(Nichols, 2017). Rather than leaving users dependent on external systems to define their behavior for them, tools could instead be designed to help people recognize what works for them and why. Over time, this kind of engagement with one's own decisions can build personal heuristics that help users navigate their health behavior across changing circumstances (Schraefel et al., 2021).

By increasing self-tailoring, behavior change tools can support users to construct their behavioral actions rather than simply receiving them, deciding for themselves what strategies to pursue and how to enact them. While many DBCIs offer ways to tailor the user experience, users still have minimal influence over the underlying behavioral mechanisms applied (Hankonen, 2021; Klooster et al., 2024). Designers select BCTs deemed suitable for a given behavior or target group (Fiedler et al., 2020), yet BCTs such as reminders, action planning, and social accountability are broad concepts that leave significant room in how they are designed and enacted (Farhat-ul-Ain et al., 2025). Research with adolescents, for example, shows that participants use only a subset of offered BCTs (Hankonen et al., 2015), suggesting that they already select those strategies that seem most useful and relevant to them.

Rather than pre-formulating BCTs further, behavior change tools can offer strategies in actionable and digestible forms that users can choose and adapt for themselves (Hankonen, 2021). This is a form of delegation of design, in which the act of designing is distributed to the user (Krippendorff, 2005). In doing so, interventions do not become prescriptions but invite users to draw on their own self-knowledge to contextualize and enact strategies, making and learning from their own decisions over time.

As illustrated in Figure 1, we conceptualize self-tailoring as a cycle in which the tool and behavior are connected through the user's developing self-knowledge. Rather than prompting behavior directly, the tool scaffolds self-knowledge, supporting users in making sense of their own experiences and choices. That self-knowledge then informs how users choose to act. Enacting those choices contributes to self-knowledge over time through experiences, which in turn informs how users continue to engage with the tool.

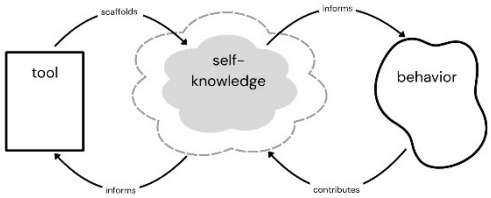


Figure 1. Self-tailoring as a cycle of tool, self-knowledge, and behavior.

This paper explores how self-tailoring can work in practice with adolescents. While digital interfaces typically aim to minimize cognitive effort (Mejtoft et al., 2019), the effortful sense-making that self-tailoring requires is where its value lies. This cognitive involvement serves as a form of positive friction (Chen & Schmidt, 2024) that, when applied at the right moment in the behavior change process, can foster intentional engagement through which self-knowledge can develop to support autonomous health behavior change. We conducted two studies with adolescents, developing prototypes that investigate how adolescents construct,

apply and reflect on behavior change strategies, examining how self-tailoring can be designed.

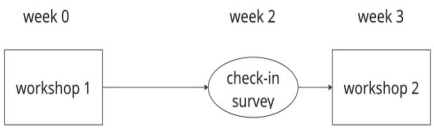
2. Method

Using a Research through Design (RtD) approach (Stappers & Giaccardi, 2017), we iteratively developed and tested two prototypes to support adolescents in self-tailoring various aspects of a healthy lifestyle behavior goal. The studies were conducted as sequential phases: Study 1 was exploratory, aimed at understanding how adolescents construct, apply and reflect on their own behavior change strategies; Study 2 was generative, translating those insights into a concrete design artifact and examining how a strategy menu could support user constructed strategies. In both studies we recruited first-year bachelor students, whose transitional life stage and new academic environment provided a naturalistic setting for studying how adolescents develop and revise personal behavior change strategies amid real competing demands.

Study 1 involved two workshops in which participants reflected on a self-chosen health behavior goal, generated possible strategies, and configured their own approach. An online check-in between sessions gave participants the opportunity to revisit and revise their strategies based on early experience.

Study 2 built on the findings of Study 1 by developing a strategy menu, which was explored with a new cohort to examine how a structured set of options could support user constructed health behavior strategies. Table 1 outlines the research questions and characteristics of the two studies.

Table 1. Studies overview.

	Study 1	**Study 2**
Research question	How do adolescents construct, apply and reflect on their behavior change strategies?	How can adolescents be supported in constructing their own health behavior change strategies using a menu?
Prototype	We developed two workshops in which we provided paper based reflection tools with prompts to guide users to defining, choosing and reflect on strategies for a personal health goal.	We developed a menu with behavior change strategies as selectable “building blocks” that participants could combine to construct personalized approaches to help structure health behavior change
Duration & Structure	Two 60-minute workshops over three weeks and a check-in survey 	Single 15-minute session in which participants used the strategy menu to construct their behavioral strategies.
Participants	7 first-year bachelor industrial design engineering students (7 female age 18-20)	20 first year industrial design engineering students (14 male, 6 female, age 18-19)
Recruitment	Recruited via posters and messages in student whatsapp groups. New Year’s resolutions. Participants received a free healthy lunch during the workshops. January 2024	Recruited via participants at the end of a lecture. With participation, participants could win one of two 5 euro voucher via a lottery. October 2024
Data &	Qualitative content analysis of reflection worksheets,	Quantitative analysis of strategy selection

analysis	check-in questionnaire responses, workshop audio recordings, and field notes to identify patterns in adolescent behavior change processes and opportunities for positive friction.	patterns and ratings which we supplement with participant generated examples of strategies and fieldnotes

3. Study 1

3.1 Process

Participants with New Year's intentions completed a three-week intervention comprising two in-person workshops with an online check-in at the midpoint inspired by the set-up by (Fedlmeier et al., 2022).

Workshop 1 (Week 0): Participants used two worksheets (Figure 2) to design personal behavior change experiments. The first worksheet prompted divergent thinking to generate potential strategies (e.g. what would it look like if it were social, what would it look like if it were a game?); the second facilitated convergent thinking to concretize one strategy by defining goals, action steps (trigger, time, place), motivation approaches, anticipated obstacles, success criteria, and progress measurement. Participants then implemented their self-designed strategy for two weeks.

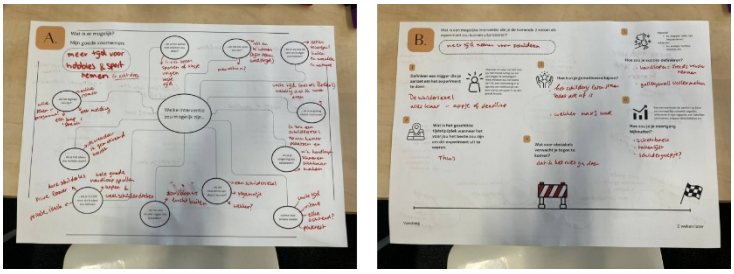


Figure 2. Worksheets for workshop 1. Left prompted thinking of diverging option and right prompted to make the goal and strategy concrete.

Online Check-in (Week 2): Participants assessed their experiment's progress, identified useful elements, determined next steps (stop, adapt, enhance, maintain), and optionally redesigned their experiment for another week.

Workshop 2 (Week 3): Participants drew and annotated motivational timelines of their three-week experience with their goal and discussed their self-tailoring process.

3.2 Results

3.2.1 Diverse Personal Goals and Strategies

During workshop 1, participants selected individual health behavior goals that clustered around two main themes:

1. **Daily structure** (5 participants): establishing morning routines, waking up earlier, creating scheduled study blocks, or achieving work-leisure balance
2. **Specific health behaviors** (2 participants): reducing sugar intake or increasing exercise and creative hobbies

Despite goal differences, participants defined similar sets of behavior change strategies for their two-week experiment, as shown in Table 2.

Table 2. Strategies employed by participants.

Strategy Type	Description	Examples
Reminders	Self-prompts for goals and strategies	Handwritten notes in planners, sticky notes, timed smartphone notifications
Social Accountability	Peer-based support systems	Group chats for progress updates, regular peer check-ins
Planning Strategies	Task organization and time management	Drafting task lists, scheduling specific time slots for activities
Environmental Design	Physical space arrangement to reduce barriers	Pre-arranging spaces for easier behavior initiation
Anticipating Benefits	Cognitive projection of positive outcomes	Imagining post-exercise energy, self-rewards for completion, penalties for non-adherence

At the week 2 check-in survey, all participants wanted to keep trying at their goals. Six out of seven participants indicated that they wanted to revise their goals and strategies. These revisions generally increased the goals' specificity, detail, and accountability, shifting them from broad intentions to more concrete, actionable commitments.

The following are some examples from revised goals made during the check-in:

- "Establish a morning routine" → "Wake at 07:45 without snoozing"
- "Be late less often" → "Not forget plans and be late less often"
- "Better balance between work and leisure" → "Plan more clearly and stick to my planning"

Strategies were also adapted. Four of the seven participants shifted toward time-blocking approaches, assigning more dedicated timeslots to activities to "make sure they follow through". Planning tools were switched from analogue (e.g., handwritten planners, sticky notes) to digital ones, to make them more easily accessible. This was in particularly common among participants aiming to improve their daily structure. Others still maintained a combination of the previously mentioned strategies, such as social accountability, loss aversion, adding obstacles and timed reminders.

3.2.2 Motivation Fluctuations and Reset Moments

Motivational timelines created during workshop 2 (Figure 3) showed consistent patterns across all participants. Motivation peaked immediately after the first workshop, when participants started implementing their initial experiments, then declined over the following two weeks, sometimes rapidly, sometimes more gradually. Around the time of the check-in survey, which prompted participants to revisit and reset their goals, their motivation levels rose again. Participants explicitly mentioned that these structured moments of reflection helped them regain focus, even when external circumstances had derailed their initial efforts. One participant explained: "The survey made me realize I hadn't completely forgotten about my goal, I just needed a reminder to get back on track" Despite being able to

self-tailor the new iteration of their goals and strategies, participants expressed a need for having explicit options to choose from when planning their behavior change strategies.

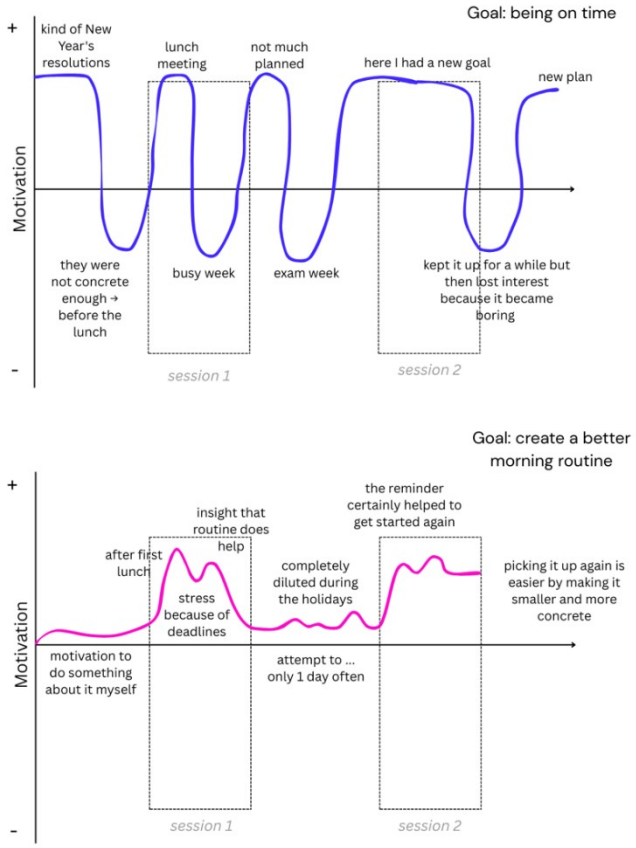


Figure 3. Annotated motivational timelines participants made during workshop 2.

A common theme that emerged was that the decline in motivation coincided with the examination period following the first session. Although students had initially been motivated to "get their lives in order" before exams, motivation decreased as both the initial enthusiasm faded and academic pressures intensified. The subsequent holiday period further disrupted routines, as students relaxed and temporarily abandoned their goals.

3.3 Insights study 1

Study 1 demonstrated adolescents' capacity for self-tailoring. Participants employed diverse strategies such as planning aids, social accountability, environmental design, and motivational tactics, many aligning with evidence-based BCTs, suggesting they already possess knowledge about behavior change principles.

Participants also learned from experience. During the two-week period, they faced obstacles from changing routines and academic pressures. However, the online check-in had a "fresh start" effect, prompting recommitment to the goal. This pattern suggests motivation fluctuations stemmed from contextual factors rather than loss of interest.

The design elements supported self-tailoring through expanding awareness and by creating focus (Chen & Schmidt, 2024).

3.3.1 Expanding awareness:

- Workshop 1's exploration worksheet prompted participants to diverge in what kinds of strategies they could adopt

Check-in survey created moments to reflect on experiences and reconsider intentions

Motivational timeline facilitated reflection on previous attempts, identifying obstacles and patterns

- Workshops provided dedicated time, creating deliberate slowness for reflection

3.3.2 Creating focus:

- Workshop 1's action planning worksheet made approaches concrete and specific

Check-in survey prompted reassessment and adjustment of goals and strategies

4. Study 2

Building on these findings, Study 2 focused specifically on (re)set moments where users define or redefine their approach. To address participants' expressed need for a structured overview of strategy options, we developed a strategy menu that provides concrete behavioral mechanisms users can select and combine for their goals.

4.1 Designing the Menu

Based on Study 1 findings, we designed a strategy menu to guide users in self-tailoring strategies to their behavioral goals. We established four design requirements:

- **Versatility**: Applicable across different goal types
- **Approach-oriented**: Focused on adopting new behaviors rather than avoiding existing behaviors
- **Modularity**: Strategies that can combined as building blocks used towards the same goal
- **Self-enactable**: Can be used independently by the user

The first author compiled an initial pool of strategies from three sources, each selected because the strategies are self-enactable: users can implement them independently, without requiring a designer or system to operationalize them. This distinguishes them from the broader BCT literature, which is primarily designer-facing and requires translation into intervention logic before reaching the user.

The first source was participant-generated strategies from Study 1, capturing approaches adolescents had developed in practice. The second was the Compendium of Self-Enactable Techniques (Knittle et al., 2020), a theoretically grounded taxonomy of strategies individuals can use to regulate their own motivation and behavior autonomously. The third was Atomic Habits (Clear, 2018a) and its accompanying online resource 30 Days to Better Habits (Clear,

2018b), a popular science resource based on habit formation research whose practical phrasing made strategies user friendly and actionable. Together, these sources provided a broad pool spanning theory-grounded but practice-oriented items, yielding an initial set of 214 strategies.

Strategies were clustered inductively by behavioral mechanism, such as reducing effort, planning, cueing, or social accountability, focusing on functional similarity rather than surface phrasing. Duplicates were removed and near-identical strategies serving similar actions were merged. The remaining strategies were evaluated against the four design requirements, and those that were domain-specific, required external support, or could not be flexibly combined were excluded, resulting in 32 strategies. Each strategy was then reformulated with an actionable title, short description, and cluster label.

Three of the authors [TAH, FSV, VV] then collaboratively reviewed the candidate set. Through discussion the remaining redundancies were resolved by checking against the design requirements and merging strategies with similar functionality, and cluster names were refined to reflect the shared underlying mechanism of each cluster. This resulted in a final set of 29 strategies organized into six categories (Table 3).

Table 3. Strategies included in the menu organized into six categories.

Space: Environmental design	**Time:** Scheduling and transitions	**Action:** Breaking up or adjusting actions	**Symbols:** Visual cues and celebrations	**Social:** Accountability and support	**Mindset:** Mental reframing
Make it easy	Time blocking	Stack habits	Celebrate your success	Do it together	Every day is a reset
Remove temptations	Time pressure	Start small	Visualize streaks	Tell it somebody	Every obstacle has two sides
Add obstacles	Use transitions	Break up actions	Visual memory	Find like-minded people	Enjoy the moment
Setting the stage		Track behavior	Make it stylish	Public commitment	Visualize pride
		Make it more fun			Positive perspective
		Add challenge			Anticipate regret
		2-in-1 actions			Mental rehearsal

To guide systematic application, we incorporated a temporal dimension inspired by ritual design frameworks (Venkataramani & Menter, 2022). Users would consider when to deploy each strategy: before (setting up conditions), during (in-the-moment support), or after (tracking outcomes) the goal activity.

4.2 Process

To explore how adolescents can be supported in crafting their own health behavior change strategies using a menu, we created a worksheet (Figure 4) tested the strategy menu with twenty bachelor students through a two-stage process.

4.2.1 Stage 1: Goal Selection

Participants chose one health goal from three domains:

- **Move:** Move daily through walking or biking to improve energy, focus, and lower stress
- **Eat:** Consume a balanced mix of protein and healthy carbs for more energy and mental focus
- **Recharge:** Take regular breaks from studying or technology with planned screen-free time

4.2.2 Stage 2: Strategy formation

Participants then:

- Selected their top 5 strategies from the 29-item menu
- Wrote an example for each strategy
- Rated each strategy on applicability, effectiveness, and longevity (1-5 Likert scale)
- Indicated temporal placement (before, during, or after the activity)

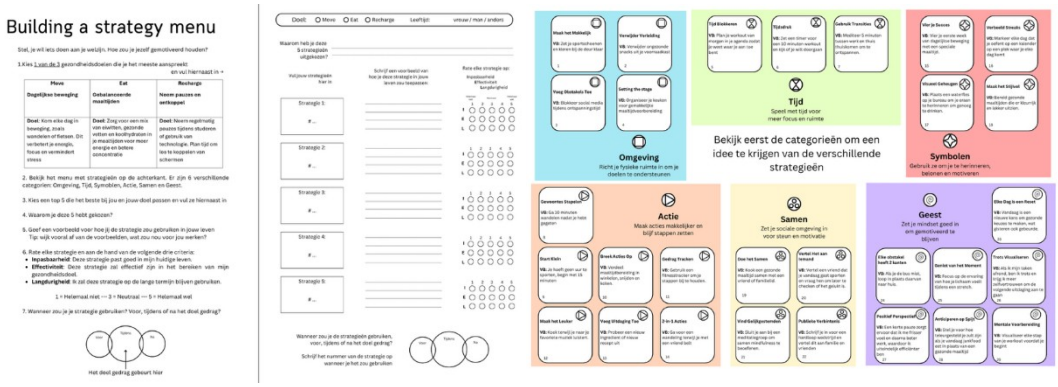


Figure 4. Overview of worksheet used during test.

4.3 Results

4.3.1 Overall Strategy Selection Patterns

Of the 20 participants, 11 chose move goals, 8 chose eat goals, and 1 chose a recharge goal. Each participant selected a unique combination of five strategies, no two sets were identical. Each set of strategies selected by a participant included at least 3 different categories, demonstrating that participants liked to draw from different categories. The distribution of the chosen strategies per category is shown in Figure 5.

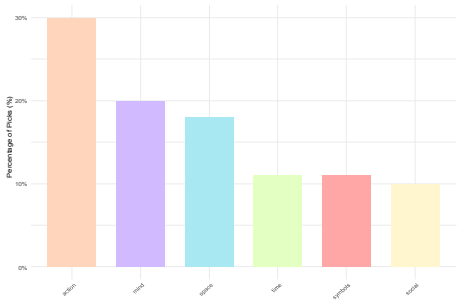


Figure 5. Percentage of chosen strategy categories overall.

The menu was used almost in its entirety. Out of the 29 strategies, only two were not selected: 'Use transitions' (Time) and 'Celebrate your success' (Symbols). The most frequently chosen strategies and their ratings on applicability, effectiveness and longevity is shown in Table 4.

The most selected individual strategies were Remove temptations and Time blocking. Participants grounded these in their own contexts, for example removing temptations by "not having anything unhealthy in the house" or time blocking by scheduling "an hour dedicated so I don't have any excuses".

Participants also selected strategies to make activities more appealing. Some added enjoyable elements by "listening to music at the same time" while others introduced challenges like "trying a new vegetable in a recipe every week". Finally, Symbol and Social strategies were chosen to provide environmental and interpersonal support, such as "put the healthy snacks within sight" and "going [to the gym] with a friend works best, you motivate each other". Notably, Likert ratings for the same strategies varied widely across participants, suggesting that different strategies resonate with different users.

Strategies were predominantly placed **before** (n=53) or **during** (n=50) the target activity, with very few selected for **after** (n=9) (some strategies were placed at multiple timepoints e.g. both before and during), suggesting participants prioritized preparation and in-the-moment support over post-activity monitoring.

Table 4. Mean ratings for most frequently selected strategies.

Strategy	**Category**	**# of picks**	**Goal domain**	**Applicability** Mean (range)	**Effectiveness** Mean (range)	**Longevity** Mean (range)
Remove temptations	Space	9	Eat (6) Move (3)	3.67 (1–5)	4.22 (3–5)	3.44 (1–5)
Time blocking	Time	9	Move (9)	3.67 (2–5)	4.44 (3–5)	3.44 (2–5)
Make it more fun	Action	6	Eat (4) Move (2)	3.83 (2–5)	3.83 (3–5)	4.00 (2–5)
Add challenge	Action	6	Eat (4) Move (2)	3.50 (3–4)	3.83 (3–5)	3.33 (2–5)
Setting the stage	Space	5	Eat (4) Move (1)	4.00 (3–5)	3.80 (3–5)	3.60 (3–4)
Stack your habits	Action	5	Move (5)	3.80 (2–5)	4.60 (4–5)	4.20 (2–5)
Visual reminders	Symbols	5	Eat (5)	4.60 (4–5)	4.00 (2–5)	4.20 (3–5)
Do it together	Social	5	Eat (2) Move (2) Recharge (1)	3.80 (2–5)	4.40 (3–5)	3.40 (2–5)

4.3.2 Domain-Specific Selection Patterns

Distinct patterns emerged across goal domains (Figure 6). Due to having only one participant, Recharge was excluded from comparative analyses. While Move and Eat goals both relied heavily on Action and Mindset strategies, they differed in other categories. Participants with Move goals favored Time and Social strategies, while participants with Eat goals favored Space strategies (e.g., controlling food availability) and Symbol strategies (e.g., creating visual reminders in eating contexts).

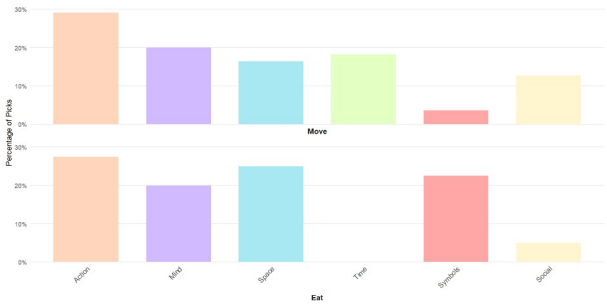


Figure 6. Percentage of chosen strategy categories per goal domain.

4.4 Insights study 2

Study 2 demonstrated how a strategy menu can facilitate self-tailored behavior change planning among adolescents by scaffolding deliberate strategy selection. Participants selected 27 of the 29 available strategies with minimal overlap in their set of strategies. Ratings for the same strategies varied widely across participants, suggesting that perceived strategy effectiveness and applicability is highly personal.

While Action strategies appeared universally, complementary patterns differed by goal type. Move goals paired with Time and Social strategies; Eat goals paired with Space and Symbol strategies. These patterns reveal adolescents' intuitive understanding of domain-specific needs: dietary change requires controlling food availability and visual cues, while physical activity benefits from time planning and social motivation.

The strategy menu supported self-tailoring again through expanded awareness and creating focus (Chen & Schmidt, 2024)

Expanding awareness:

- The menu presented an overview of strategy options
- Diversity in strategies suggest exploration of personal fitting strategies

Creating focus:

- Participants had to make deliberate choices and make the strategy concrete with an example
- The menu provided strategies to support the goal, either inhibiting automatic behaviors (removing cues) or activating new behaviors (stack habits)

5. Discussion

This paper explored how self-tailoring can be designed in health behavior change tools. Through two iterative studies, we examined how adolescents construct, apply and reflect on their behavior change strategies. We organize our discussion around three key themes: adolescents' capacity for self-tailoring, how self-tailoring can be operationalized, and the strategic timing of positive friction. We then provide design implications and conclude with limitations and future directions.

5.1 Adolescent Capacity for Self-Tailoring

Our studies demonstrate that adolescents are capable of self-tailoring their health behavior change trajectory in two ways: they craft strategies that already incorporate behavioral change principles, and they update their approaches based on self-knowledge gained through experience.

In Study 1, participants autonomously specified goals and strategies using only basic prompts. Participants generated their own strategies rather than receiving them, placing themselves as the authors of their own behavioral plans. Without explicit instruction, participants' strategies already reflected established behavior change principles such as reminders, social accountability, and environmental modification.

The two-week experimental period revealed participants' capacity to build self-knowledge through that experience. They discovered what worked, identified barriers, and adjusted accordingly. Broad intentions like "establish a morning routine" evolved into specific commitments like "wake at 07:45 without snoozing," demonstrating reflection and refinement of their plan. These shifts reflect participants adapting their approaches in response to what they experienced, tuning them to fit their personal circumstances (schraefel & Hekler, 2020).

Study 2 showed that despite gravitating intuitively toward domain-specific strategies, each adolescent constructed different approaches, reflecting their own preferences and life contexts. This suggests that adolescents bring their own self-knowledge into the behavior change process, and strategy menus can scaffold those choices. Together, both studies show that with minimal guidance, adolescents were able to draw on their experiential insights, build self-knowledge, and use it to construct their strategies.

5.2 Operationalizing Self-Tailoring for Health Behavior Change

Across both studies, the design elements we developed supported self-tailoring by creating conditions for users to construct, enact and reflect on their behavioral strategies. Drawing on Chen and Schmidt's (2024) positive friction framework, we find that these conditions operate at two levels: the level of tool interaction and the level of the behavior itself. Self-knowledge connects these two levels: rather than prompting behavior directly, the tool scaffolds self-knowledge, which in turn informs how users choose to act. Figure 7 summarizes these insights.

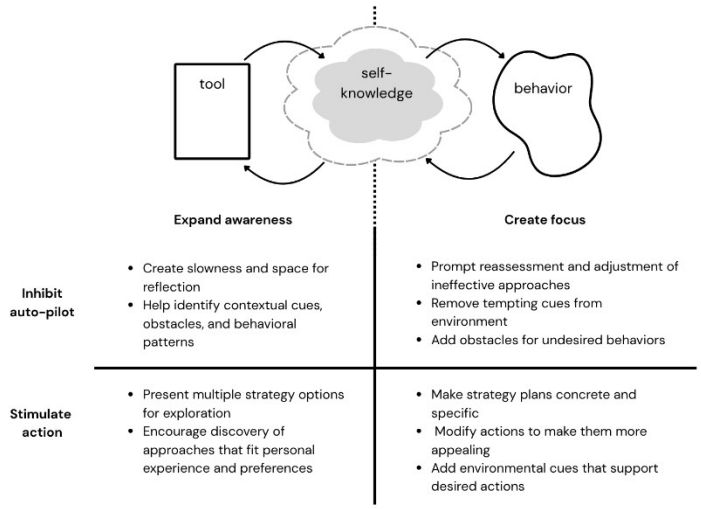


Figure 7. Summary of insights on how self-tailoring can be operationalized at the level of tool interaction and at the level of the behavior.

At the tool level, behavior change tools can support self-tailoring by expanding user awareness about possible actions. Study 1 demonstrated this through workshops and motivational timelines that provided time and space for reflection, helping participants identify contextual barriers and behavioral patterns that disrupted existing automatic routines. Study 2's strategy menu expanded awareness by presenting diverse strategy options and enabling users to search for approaches that fit their needs, preferences, and goals.

At the behavior level, creating focus proved essential for structuring engagement with the behavior change process. Auto-pilot behaviors could be inhibited through prompts to refocus on goals, such as Study 1's check-in, which redirected participants who had lost focus amid life's demands, and through strategies that added obstacles or removed cues to prevent temptations and unwanted behaviors. To stimulate new actions, tools helped users make plans concrete, structured, and actionable. This included making deliberate choices about when to deploy strategies temporally and providing modular building blocks that users could apply to modify their actions, making them more appealing or adding visual cues and reminders to support desired behaviors.

These findings suggest how to promote self-tailoring in health behavior change interventions. Behavior change tools can create more space for reflection, slowdown, and option exploration, elements currently underdeveloped in DBCIs (Ekhtiar et al., 2022). Providing actionable strategies that users can enact themselves, rather than predetermined by designers, enables users to actively shape their behavior change process by modifying their actions and environments, and to develop an understanding of what works for them through doing so. Framing behavior change as explorative experiments (Fedlmeier et al., 2022) can also encourage users to approach their own behavior as personal scientists (Heyen, 2020): trying out strategies, observing what happens, and interpreting the results in light of their own context. Repeated cycles of this kind can build the insourced knowledge, skills, and practices that over time inform health decisions independently of the tool (Schraefel et al., 2021).

5.3 Timing of positive friction

We found that motivation fluctuates during the behavior change process in a consistent pattern. Motivation tends to dip due to life circumstances and schedule changes that break regular routines. However, (re)setting goals and strategies emerged as particularly motivating moments that provided a fresh start effect (Dai et al., 2014). In Study 1, the check-in survey restored motivation through goal revisiting, leading all participants to recommit to their strategies. Beyond restoring motivation, these moments are also opportunities for users to compare what they expected with what actually happened, and to revise their understanding of what their own context demands. Positive friction applied at these moments can support users in translating experiential insight into revised strategies, converting lived experience into the kind of self-knowledge that can guide future behavioral choices.

5.4 Design Implications

Our findings offer directions for designers working on self-tailoring in behavior change tools. Although our studies focused on adolescents, these insights may apply to other populations. We organized them around four themes.

Delegate strategy construction to users. Rather than pre-selecting behavior change techniques on users' behalf, tools should provide diverse strategies that users can select, combine, and adapt to their own needs. In this way, users with different needs, meanings, and skill levels can design their own realities with them (Krippendorff, 2005). Offering strategies across multiple dimensions, such as modifying actions, restructuring environments, using time cues, or drawing on social support, gives users the material to construct approaches that fit their particular context.

Keep strategies actionable but open to interpretation. Strategies should be concrete enough to act on, but leave sufficient room for users to bring in their own experiences and meanings. A degree of ambiguity can invite personal interpretation rather than foreclose it (Homewood & Vallgårda, 2020). Filling a strategy in with one's tacit understanding own context, history, and constraints is how users draw on (tacit) self-knowledge to make it their own. Providing examples can help users envision how a strategy might work in their own life, without prescribing a single way of enacting it. A balance between clarity and ambiguity is what gives self-tailoring room to work.

Design around the rhythms of people's lives. Cognitively effortful engagement should not be applied continuously but timed to align with motivational peaks, particularly at moments of goal (re)setting. The fresh start effect (Dai et al., 2014) suggests these moments carry heightened motivation and openness to change. Tools should make the most of them by supporting users to translate reflective insights into concrete, focused next steps, helping them rebuild momentum rather than simply revisiting what went wrong.

Design for pause. Slowing down interactions at reset and check-in moments creates space for users to reflect on what worked and what did not during the preceding experimentation

period. Rather than pushing toward the next action, slow technology (Odom et al., 2022) can support moments of mental rest and reflection before users commit to next steps.

5.5 Limitations

Our findings should be interpreted with several limitations in mind. First, our studies were done with a small sample of Dutch Industrial Design Engineering students. This population is highly educated and may be used to abstract reasoning. Self-tailoring and strategy menus might work differently with populations with different educational backgrounds, cultural orientations, or age groups, and different people may benefit from or prefer different degrees of self-tailoring.

Second, we did not test our set-up in a digital format. Our methods included the use of social spaces and physical worksheets which will influence the experience. Nonetheless, the principles we found may still be relevant for the design of digital interventions.

Third, our studies emphasized conscious, intentional pursuit of approach goals, the deliberate addition of a healthy lifestyle activity. It is unclear how self-tailoring might work for other types of behavior, such as avoidance goals (e.g. stopping smoking), or within health behavior change interventions embedded in clinical care. These contexts may place different demands on users and warrant separate investigation.

5.6 Future Directions

First, longitudinal studies are needed to examine how self-tailoring operates over time, and how repeated cycles of self-tailoring can be designed to build self-knowledge and support increasingly independent behavior regulation. Second, the strategy menu represents only one operationalization of self-tailoring. Alternative approaches, including those tailored to specific health behaviors such as sleep, nutrition, or physical activity, warrant further investigation in terms of how to best scaffold behavioral choices within those domains. Third, our second study focused on the upper part of the self-tailoring cycle: how tools can scaffold behavioral choices by drawing on users' existing self-knowledge. Future research should also explore the lower part of the cycle, examining how lived experience with behavior can generate new self-knowledge and feed back into behavior change tools. Rather than reducing self-understanding to individually tracked parameters, tools could move toward representations that also capture the subjective dimension of how people make sense of their own body and behaviors (Homewood & Vallgårda, 2020). **Conclusion**

Our findings provide initial insight into how self-tailoring can be operationalized in health behavior change tools. We show that adolescents are capable of constructing, enacting, and reflecting on their own behavioral strategies, and that scaffolding behavioral decisions can help bring self-knowledge into the behavior change process. By shifting from system-driven tailoring toward self-tailoring, behavior change tools can support users in building the self-knowledge that makes it possible to navigate health decisions autonomously.

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