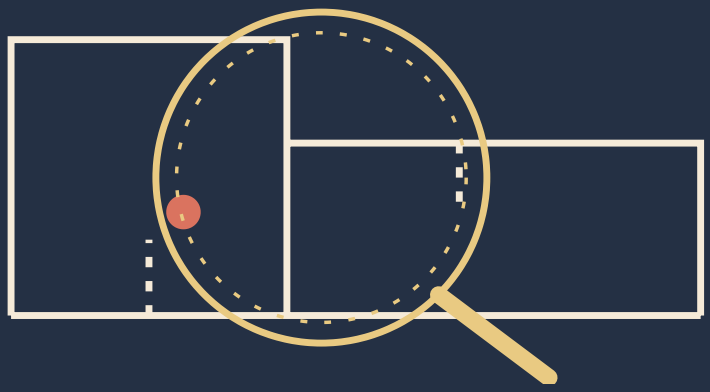
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FIELD GUIDE · HABIT FORMATION AND ENVIRONMENTAL DESIGN



Habit Architecture

Is it willpower, or the room you are standing in? A working guide to testing explanations of habit against evidence — and to redesigning one doorway in your own day.

Sahil Tayal · 2026

Companion to sahiltayal.com/habit-architecture · CC BY 4.0

BEFORE YOU BEGIN

The question this guide asks

When you repeat something every day, how much of it is a decision — and how much is the setting deciding for you?

Thesis (contestable). Most repeated behaviour is less a daily decision than a response to a familiar setting. Change the setting — what is visible, near, and paired with when — and you change what repetition builds. Willpower is a weaker lever than design.

Three things you should be able to do by the end

1. **Tell a habit from a goal.** A habit is triggered by a setting; a goal-driven routine is chosen for its result. They break under different conditions.
2. **Predict before you believe.** Use three tests — a context change, a lost reward, added friction — to see which explanation a study supports and which it never tested.
3. **Redesign one doorway honestly.** Change one feature of a real setting and know in advance what would show you were wrong.

How to read the labels

Label	Means
DOCUMENTED	Reported by a published study, cited with its details.
INTERPRETATION	A reading of evidence that reasonable researchers could dispute.
FICTION	Invented to illustrate. Never counts as evidence.
UNSUPPORTED	A popular claim without a documented source.

This guide is a teaching tool. It does not diagnose anyone, and its worked examples are illustrations, not measurements.

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CONCEPT MAP

The loop, and where it can be tested

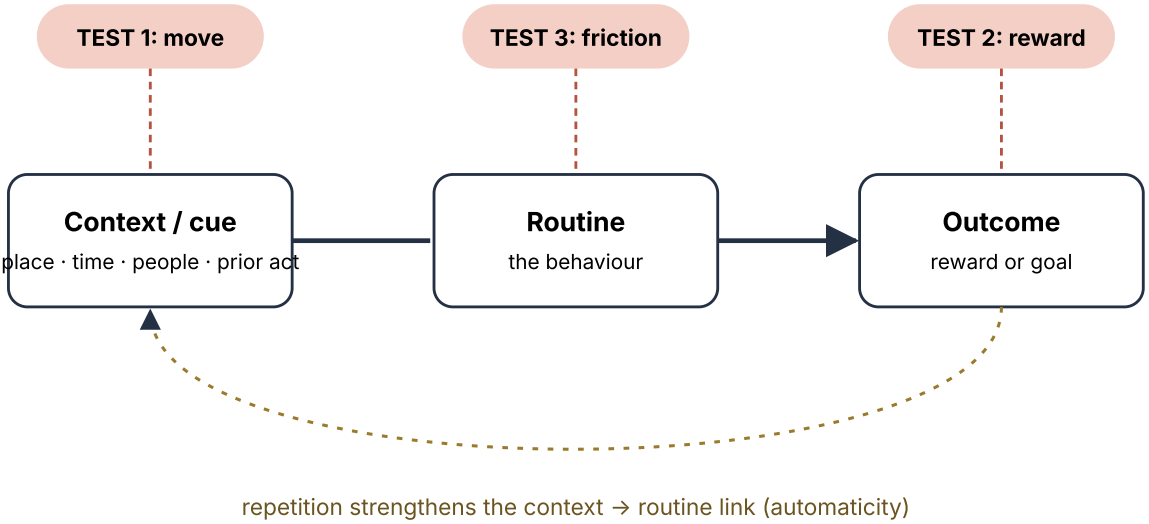


Figure 1. Each test acts on a different part of the loop. The cue account predicts the routine depends on the first box; the goal account on the last; the friction account on the effort inside the middle.

Reading the map

A **context change** (Test 1) removes the familiar cue: a cue-driven habit loses its automatic start; a goal-driven routine should travel with the person. A **fading reward** (Test 2) removes the outcome: a goal-driven routine should stop quickly, while an established habit can keep running for a while because it is partly insensitive to outcomes. **Added friction** (Test 3) raises the effort of the routine itself: the friction account predicts the easier alternative wins.

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TERMS AND MECHANISMS

Eight words, used precisely

Term	Meaning in this guide
Habit	A learned link between a context and a response, built by repetition, so that the context brings the response to mind with little deliberation (Wood & Neal, 2007).
Cue	The part of the context that starts the response: a place, a time, people present, a preceding action, an object in view.
Automaticity	How effortlessly and unthinkingly a behaviour runs; measured in research mostly by self-report.
Context stability	Doing the behaviour in the same setting each time — the condition under which habits form most reliably (Gardner, Lally & Wardle, 2012).
Outcome insensitivity	The tendency of established habits to keep running after their reward has faded (Wood & Neal, 2007).
Friction	The effort, time or steps between impulse and action. Small frictions decide close calls.
Choice architecture	The arrangement of options in a setting. TIPPME classifies changes to the placement and properties of products and objects (Hollands et al., 2017).
Habit discontinuity	The idea that life transitions, such as moving home, temporarily loosen habits and open a window for change (Verplanken & Roy, 2016).

Mechanism in one paragraph. Each repetition of a response in a context strengthens their association a little. Over many repetitions the response becomes easier to start and harder to notice. People tend to explain their habits through goals; experiments suggest exposure to the usual context, not goal reminders, is what activates the habitual response (Neal, Wood, Labrecque & Lally, 2012).

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CASE ONE DOCUMENTED

Ninety-six volunteers and a curve

Lally, van Jaarsveld, Potts and Wardle (2010) asked 96 volunteers to choose one new healthy behaviour — drinking water with lunch, a short walk, sit-ups — to perform daily in the same context, and to rate its automaticity for 84 days. Automaticity rose with repetition and levelled off.

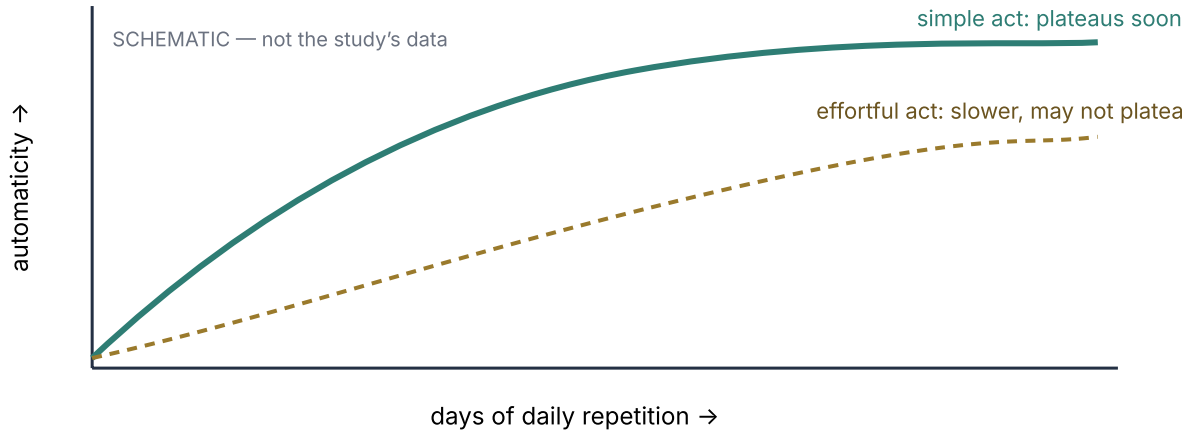


Figure 2. Schematic of the reported pattern. Shapes are illustrative; see the paper for the data.

What the study reports

- Of 82 participants with enough data, 39 produced curves that fitted the model well.
- For those 39, the median time to approach the plateau was **66 days**; the range was **18 to 254**.
- Missing a single opportunity did not meaningfully set progress back.
- Simpler behaviours tended to become automatic faster than effortful ones (Gardner, Lally & Wardle, 2012).

The misreading to avoid. "66 days" is a median among people whose data behaved tidily — not a deadline for anyone. The honest summary: weeks to months, depending on person and behaviour, and a missed day is survivable.

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CASE TWO DOCUMENTED

The students who moved

Wood, Tam and Guerrero Witt (2005) surveyed 115 students a month before and a month after transferring to a new university, tracking exercise, television watching and newspaper reading, along with the contexts in which these happened.

Cues stayed similar
Strong habits continued, regardless of what students intended. The setting kept starting the routine.

Cues changed
Habits lost their grip and behaviour began to follow intentions. The move did not dictate a new routine; it returned the decision to the person.

Why this case matters for the map

It is the cleanest documented witness for Test 1. The cue account predicts that removing familiar cues releases a habit; the study reports exactly that pattern. The willpower account predicts nothing much should change, because self-control travels with the person — the study reports otherwise.

Contrast with case one

	Lally et al. 2010	Wood et al. 2005
Question	How do new habits form?	What happens to old habits when context changes?
Context	Held constant by design	Changed by life event
Tests in the map	Baseline only	Context change and baseline
Silent about	Moving, fading rewards, friction	Fading rewards, friction

“Silent” matters: a study that never applied a test cannot count for or against a prediction about it.

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THE CUE-ROUTINE MAP · EXACT RULES

Three inputs, three rules, one verdict

Inputs. A — a scene (three documented studies, two labelled fictions). B — an interpretation (cue, goal, friction, willpower). C — a test (context change, reward fades, friction added, baseline).

1. **Rule 1 — predict.** Look up what B predicts under C (table below).
2. **Rule 2 — check the witness.** If A is fiction → *Illustration only*. If A did not apply test C → *Evidence is silent*.
3. **Rule 3 — compare.** Same outcome → *Consistent*. The study reports an opening that needed an extra push and B predicted an opening → *Partly consistent*. A "weakens" prediction against a persist/stop report → *Partly consistent*. Otherwise → *In tension*.

B \ C	Setting changes	Reward fades	Friction added	Baseline
Cue	Trigger gone; follows intention	Persists for a while	Weakens, survives	Persists
Goal	Persists	Stops	Persists	Persists
Friction	Depends on new layout (opens)	Persists if still easiest	Stops	Persists
Willpower CONTESTED	Persists	Stops	Persists	Persists

What each documented scene reports

Scene	Test reported	Report (as an outcome)
A1 Lally 2010	Baseline	Persists (automaticity grows)
A2 Wood 2005	Setting changes; baseline	Trigger gone, follows intention; persists
A5 Verplanken & Roy 2016	Setting changes	Opening that needed an intervention

Invalid state: if any of A, B or C is missing, the map returns *Incomplete case* and names the missing input. Reset returns to the baseline case.

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WORKED EXAMPLE · BASELINE → PERTURBATION

Change one input, watch the verdict move

F1 · BASELINE A = transfer students · B = cue account · C = setting changes

Rule 1 — Cue account under “Context change” predicts: the automatic trigger disappears and behaviour follows intention.
Rule 2 — the study reports: when the cues around a behaviour changed with the move, strong habits stopped running on autopilot and behaviour followed intentions instead.
Rule 3 — prediction vs report → **CONSISTENT**.
Would change the verdict: a replication in another population where the same test produced the opposite pattern.

F2 · PERTURBATION (B only) A = transfer students · B = willpower account · C = setting changes

Rule 1 — Willpower account under “Context change” predicts: the routine keeps running (self-control travels with the person).
Rule 2 — the study reports: habits were released when cues changed.
Rule 3 — prediction vs report → **IN TENSION**.
Caveat — the ego-depletion mechanism behind this account showed an effect indistinguishable from zero in a 23-lab replication (Hagger et al., 2016).

Interpretation

Only B changed, so the change of verdict is attributable to the interpretation alone. That is the logic of a controlled comparison, applied to arguments. It does not prove the cue account true — it shows that, for this witness and this test, the cue account’s prediction survives and the willpower account’s does not.

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COUNTEREXAMPLE INTERPRETATION OF DOCUMENTED EVIDENCE

Moving is a door, not a push

Verplanken and Roy (2016) studied about 800 households; half had recently moved, each matched with a household that had not. A sustainability intervention changed self-reported behaviour more among recent movers. Moving alone was not the active ingredient. The authors suggest the window lasted about three months.

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F3 · COUNTEREXAMPLE A = movers experiment · B = cue account · C = setting changes

Rule 1 — predicts: the automatic trigger disappears; behaviour follows intention.
Rule 2 — the study reports: moving did not change behaviour by itself; the intervention worked better among movers.
Rule 3 → PARTLY CONSISTENT. The opening was predicted; the need for a push was not.
```

Unresolved questions

- How long does a transition window last for different behaviours, and does it close faster for people with stronger habits?
- When a habit persists after its reward fades, how much is outcome insensitivity and how much is an unnoticed secondary reward?
- What role do identity and meaning play in routines that survive every change of setting — prayer, a daily call home, a protected practice?
- How well do canteen and shop findings on placement transfer to individuals redesigning their own homes?

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EVIDENCE MAP

What supports which claim

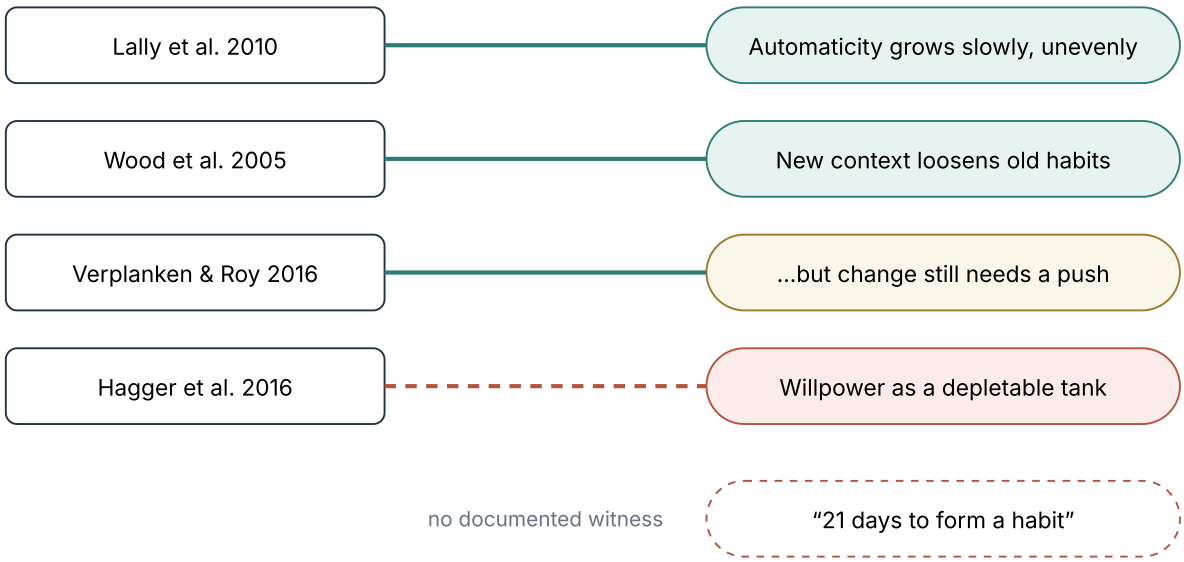


Figure 3. Solid teal: supports. Dashed red: weakens. Gold outline: an interpretation that goes a step beyond the data.

Evidence, interpretation, speculation — a legend for your own notes

Write it as…	When	Example
DOCUMENTED	A source reports it, and you can cite the source.	Median 66 days among 39 well-fitting participants.
INTERPRETATION	You infer it from documented results.	Transitions are good moments to change habits.
Speculation	Plausible, untested.	My evening scrolling is mostly a bedside-charger habit.
FICTION	Invented to show an idea.	Meera’s shoes by the door.

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PRACTICAL ACTIVITY FICTION · SAMPLE DATA

Redesign a flat — three readings of one room

A fictional flat has four objects. In the default layout the running shoes sit by the front door, the phone charger beside the bed, and the fruit bowl and a paperback in a closed cupboard. The website lets you move them; here are the readings it produces.

Object (location)	Cue account	Friction account	Goal account
Running shoes (front door)	Likely — it sits where the moment happens	Likely — zero steps	Depends on the goal
Phone charger (bedside)	Likely — late-night scrolling is prompted	Likely — zero steps	Depends on the goal
Fruit bowl (cupboard)	Unlikely — nothing prompts it	Occasional — a closed door is a small cost	Depends on the goal
Paperback (cupboard)	Unlikely — nothing prompts it	Occasional — a small cost	Depends on the goal

Now move one thing

Move the phone charger to the kitchen counter. The **cue account** now says late-night scrolling is *unlikely*: the bed no longer contains the prompt. The **friction account** says *occasional*: a walk to the kitchen at midnight is a cost, not a wall. The **goal account** is unmoved: if you want to scroll, you will.

The point. The same layout supports three different predictions. Which one is right for you is an empirical question — answerable only by changing the setting and watching for weeks, not by choosing the theory you like.

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WORKSHEET · PRINT AND FILL IN

Audit one doorway

1. The routine (one behaviour, almost daily, that you want to start or stop):

2. The moment — where, when, who, and what you did just before:

3. The three tests (tick what you think would happen):

If…	Keeps running	Weakens	Stops	Don’t know
I were in a different place for a week				
The reward vanished				
It took ten more seconds to start				

4. One change to the setting (placement, visibility, or what it follows):

5. What would prove me wrong after four weeks:

Keep the change for weeks, not days. Missing a day is allowed (Lally et al., 2010).

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EXAMPLE ANSWER FICTION AND CRITICAL REFLECTION

A filled-in worksheet

1. Stop scrolling in bed for an hour before sleep.

2. Bedroom, about 11 pm, alone, immediately after plugging the phone in at the bedside.

3. Different place: *weakens* (on trips I read instead). Reward vanished: *keeps running* (it rarely feels good now). Ten more seconds: *don't know*.

4. Charge the phone on the kitchen counter; keep a paperback on the pillow.

5. If after four weeks I still scroll most nights — carrying the phone to bed — friction alone is not doing it, and I should treat this as a goal problem (what the scrolling gives me) rather than a placement problem.

Reflection: what the example gets right, and what it assumes

- **Right:** it names the setting, not a reason; it predicts before acting; it states a failure condition in advance.
- **Right:** "keeps running even though it rarely feels good" is the signature of outcome insensitivity — a hint the cue account fits.
- **Assumes:** the person controls the kitchen counter and sleeps alone. In a shared room or with a phone needed for work alarms, the design changes.
- **Assumes:** self-report over four weeks is accurate. Keep a simple tally rather than relying on memory.

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MYTHS · ETHICS · LIMITS

Three warnings

Myth: “21 days” UNSUPPORTED

Usually traced to anecdotal observations about how long surgical patients took to adjust to a changed appearance — not a measurement of habit formation (Gardner, Lally & Wardle, 2012).

Contested: willpower as a tank CONTESTED

A preregistered replication across 23 labs and 2,141 participants found an ego-depletion effect of d = 0.04, with a confidence interval including zero (Hagger et al., 2016). Self-control still matters; designs that rely on “trying harder” rest on weaker ground.

Ethics: would the arrangement survive being explained?

Every workplace, app and shop is already designed. The same tools that put fruit at eye level build the infinite feed. A practical test: if you could not comfortably post an explanation of the design on the wall where people meet it, it is manipulation, not architecture.

What this guide does not prove

- The map compares simplified, labelled predictions with what a few studies report. It does not measure your habits.
- “Consistent” means “not contradicted by this source”, not “proven”.
- The interpretations are teaching simplifications; researchers in each tradition add conditions.
- Several studies used self-report. The flat and the worksheet example are fiction.
- Environment design presumes control over your environment — many people have little.

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FURTHER EXPLORATION

Related works by Sahil Tayal

- **The Identity–Action Gap** — identityaction.sahiltayal.com
  Why actions lag behind the person we believe we are; the setting that rehearses the old self is one mechanism for that lag.
- **Upkeep** — sahiltayal.com/upkeep
  An interactive field guide to maintenance; habits are the personal form of upkeep.
- **The Scaffolding** — sahiltayal.com/scaffolding
  A workshop for making knowledge useful to your future self; environment design is scaffolding for behaviour.

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