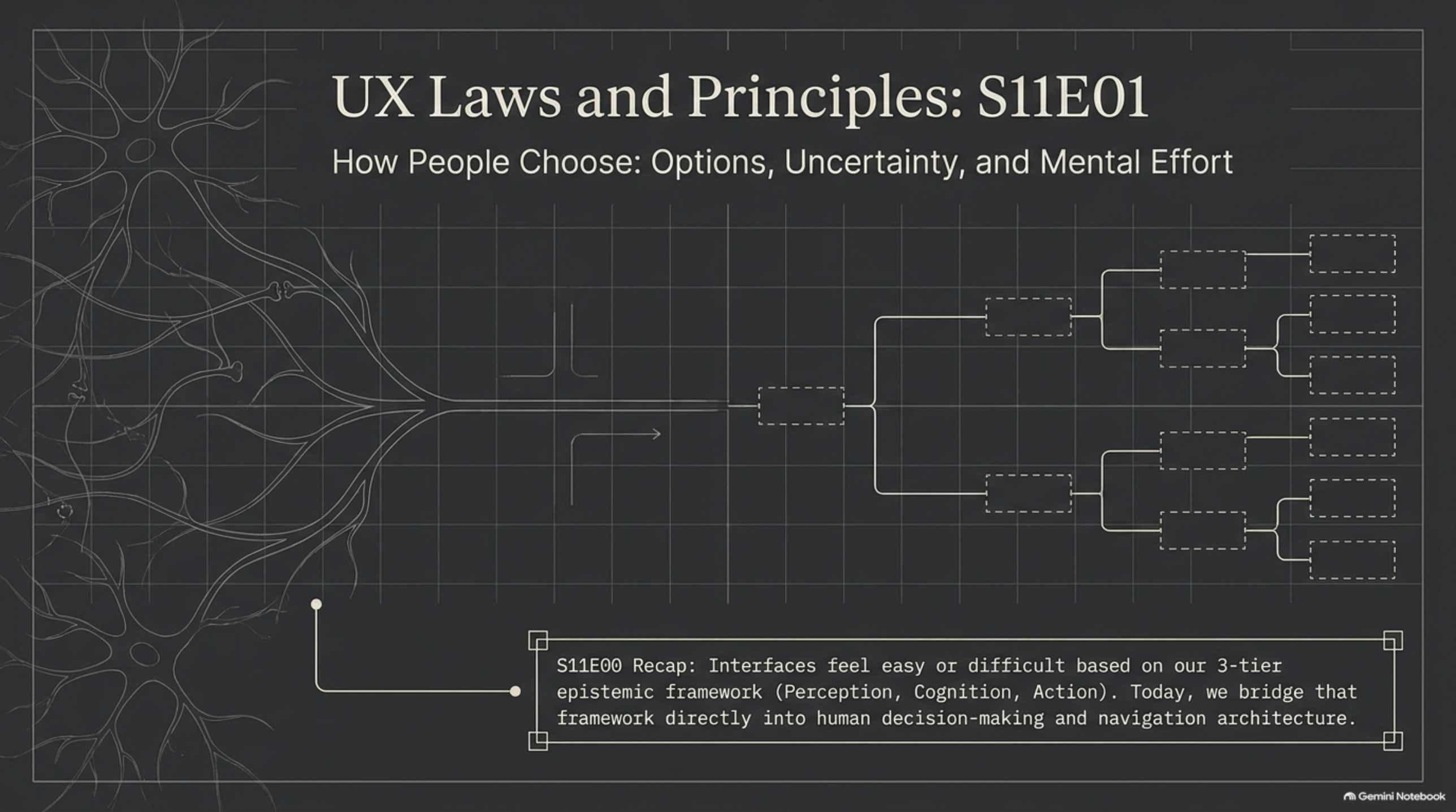
UX Laws and Principles: S11E01

How People Choose: Options, Uncertainty, and Mental Effort



S11E00 Recap: Interfaces feel easy or difficult based on our 3-tier epistemic framework (Perception, Cognition, Action). Today, we bridge that framework directly into human decision-making and navigation architecture.

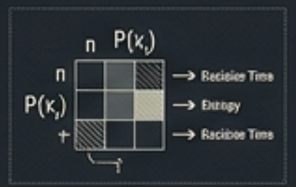
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The Engineering of Choice: Diagnostic Manual Overview

1 — True Tier 1 Origins: Hick–Hyman's Law & Shannon Entropy

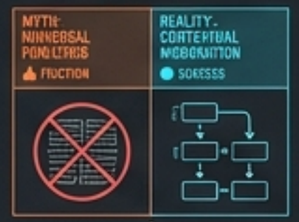
- **TECHNICAL REFERENCE:**
  - MATHEMATICAL BASIS OF DECISION TIME & INFORMATION THEORY.
  - HICK-HYMAN LAW: $T = b \cdot \log_2(n+1)$, WHERE n IS THE NUMBER OF EQUALLY PROBABLE CHOICES.
  - SHANNON ENTROPY: $H(S) = -\sum P(x_i) \cdot \log_2(P(x_i))$.



INFORMATION SCENT DENSITY INDICATOR

2 — Empirical Myth-Busting #1: Choice Overload Meta-Analysis

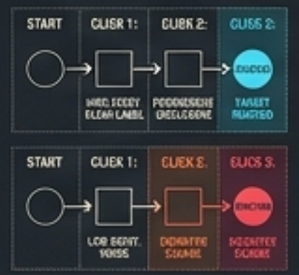
- **DIAGNOSTIC INDICATOR:**
  - CONTRASTING COMMON BELIEFS WITH EMPIRICAL DATA.
  - META-ANALYSIS REVEALS CONTEXT-DEPENDENT EFFECTS, NOT UNIVERSAL OVERLOAD.
  - KEY FACTORS: DECISION DIFFICULTY, PREFERENCE UNCERTAINTY.



OPTIMIZES CHOICE ARCHITECTURE

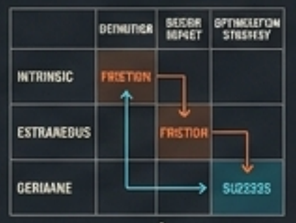
3 — Empirical Myth-Busting #2: Refuting the 3-Click Rule

- **STRUCTURAL ANALYSIS:**
  - DEBUNKING ARBITRARY NAVIGATION CONSTRAINTS.
  - EMPIRICAL EVIDENCE SHOWS SATISFACTION UNCORRELATED WITH CLICK COUNT. FOCUS ON INFORMATION SCENT AND NAVIGATION CLARITY OVER ARBITRARY LIMITS.



4 — Sweller's Cognitive Load: Architecture Trade-Offs

- **COGNITIVE LOAD MATRIX:**
  - INTRINSIC (TASK COMPLEXITY), EXTRANEOUS (DESIGN FRICTION), GERMANE (LEARNING & SCHEMA BUILDING).
  - ARCHITECTURAL GOAL: MINIMIZE EXTRANEOUS, MANAGE INTRINSIC, OPTIMIZE GERMANE.



ACTION FOR DESIGNED FLOW

5 — The Power of Defaults: Friction vs. Dark Patterns

- **DIAGNOSTIC CLARIFICATION:**
  - INTENTIONAL DESIGN VS. MANIPULATION. DEFAULTS AS COGNITIVE SHORTCUTS (BENEFICIAL) VS. COERCIVE TOOLS (MALICIOUS).



OBSERVE DESIGN (CRIMSON RED INDICATOR)

6 — Multi-Modal Walkthrough: Broken vs. Repaired Pathways

- **COMPARATIVE ANALYSIS:**
  - DIAGNOSING AND REMEDIATING USER JOURNEYS.
  - ILLUSTRATION OF BROKEN INTERACTION SEQUENCE VS. OPTIMIZED, MULTI-MODAL FLOW.



INFORMATION SCENT

7 — Hands-On Exercise: Dual-Refactor & S11E02 Teaser

- **PRACTICAL APPLICATION:**
  - APPLYING DIAGNOSTIC PRINCIPLES.
  - DUAL-REFACTOR CHALLENGE AND PREVIEW OF NEXT MODULE.
  - S11E02: "THE ARCHITECTURE OF TRUST & PERSUASION".



SET FOR SEASON FINALE: THE ARCHITECTURE OF TRUST & PERSUASION FRAMEWORKS

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Section 1: Hick-Hyman Law & Shannon Entropy

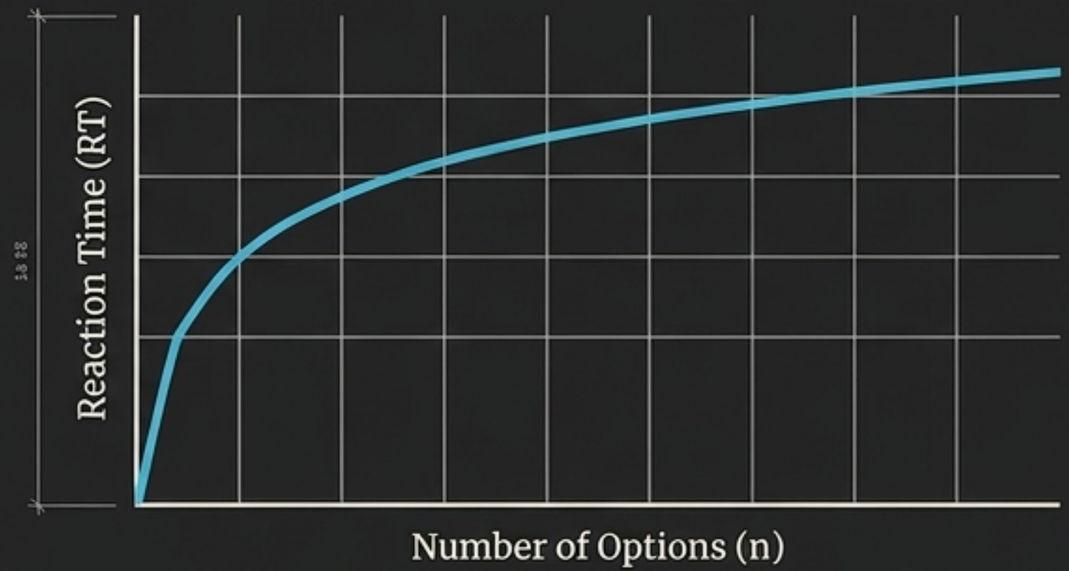
THE MATH

$$RT = a + b \log_2 (n + 1)$$

Accounts for the uncertainty of whether to respond at all.

$$H = \sum_i p_i \log_2 \left(\frac{1}{p_i} + 1 \right)$$

THE TRANSLATION



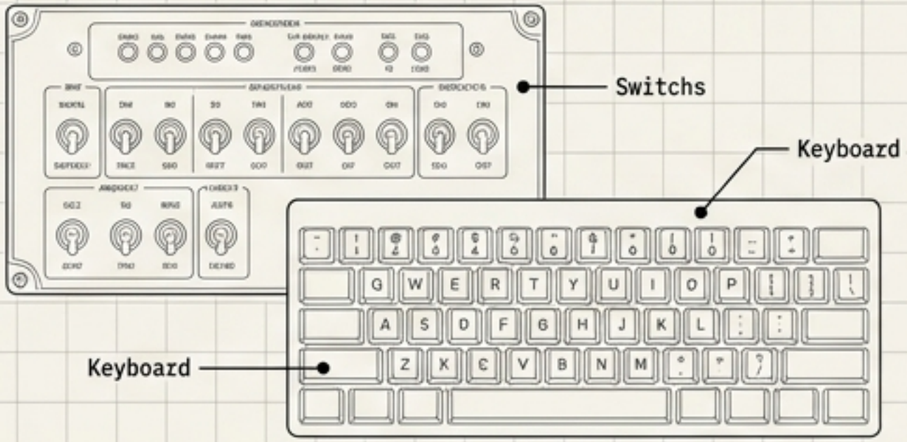
Logarithmic Compression: The $\log_2$ the $\log_2$ indicates binary search. The brain halves uncertainty at each step.

Rate of Gain: The constant *b* represents human processing speed, derived from information entropy (Hick 1952, Hyman 1953, MIT Human Factors).

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Where Logarithmic Compression Applies (And Where It Breaks)

Applies: Practiced Stimulus-Response

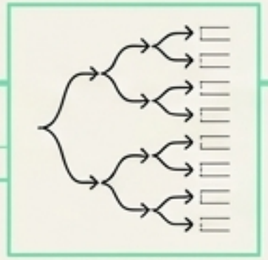


Criteria:

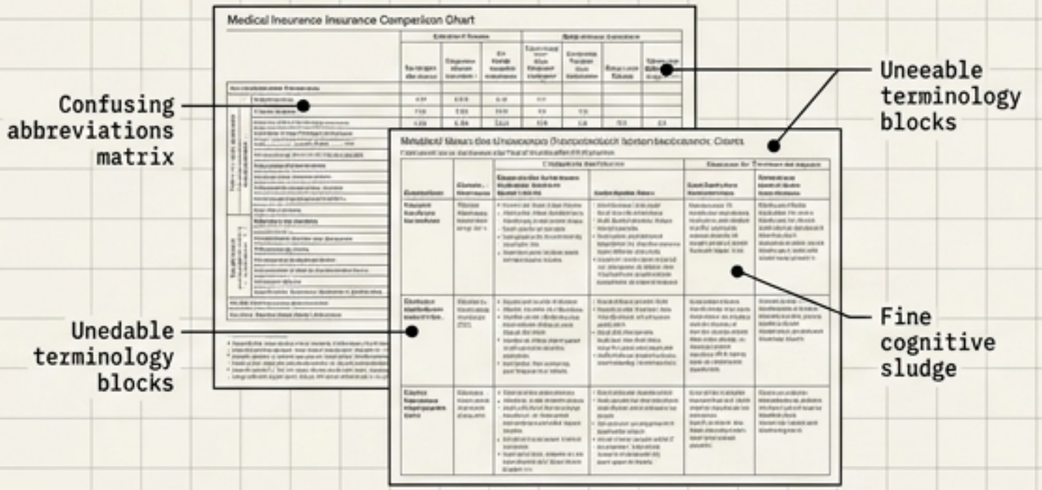
Options are known, equiprobable, and require rapid motor selection.

Why it works:

Users apply subdividing strategies (binary search) to categorized, familiar data.



Breaks: Semantic Value Comparison

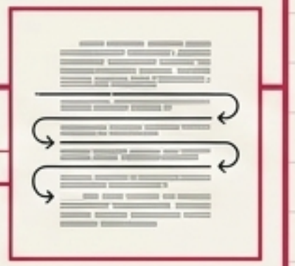


Criteria:

Options require reading comprehension, unfamiliar terminology, or complex value judgments.

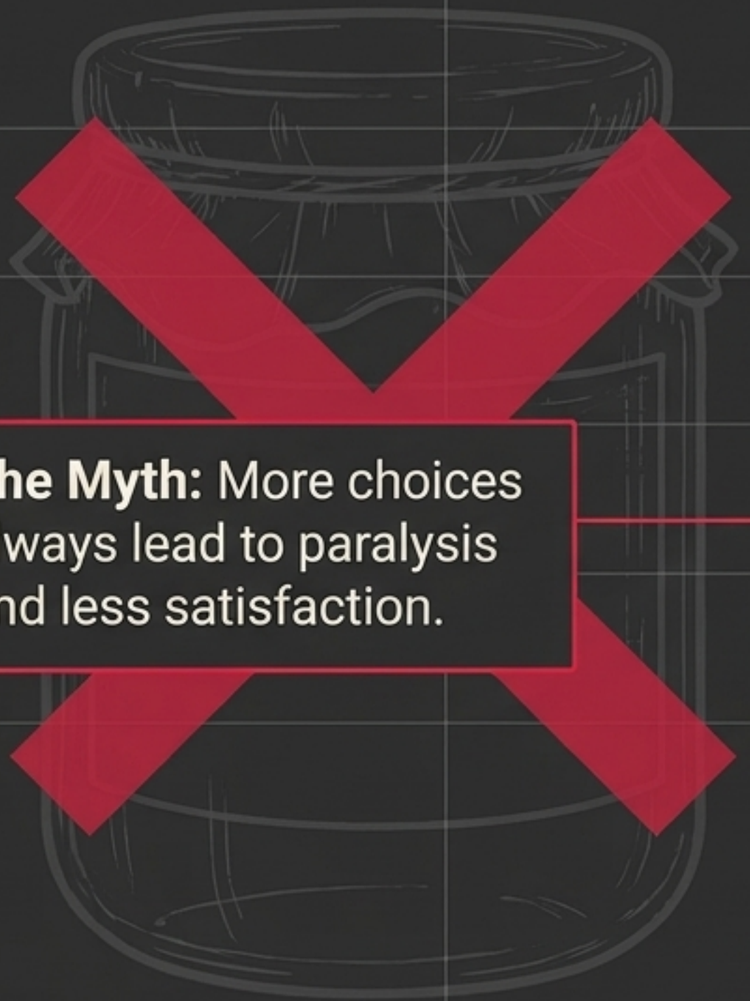
Why it fails:

Linear reading is required. You cannot binary-search a block of dense, unfamiliar text. Hick's Law does not apply to semantic comparison.

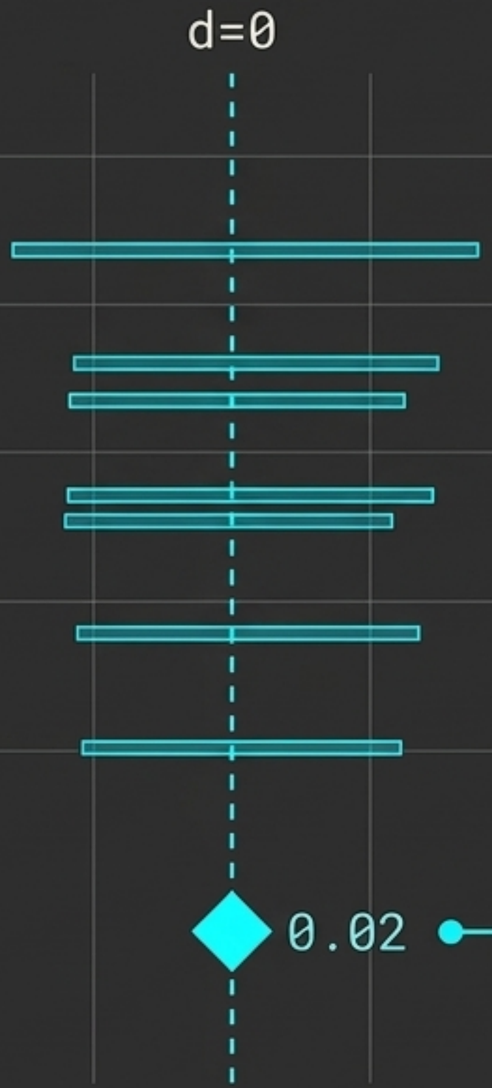


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Section 2: Choice Overload Meta-Analysis (N= 5,036)



The Myth: More choices always lead to paralysis and less satisfaction.



The Reality:
Scheibehenne, Greifeneder & Todd (2010): A rigorous 50-study meta-analysis across 5,036 participants.

The Finding: The overall mean effect size of choice overload is virtually zero (d ≈ 0.02).

The Insight: Humans are highly capable of filtering large assortments. Arbitrarily depriving users of choice to save them frequently backfires, decreasing overall satisfaction.

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When Choice Overload Actually Strikes (The 4 Moderators)

Quadrant 1: Uncategorized Sets



High cognitive cost to parse unstructured data (e.g., 50 random items vs. 5 categories of 10).

Quadrant 2: Unfamiliar Domain Attributes



Users lack the domain expertise to understand the differences between options.

Quadrant 3: High Decision Difficulty / Time Pressure



Complex trade-offs required under strict temporal constraints.

Quadrant 4: Preference Uncertainty



The user lacks a clear dominant option, prior preference, or specific end-goal.

The UX Mandate: Do not arbitrarily hide options. Structure them, categorize them, and clarify the attributes.

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Section 3: Refuting the 3-Click Rule

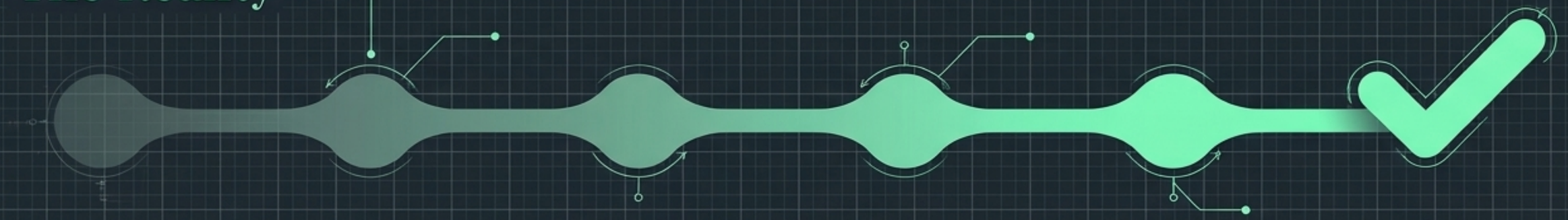
The Myth



Users will abandon a task if it takes more than 3 clicks.
(An arbitrary heuristic with zero empirical backing).

Shallow mystery hierarchies trigger disorientation, pogo-sticking, and high abandonment.

The Reality



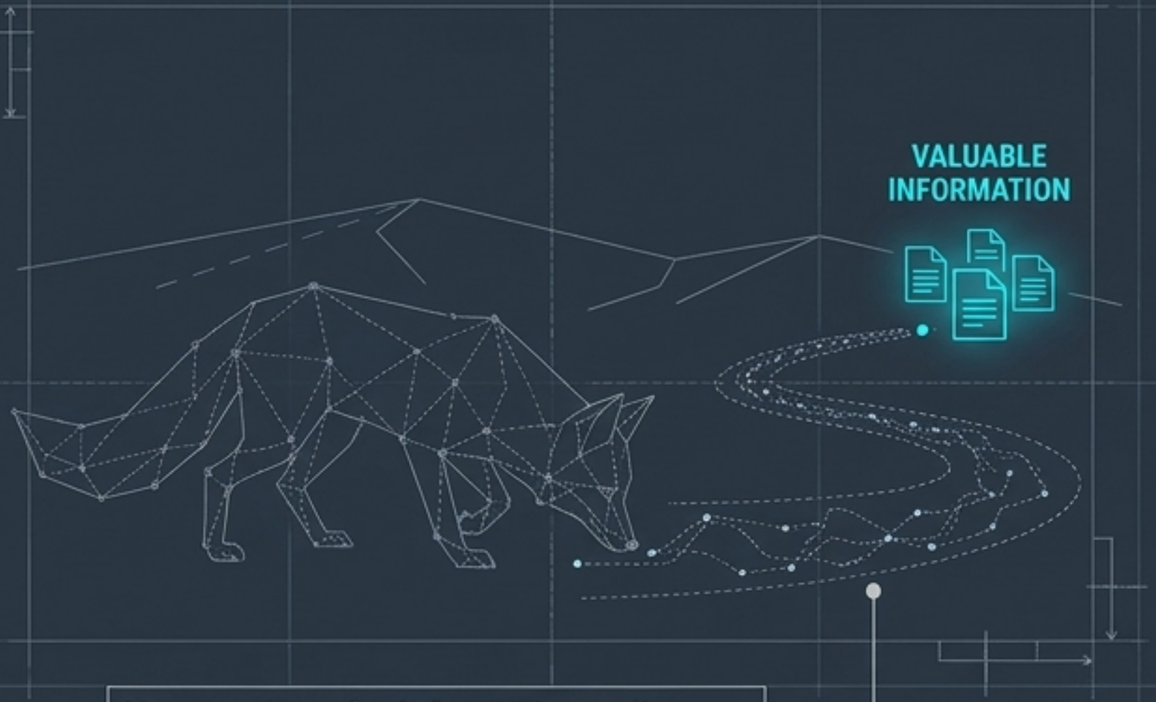
The **1-Click Rule Paradigm**: Every click should take the user visibly closer to their goal while eliminating the non-destination.

Interaction cost is not measured merely by counting clicks. Cognitive friction matters more than physical clicks.

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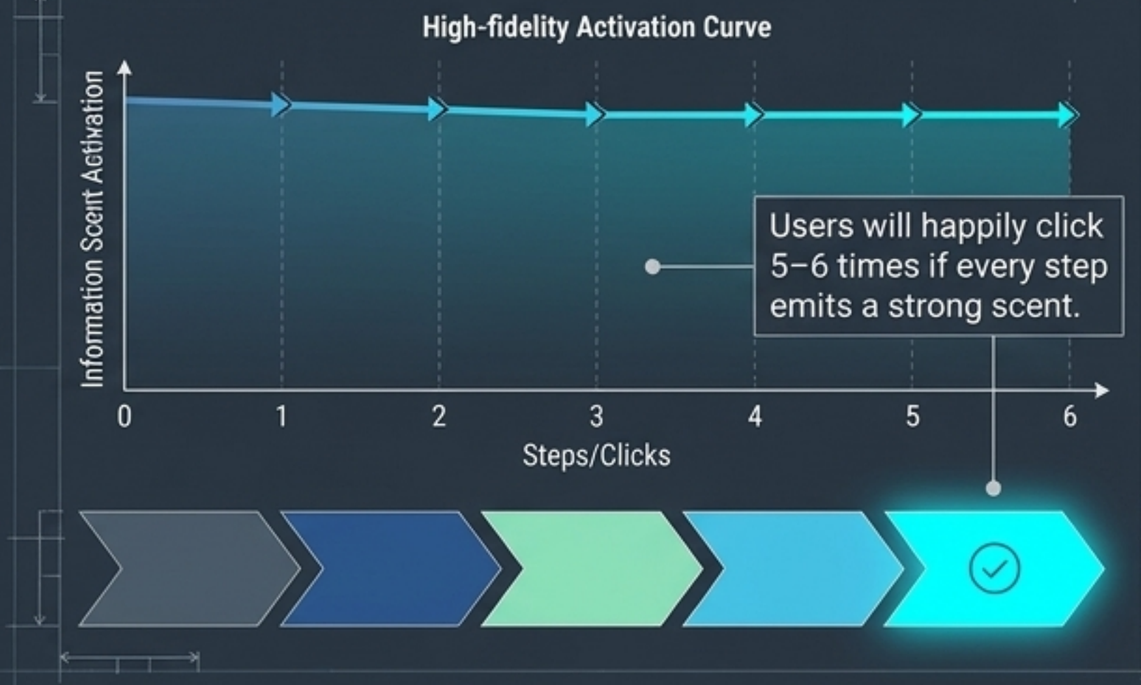
Information Foraging Theory & Information Scent

Core Theory



Humans hunt for information online exactly like animals forage for food in the wild. The brain seeks to maximize energy intake (valuable information) while ruthlessly minimizing caloric burn (cognitive effort and time).

The Mechanics of Information Scent

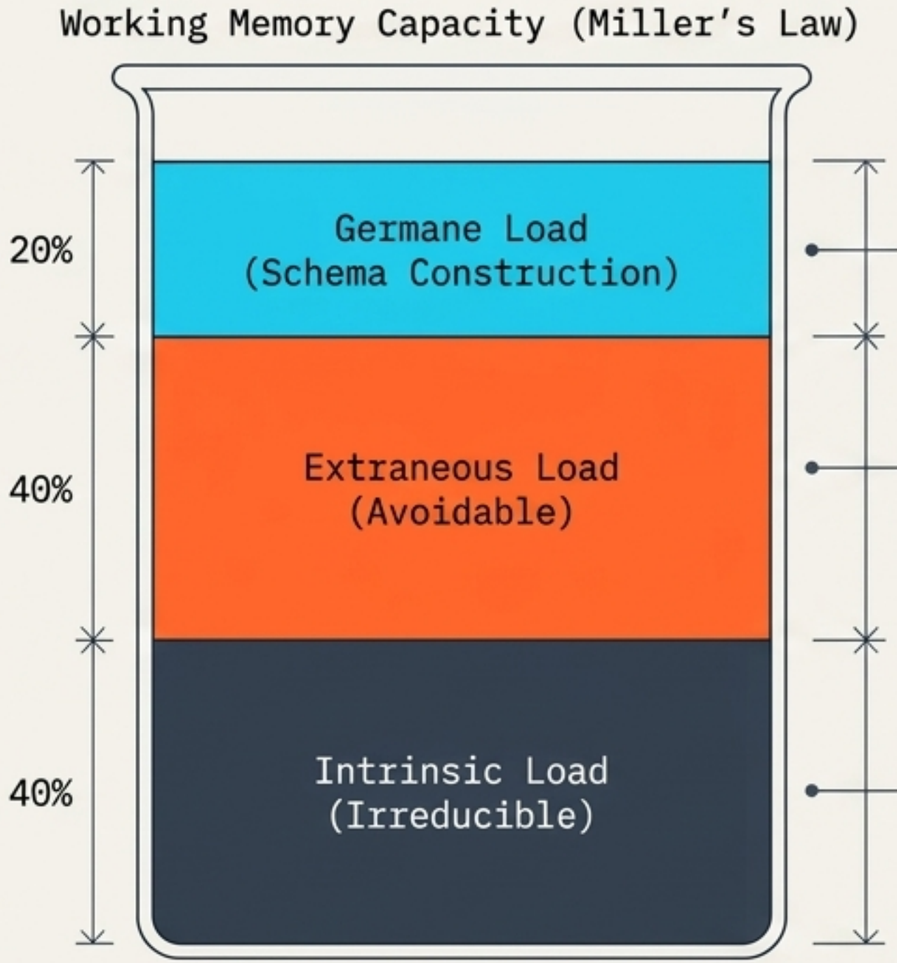


Predictable Labels: Specific trigger words that map exactly to the user's mental model, moving them visibly closer to the goal.

Scent Trails: Clear wayfinding, progressive breadcrumbs, and exact-match terminology rather than clever marketing jargon.

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Section 4: Sweller's Cognitive Load Theory



The mental effort successfully used to actually learn, process, and build permanent mental models.

Action: Maximize by removing extraneous noise.

Friction generated by bad design: marketing jargon, split attention, hidden fees, complex UI widgets.

Action: Ruthlessly eliminate to free up mental capacity.

The inherent difficulty of the domain.

Action: We cannot remove this; we can only manage it via chunking and sequencing.

Bad UX adds Extraneous Load; Good UX manages Intrinsic Load.

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Structural Architecture Trade-Offs by Context of Use

Categorized Flat Mega-Menus

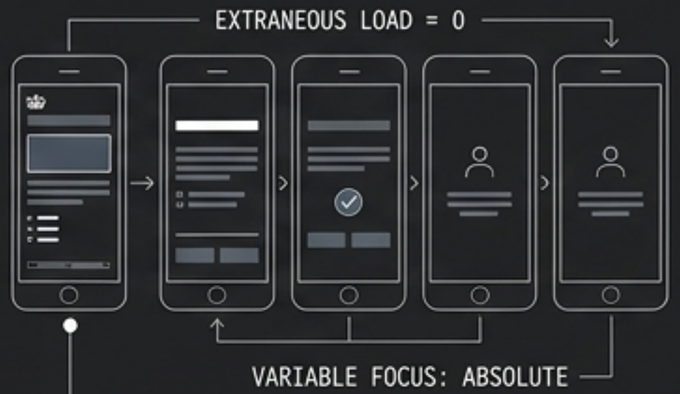
- **Context of Use:** E-commerce, broad catalogs, mixed-expertise audiences.



- **Cognitive Impact:** Eliminates scrolling; exposes 2nd-level hierarchy simultaneously.
- **Failure State:** Collapses into choice overload if items are un-categorized or lack clear typographic visual hierarchy.

GOV.UK One Thing Per Page

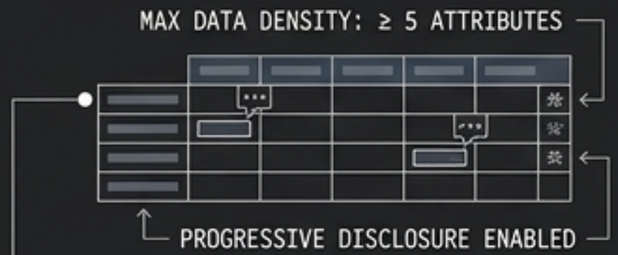
- **Context of Use:** Infrequent, highly anxious, mobile users, or W3C COGA compliance.



- **Failure State:** Frustrates expert users who require macro-comparisons and rapid data entry.

Dense Comparison Matrices

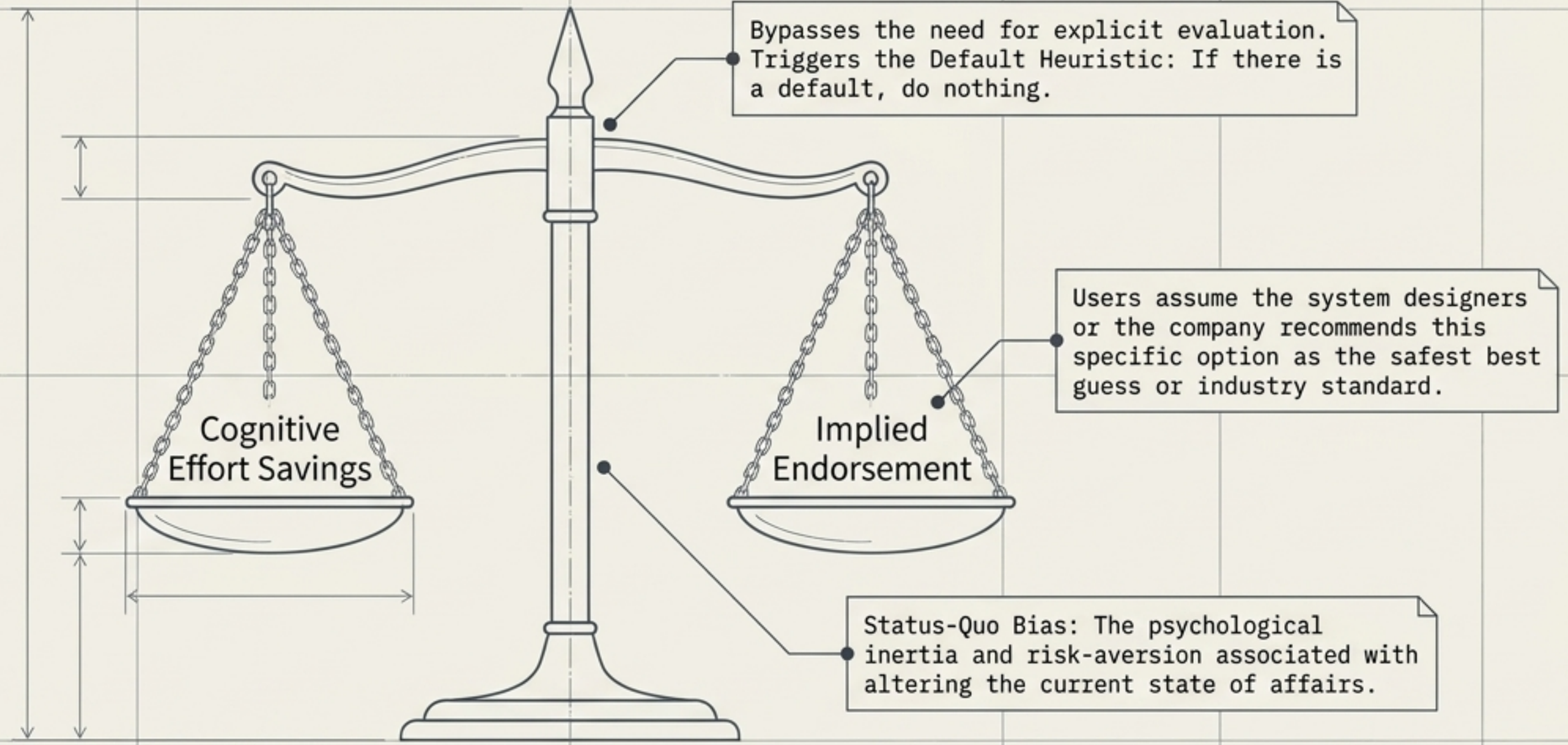
- **Context of Use:** Daily expert staff, B2B workspaces, specialized SaaS.



- **Cognitive Impact:** Maximizes data density (≤ 5 key attributes + progressive disclosure via tooltips).
  Data point: ≤ 11.0
- **Failure State:** Paralyzes novices due to overwhelming intrinsic load and preference uncertainty.

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Section 5: The Power of Defaults



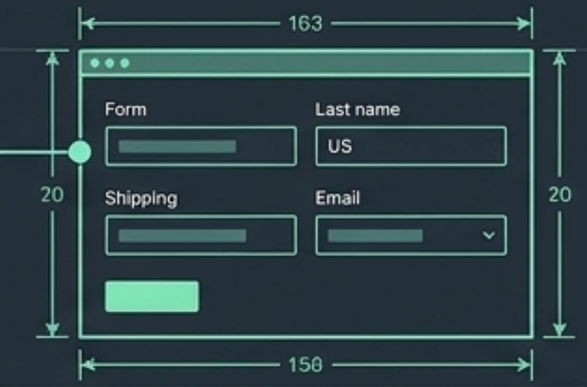
When users lack expertise (high uncertainty), defaults act as a powerful guiding rail. They are a neutral tool—a hammer that can build a house or break a window.

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Ethical Choice Architecture vs. Deceptive Sludge

Smart, User-Aligned Defaults (Nudges)

Pre-filling common settings: E.g., defaulting to standard shipping or the user's home country.





One-click revocable actions: Easy undo states with zero friction.

Benign defaults: Protecting users from catastrophic errors (e.g., auto-saving, defaulting to private data sharing).



Manipulative Dark Patterns (Sludge)



Sneaking: Pre-checked upsells or opt-out add-ons silently added to the basket at checkout.

Confirmshaming: Emotionally manipulative opt-out copy (e.g., No thanks, I hate saving money and the environment).

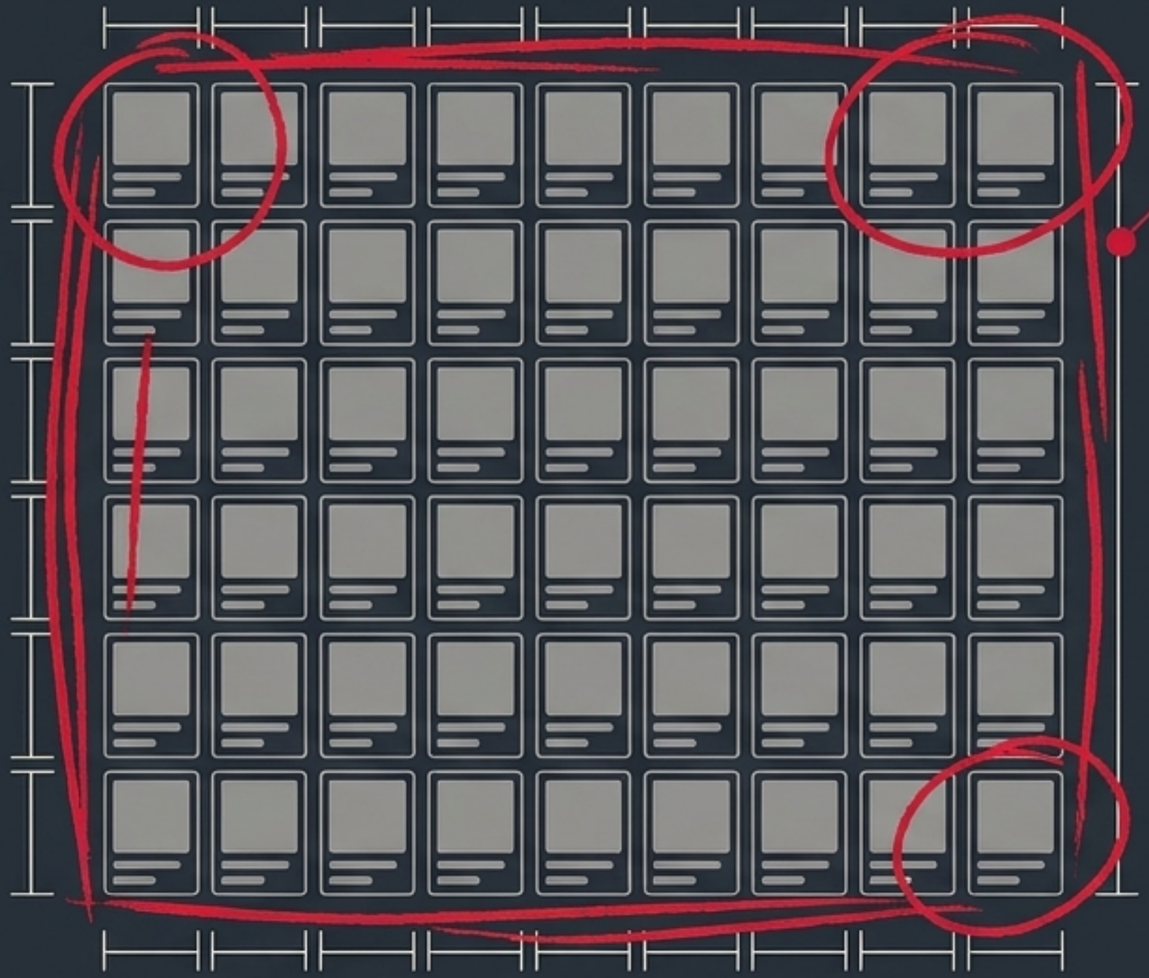




Obstruction: High interaction cost designed to block changing the default (e.g., forcing users through 5 deep-linked screens to decline tracking cookies).

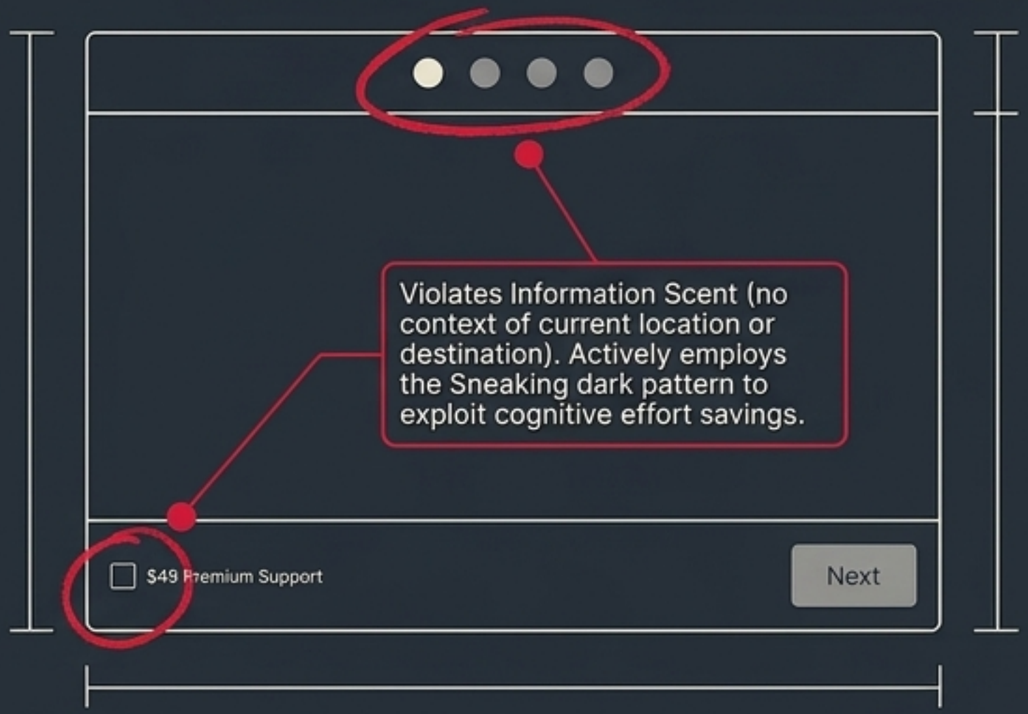
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Section 6: Broken Pathway — Catalog, Comparison & Defaults



COMPONENT 1: BROKEN AREA A (THE JARGON WALL)

Triggers Chernev's Quadrant 1 (Uncategorized sets) + Quadrant 2 (Unfamiliar attributes). Induces extreme to extreme choice overload and cognitive fatigue.



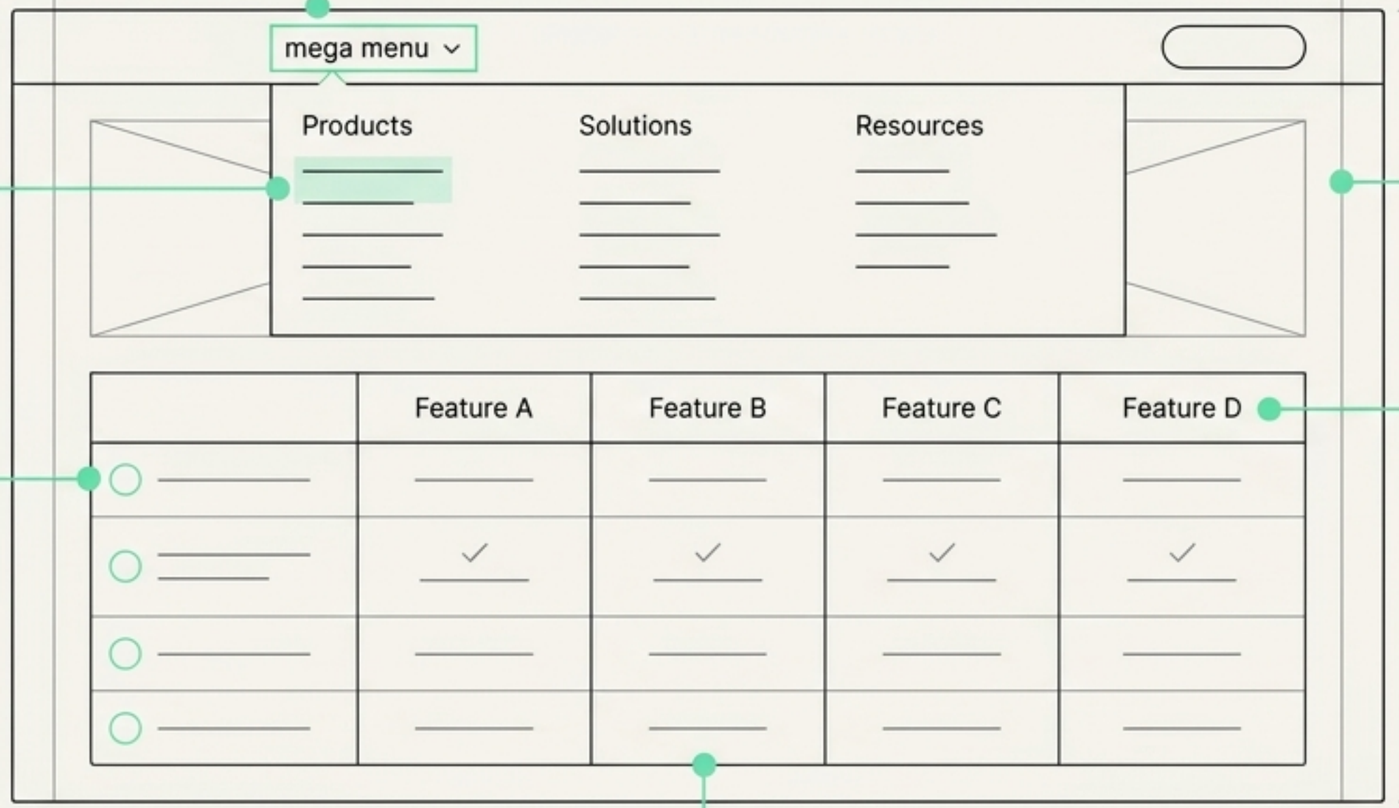
COMPONENT 2: BROKEN AREA B (THE MYSTERY WIZARD)

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Repaired Pathway — Multi-Modal & Accessible

Keyboard / Switch:
Encapsulated in <nav>, mapped with `aria-expanded`, and features explicit Escape key dismissal.

Desktop Pointer / Mobile Thumb:
Predictable 44x44px touch-targets and strong hover-scent.



Vision / Zoom: Fully responsive layout reflowing cleanly at 400% Zoom (320 CSS px viewport).

Screen Reader: Proper DOM hierarchy using <h2>/<h3> menu groups, and semantic <th scope=col/row> markup for the comparison table.

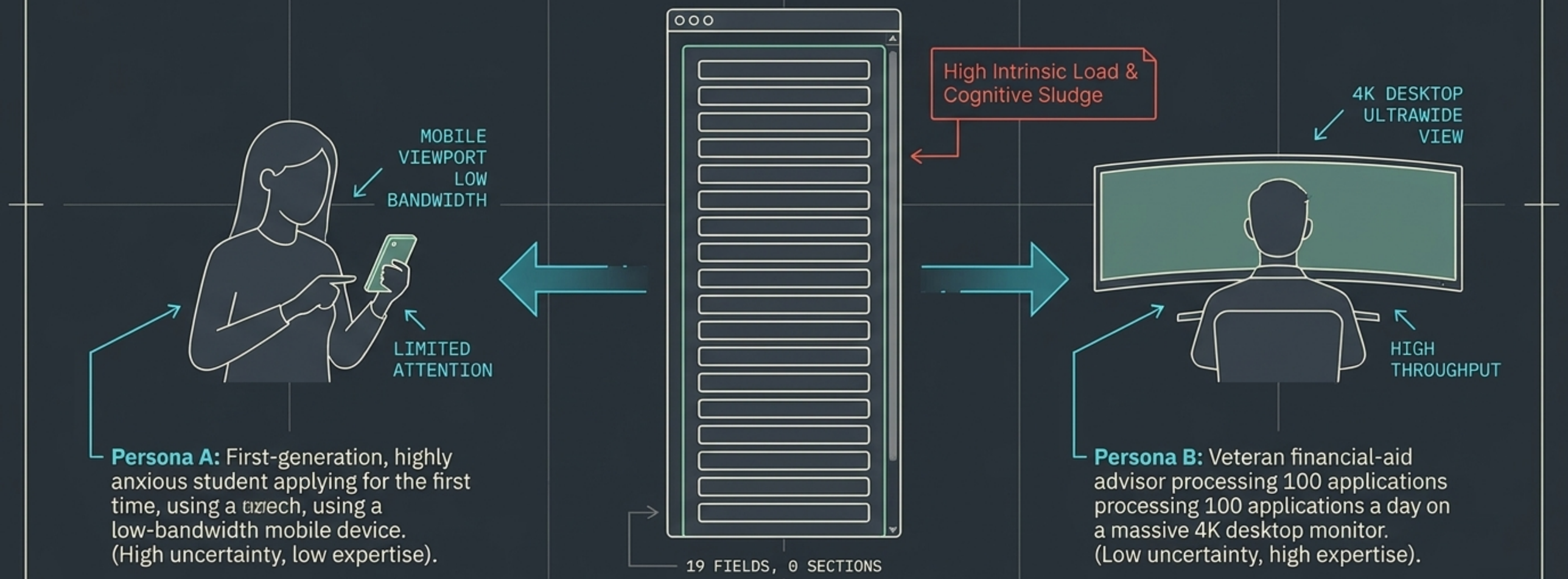
W3C COGA: Plain language labels replacing marketing jargon; clear spatial orientation.

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Section 7: Hands-On Dual-Refactor Exercise

The Challenge: Refactor the exact same 19 data fields to manage Intrinsic Load for two completely different audiences with opposing cognitive needs.

Source Material: 19-Field Legacy Financial-Aid Intake Form



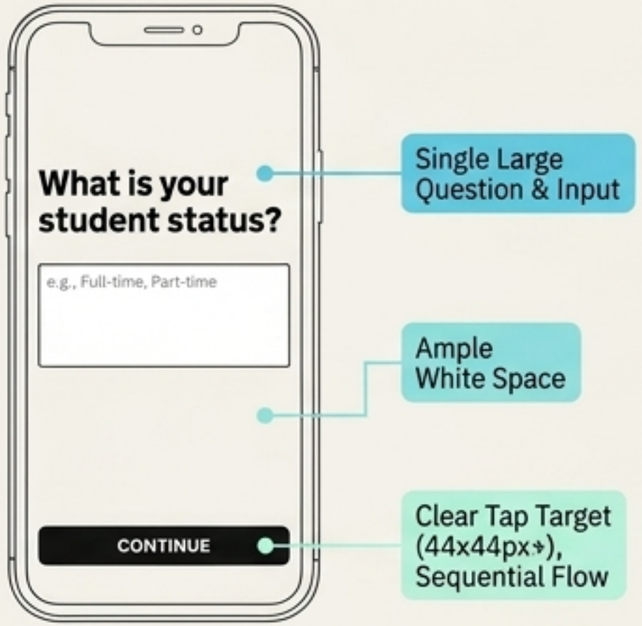
Persona A: First-generation, highly anxious student applying for the first time, using a ⊡ech, using a low-bandwidth mobile device. (High uncertainty, low expertise).

Persona B: Veteran financial-aid advisor processing 100 applications processing 100 applications a day on a massive 4K desktop monitor. (Low uncertainty, high expertise).

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Applying Architecture to Context of Use

Solution A: The GOV.UK Flow (For the Student)



Structure: A One thing per page multi-step flow.

Why it works: Radically reduces extraneous load for novices. Minimizes anxiety by isolating choices. Provides clear sequential information scent. Perfect for mobile tap-targets and strict COGA compliance.

Solution B: High-Density Triage (For the Advisor)



Structure: A dense, single-screen workspace featuring data tables, micro-typography, and inline editing.

Why it works: Experts rely on rapid macro-comparisons and scanning. Paginating this workflow into a wizard would artificially inflate their interaction cost and shatter their mental model. Extraneous load for an expert is different than for a novice.

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Choice Architecture Verification Checklist

- [ ] 1. Does the layout align with Hick's Law boundaries? (Utilized for practiced motor selection; avoided for complex semantic reading/comparison).

  DIAGNOSTIC: Selection Speed vs. Cognitive Cost

- [ ] 2. Are large assortments structured to prevent overload? (Categorized subsets, clear unfamiliar attributes, dominant options highlighted).

  DIAGNOSTIC: Information Architecture & Filtering

  DIAGNOSTIC: Selection Speed vs. Cognitive Cost

- [ ] 3. Does the navigation emit strong Information Scent? (Predictable, specific trigger labels vs. counting arbitrary, shallow clicks).

  DIAGNOSTIC: Navigation Clarity & Predictability

  DIAGNOSTIC: Navigation Clarity & Predictability

- [ ] 4. Is Extraneous Cognitive Load ruthlessly eliminated? (Zero marketing jargon, no split attention, high signal-to-noise ratio).

  DIAGNOSTIC: Signal-to-Noise Ratio

  DIAGNOSTIC: Signal-to-Noise Ratio

- [ ] 5. Are Defaults user-aligned and ethical? (Helpful friction reduction; zero hidden sludge, sneaking, or confirmshaming).

  DIAGNOSTIC: Ethical & Aligned Defaults

  DIAGNOSTIC: Ethical & Aligned Defaults

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Conclusion & Up Next

The UX Architect's Conclusion

Designing how people choose is not about arbitrarily reducing options to meet fake heuristics. It is the rigorous practice of structuring uncertainty, managing cognitive load, and engineering clear pathways of information scent.



Next Up in S11E02: How People Act: Targets, Movement and Control

We transition from the cognition of choice to the biomechanics of execution—covering Fitts's Law, the Steering Law, and multimodal actuation.

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