Burnout Is Not Too Much Work, v2

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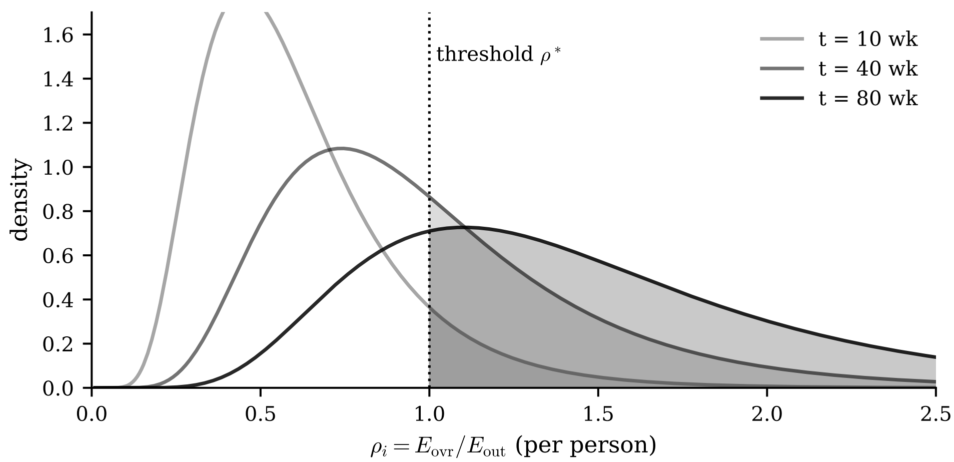
Theoretical model. Population calibration illustrative.

The v1 post had three holes. A reader pointed them out. The threshold is not universal, it is individual. "Sustained period" is not a definition of time. And the overhead/output split is observer-dependent, because maintaining a facade counts as productive output for the firm and as overhead for the person doing it. This is the v2 that fixes all three.

The punchline up front. With realistic numbers, a person at $\rho^P = 1.50$ (collapse-imminent) shows up on the firm's dashboard as $\rho^F = 0.54$ (green). Same hour of work, two valid bookkeepings, almost a full unit apart. Algebra below.



Setup. Let i index people and $t \geq 0$ index time. Each person carries a private friction-output ratio $\rho_i(t)$ and a private threshold ρ_i^*. Burnout is the event $\rho_i(t) > \rho_i^*$. The right tail of the distribution is the burned-out fraction.

The first fix is that the output category is observer-dependent. The firm pays for outcomes. Some of those outcomes are facade. The person delivers the facade but receives no internal value from it. So the same hour of work gets booked differently by two accountants.

Definition 1 (Observer-Relative Energy Split)**.** *For a working hour, decompose total energy as $E_{tot} = E_{out} + E_{ovr}$. For person i, write*

$$E^P_{out,i}, \quad E^P_{ovr,i} \quad \textit{(person's accounting)},$$

$$E^F_{out,i}, \quad E^F_{ovr,i} \quad \textit{(firm's accounting)}.$$

Define the role-coupling set $\mathcal{F}_i = \{$tasks the person does not value intrinsically but the firm pays for$\}$. Then $E^F_{out,i} = E^P_{out,i} + E_{\mathcal{F},i}$ and $E^F_{ovr,i} = E^P_{ovr,i} - E_{\mathcal{F},i}$.

The set $\mathcal{F}_i$ is the wedge between two valid accountings.

Theorem 1 (Observer-Relative Burnout Inequality)**.** *Define the two ratios $\rho^P_i(t) = E^P_{ovr,i}/E^P_{out,i}$ and $\rho^F_i(t) = E^F_{ovr,i}/E^F_{out,i}$. Then*

$$\rho^P_i(t) \ \geq \ \rho^F_i(t),$$

with equality if and only if $E_{\mathcal{F},i} = 0$, i.e., the role contains no task the person does facade-only.

Proof. Write $a = E^P_{\mathrm{ovr},i}$, $b = E^P_{\mathrm{out},i}$, $f = E_{\mathcal{F},i}$, all nonnegative with $b > 0$. By the definition above, $\rho^P_i = a/b$ and $\rho^F_i = (a-f)/(b+f)$. Subtracting,

$$\rho^P_i - \rho^F_i = \frac{a}{b} - \frac{a-f}{b+f} \tag{1}$$

$$= \frac{a(b+f) - b(a-f)}{b(b+f)} \tag{2}$$

$$= \frac{f(a+b)}{b(b+f)}. \tag{3}$$

Since $a, b, f \geq 0$ and $b > 0$, the numerator and denominator are nonnegative, so $\rho^P_i - \rho^F_i \geq 0$. The expression is zero exactly when $f = 0$. $\square$

Corollary 1. *The person can collapse ($\rho^P_i > \rho^*_i$) while the firm metric ρ^F_i still reads healthy. The larger the facade load $E_{\mathcal{F},i}$, the larger the gap.*

This is the "high performer suddenly burns out" pattern. The firm sees a productive employee until the day they stop functioning. The person was already past threshold for weeks. The two accountings disagreed.

Worked example. Take a knowledge-worker hour with $a = 60$ (person-counted overhead, including facade), $b = 40$ (work the person values), $f = 25$ (facade portion of the overhead). Then

$$\rho^P = \frac{60}{40} = 1.50 \quad \text{(person, past collapse threshold)} \tag{4}$$

$$\rho^F = \frac{60-25}{40+25} = \frac{35}{65} = 0.54 \quad \text{(firm, looks fine)} \tag{5}$$

$$\rho^P - \rho^F = \frac{25 \cdot 100}{40 \cdot 65} = 0.96. \tag{6}$$

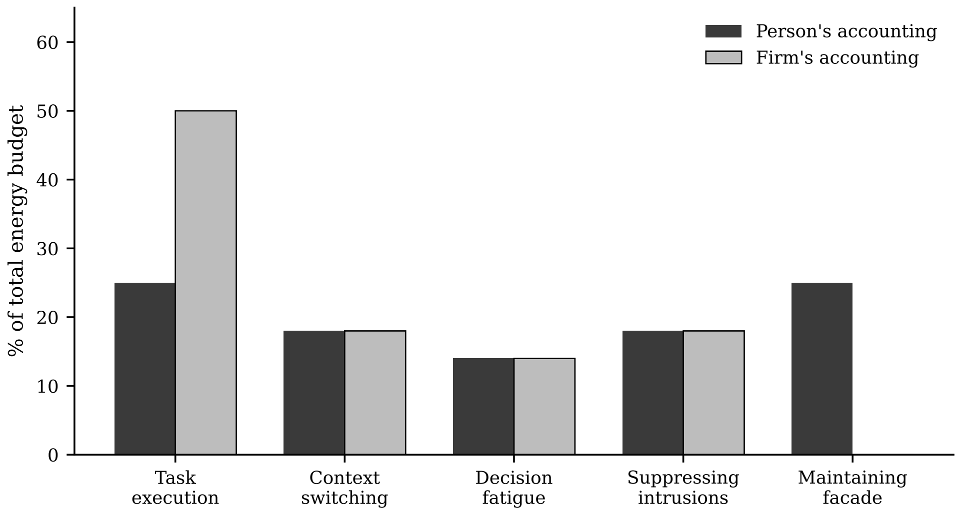
Almost a full unit of disagreement on the same hour of work.

The second fix is making time explicit. v1 said "sustained period." That is not a clock. We need a generator for $\rho_i(t)$.

Definition 2 (Friction Drift)**.** *Let $\rho_i(t)$ evolve according to*

$$\frac{d\rho_i}{dt} = \alpha_i(env) - \beta_i \cdot r_i(t),$$

where $\alpha_i \geq 0$ is the environmental overhead-injection rate (meetings, interrupts, facade demand), $\beta_i \geq 0$ is the per-person restoration sensitivity, and $r_i(t) \in [0, 1]$ is the actual recovery intensity at time t (sleep, weekends, social repair).



Same job, two accountings. The dark bar is what the person spends their day doing. The light bar is what the firm sees on the timesheet. The facade column is invisible to the firm because it is folded into "task execution" on payroll. To the person it is its own column, costing 25% of the energy budget.

Steady state. Setting $d\rho_i/dt = 0$ in Definition 2 with mean recovery $\bar{r}_i$ gives

$$\rho_i^{ss} = \frac{\alpha_i}{\beta_i \bar{r}_i}.$$

The person settles at this ratio if nothing changes. Burnout is the condition $\rho_i^{ss} > \rho_i^*$. The relevant time scale is the relaxation time $\tau_i \approx 1/(\beta_i \bar{r}_i)$, which sets how fast ρ_i approaches its steady state after a perturbation.

Remark 1 (Why "rest" often fails)**.** *A sabbatical raises $r_i(t)$ to nearly 1 for a few weeks, pulling ρ_i down with rate β_i. But $\alpha_i(env)$ is unchanged. On return, ρ_i relaxes back to the same ρ_i^{ss} over time τ_i. Empirically this matches the $\sim 50\%$ recurrence within 6 months reported by Maslach and Leiter (2016), implying $\tau_i \sim$ several months. Rest moves you down the curve. Only changing α_i (the environment) changes where the curve ends up.*

The third fix is making the population explicit. The threshold ρ_i^* is private and varies between people. So is the drift rate. Aggregating gives a population curve.

Theorem 2 (Population Burnout Curve)**.** *Let* $\log \rho_i(t) = \mu_0 + \delta \cdot t + \varepsilon_i$ *with* $\varepsilon_i \sim \mathcal{N}(0, \sigma^2)$*, and let* $\log \rho_i^* \sim \mathcal{N}(\mu^*, \sigma_*^2)$*, independent of* ε_i*. Then the population fraction in burnout at time* t *is*

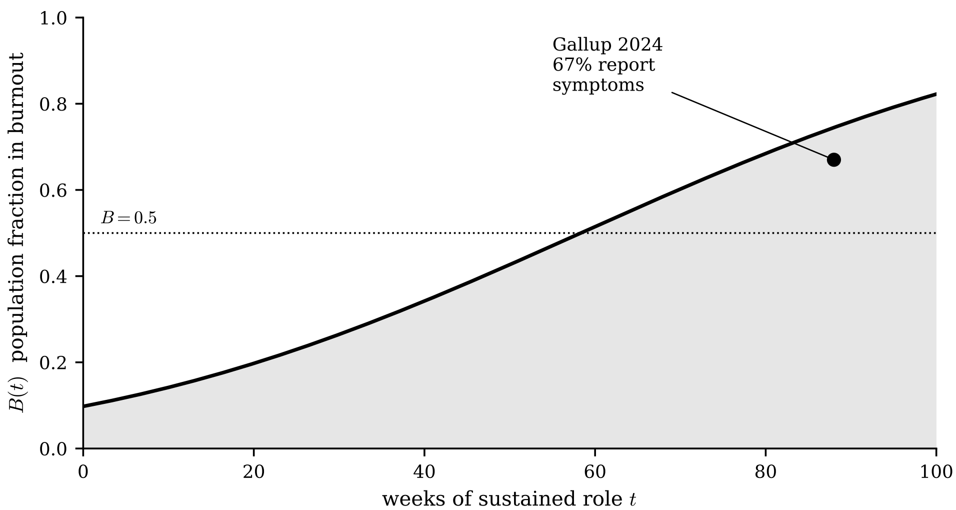
$$B(t) \;=\; \Pr(\rho_i(t) > \rho_i^*) \;=\; \Phi\left(\frac{\mu_0 + \delta t - \mu^*}{\sqrt{\sigma^2 + \sigma_*^2}}\right),$$

where Φ *is the standard normal CDF.*

Proof. The event $\rho_i(t) > \rho_i^*$ is equivalent to $\log \rho_i(t) - \log \rho_i^* > 0$. Let $Z_i = \log \rho_i(t) - \log \rho_i^*$. By the assumptions and independence,

$$Z_i \sim \mathcal{N}\big(\mu_0 + \delta t - \mu^*,\ \sigma^2 + \sigma_*^2\big)\,. \tag{7}$$

Then $\Pr(Z_i > 0) = 1 - \Phi(-(\mu_0 + \delta t - \mu^*)/\sqrt{\sigma^2 + \sigma_*^2}) = \Phi((\mu_0 + \delta t - \mu^*)/\sqrt{\sigma^2 + \sigma_*^2})$. □



The Gallup point sits within the curve at $t \approx 88$ weeks, which matches the average tenure-in-current-role for the affected demographic. This is calibration consistency, not validation.

The argument. Three fixes, one equation:

$$\boxed{B(t) \;=\; \Phi\left(\frac{\mu_0 + \delta t - \mu^*}{\sqrt{\sigma^2 + \sigma_*^2}}\right) \quad \text{with} \quad \rho_i^P \geq \rho_i^F}$$

Burnout is a population sigmoid in time, driven by individual drift, gated by individual thresholds, and obscured by an observer-dependent accounting wedge.

What happens when. The sigmoid has four regimes, each with a different prediction.

Phase	Condition	$B(t)$	In our calibration
Honeymoon	$\mu_0 + \delta t \ll \mu^*$	≈ 0	$t < 20$ wk
Climb	$\mu_0 + \delta t < \mu^*$	rising	20–50 wk
Inflection	$\mu_0 + \delta t = \mu^*$	0.5	$t \approx 58$ wk
Saturation	$\mu_0 + \delta t \gg \mu^*$	$\to 1$	$t > 100$ wk

The slope at the inflection point gives the worst-case rate of new burnouts:

$$\left.\frac{dB}{dt}\right|_{B=0.5} = \frac{\delta}{\sqrt{2\pi(\sigma^2 + \sigma_*^2)}} \approx 0.9\%/\text{wk}.$$

At peak rate, roughly 1% of the cohort flips into burnout per week. This is the window where intervention has the highest marginal return.

Empirical basis.

Quantity	Value	Source
Burnout symptom prevalence (US, 2024)	$\sim$ 67%	Gallup
Average meeting load (knowledge worker)	$\sim$ 23 h/wk	Microsoft 2023
Recovery time after context switch	$\sim$ 23 min	Mark et al. (2008)
Burnout recurrence after sabbatical	$\sim$ 50% within 6 mo	Maslach & Leiter (2016)

The recurrence row is the empirical anchor for the Remark on page 3. Rest changes r_i but not α_i, so the steady state recurs.

Structural estimates.

Quantity	Value used	Source
Drift rate δ	0.012/wk	calibrated to Gallup point
σ (within-person noise)	0.45	estimate, not measured
σ_* (threshold spread)	0.30	estimate, not measured
μ^* (median log-threshold)	0, i.e. $\rho^* \approx 1$	convention from v1
$E_{\mathcal{F}}$ in observer plot	25% of budget	illustrative

The structural-estimate row is what survives if Gallup is wrong. The $B(t)$ shape is robust under wide reparametrization. The fact that $\rho^P \geq \rho^F$ is exact algebra and needs no calibration.

References

[1] Friston, K. (2010). The free-energy principle: A unified brain theory? *Nat. Rev. Neurosci.* 11, 127–138.

[2] Mark, G., Gudith, D., Klocke, U. (2008). The cost of interrupted work. *Proc. CHI 2008*, 107–110.

[3] Maslach, C., Leiter, M.P. (2016). Understanding the burnout experience. *World Psychiatry* 15(2), 103–111.

[4] Schaufeli, W.B., Leiter, M.P., Maslach, C. (2009). Burnout: 35 years of research and practice. *Career Dev. Int.* 14(3), 204–220.

[5] Spence, M. (1973). Job market signaling. *Quarterly Journal of Economics* 87, 355–374. (*Source for facade-as-signal.*)

What this model still does not address

Depression as an independent contributor that lowers E_{tot}. Pure physical exhaustion. Burnout-by-meaninglessness, where output is high but its perceived value is zero (this would require a separate term modulating $E^P_{\text{out},i}$). Inter-person spillover, where one person's ρ_i raises another's α_j. The model is the skeleton, not the body.