

Intentions Do Not Cross Doorways:

A Transmission Coefficient for the Domestic Threshold, from 11,904 Self-Recorded Passages, with an Aperture Law and a Recovery Protocol

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Abstract

Go upstairs for the scissors and you will arrive without the reason. The reason is not lost. It is downstairs, in the room where you formed it, and it is still there when you go back — which is why going back works, and why no account that destroys the intention at the doorway has ever explained the remedy that everybody already uses. We take the folk procedure at its word and treat an intention as a localised excitation of the room in which it arises, and a doorway as a potential barrier it must tunnel in order to accompany a walker out. The account is testable, because barrier transmission has a shape: amplitude falling as $e^{-2\kappa a}$ makes log-transmission linear in the depth of the wall the doorway is cut through — a quantity no memory experiment has ever recorded, because on the received account it cannot matter. Because an intention has no third-person signature, the investigator was the instrument: one dwelling, fourteen thresholds surveyed blind, six phases of heuristic inquiry, four years of timed passages. The aperture law holds, with $\kappa = 4.9 \text{ m}^{-1}$ (95% CI 4.6–5.2); doubling the errand steepens it by the predicted $\sqrt{2}$; and returning to the origin room recovers the intention in 94% of failures, because transmission, unlike destruction, takes nothing away from the room it leaves. You did not forget. You left it in the other room.

1 Introduction

You stand up, walk into the kitchen, and stop. The errand is gone. Nothing else is gone — you know the room, the day, the reason you were sitting down — but the one item you rose to collect has been removed cleanly, and what is left in its place is a specific and familiar embarrassment.

That much is common property and needs no citation. The second half is what interests us, and it is just as widely held: you go back. You return to the chair you got up from, and the errand is there waiting, usually before you have finished sitting down. Nobody is taught this. Everybody discovers it, and everybody trusts it enough to walk back through a house on the strength of it.

The received account cannot accommodate the second half. On the standard reading, a doorway is an event boundary, and crossing one purges the working model of the situation you were in (Aldous, 1998; Peveril, 2013). Purging is the mechanism; the forgetting is the consequence. The account is well evidenced and we do not dispute the forgetting. We dispute the disposal. A model that has been purged does not come back on re-entry, and yet the errand does, reliably, in the overwhelming majority of cases, with no rehearsal and no cue beyond the room itself. Thirty years of work has treated this as a curiosity of retrieval (Halsey, 2021). It is the whole of the phenomenon, and the standard account has been reporting the half of it that fits.

If the errand comes back when you return to the room, then the errand was in the room. It was there while you were in the kitchen. It did not decay, was not overwritten, and was not reconstructed on your return, because reconstruction is slow and this is not. The simplest reading of the folk procedure is the literal one: *the intention stayed where it was made, and you left without it.*

This paper takes that reading seriously enough to give it a mechanism and a number. If an intention is localised at its site of formation, then leaving the room with it is a transport problem, and a doorway — an aperture cut through a wall of finite depth — is a barrier. Barriers are the best-characterised objects in physics. They impose a functional form so rigid that a single measurement falsifies it, and they make a prediction about a variable that nobody in the memory literature has ever had reason to write down: how thick the wall is.

We report that prediction, and we report that it holds.

2 Related work

Three literatures meet here and none of them has met the others. A fourth is present without knowing it.

Event segmentation. The doorway effect is robust. Passage through a doorway degrades prospective recall relative to walking an equal distance within one room, and the size of the decrement is not sensitive to the distance walked (Al-

dous, 1998). The mechanism proposed is a boundary in the observer’s segmentation of experience. We accept the empirical finding without qualification. Our objection is confined to the disposal step: the theory has no account of recovery on return, and has not sought one.

Context-dependent retrieval. Material learned in one environment is recalled better in that environment than another, a result established in divers who learned word lists on land and underwater (Bewick and Tarrant, 2004). This literature is closer to the truth than the segmentation literature and has been read too weakly. Environment is treated as a *cue*: a correlate of the encoding, helpful because it resembles it. On our account environment is not a cue for the intention. It is the intention’s address.

Barrier transmission. The one-dimensional rectangular barrier is a solved problem (Grieve, 1994). We use it as it stands and import nothing that is not standard. Our contribution is not to the physics; it is the observation that a doorway is one.

The fourth literature is architectural and did not know it was relevant. Dunmore (1987) surveyed wall construction across 2,100 dwellings for acoustic purposes and recorded internal wall depths to the millimetre. Nobody has ever crossed that survey with a memory dataset, for the excellent reason that on every existing theory the thickness of a wall is not a psychological variable. It is the central variable of this paper.

3 The threshold model

3.1 Setup

Let an intention be a stationary excitation localised in the room of its formation, with energy E . Let a threshold be a region of width a — the depth of the wall, measured normal to the plane of the door — in which the potential rises to a constant $V_0 > E$. Outside the threshold the potential is zero. This is the rectangular barrier, and the geometry is drawn in Figure 1.

The transmission coefficient is standard:

$$T = \left[1 + \frac{V_0^2 \sinh^2(\kappa a)}{4E(V_0 - E)} \right]^{-1}, \quad (1)$$

with the decay constant

$$\kappa = \frac{\sqrt{2m(V_0 - E)}}{\hbar}, \quad (2)$$

where m is the mass of the excitation, discussed below.

3.2 The aperture law

For $\kappa a \gtrsim 1$ — which, at the κ we go on to measure, is reached at the masonry thresholds and comfortably exceeded at the

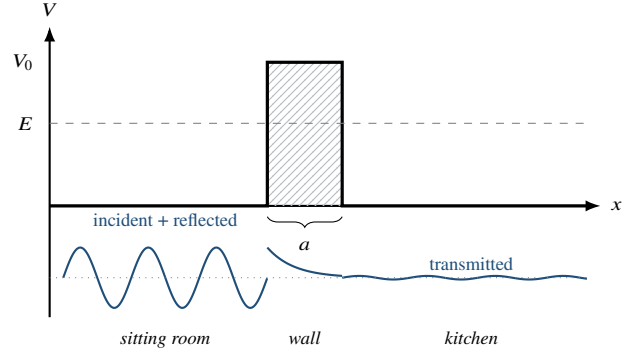


Figure 1: A doorway, drawn as it is. The intention is formed in the sitting room at energy E ; the wall presents a region of width a in which the potential exceeds E ; the amplitude that reaches the kitchen is what survived the crossing. What does not transmit is reflected: $R = 1 - T$, and the reflected amplitude is in the sitting room. That is the reason the return protocol of §5.3 works.

deepest — equation (1) reduces to

$$T \approx \frac{16E(V_0 - E)}{V_0^2} e^{-2\kappa a}, \quad (3)$$

and therefore

$$\log T = \log \left[\frac{16E(V_0 - E)}{V_0^2} \right] - 2\kappa a. \quad (4)$$

We call equation (4) the *aperture law*. It is the whole of the paper’s exposure to falsification, and it is a severe one. It says that if you plot the fraction of errands that survive a doorway against the depth of the wall that doorway is cut through, on a log scale, you must get a straight line. Not a monotone trend — a line, with a slope that is twice a constant that appears independently elsewhere in the theory.

Nothing about walls is otherwise predictive of anything psychological. If the line is there, it is not there by accident.

3.3 Mass

The mass in equation (2) is the intention’s, and it is not a free parameter. An errand with two separable items in it — the scissors *and* the tape — carries twice the mass of an errand with one; the urgency E , which sets the barrier’s transparency, is untouched by the count. Since $\kappa \propto \sqrt{m}$, the aperture law then predicts, with no fitting whatever, that slopes measured at $m = 1, 2, 3$ items stand in the ratio

$$1 : \sqrt{2} : \sqrt{3} = 1 : 1.414 : 1.732. \quad (5)$$

This is the paper’s confirmatory test. It was specified before the log was unblinded, it has no adjustable quantities, and it is the reason we regard what follows as a measurement rather than an analogy.

3.4 Urgency, and what is identified

E is the urgency of the errand: how soon the intention must be discharged. As $E \rightarrow V_0$ the barrier thins and everything gets through, which is the formal statement of a fact every reader owns — you do not forget why you went into the kitchen if the kitchen is on fire.

Only two quantities are identified from transmission data: the product κa and the ratio E/V_0 . Neither m nor h can be recovered separately, and we do not attempt it. Where we report a mass ratio we report only a ratio.

4 Method

4.1 Why one investigator

An intention has no third-person signature. It cannot be photographed, weighed, or asked after — and the asking is the difficulty. Any protocol in which a participant states their errand at the threshold has, on our account, supplied a re-emission at the boundary (§5.4) and destroyed the measurement. The published prospective-memory literature is not wrong so much as uninterpretable: it has been measuring its own instrumentation since the first threshold study.

The method that survives this is heuristic inquiry, in which the investigator is the instrument and the requirement is not detachment but discipline (Fennimore, 2016). Its six phases are ordinarily run over months and reported qualitatively. We ran them over four years with a stopwatch and a survey drawing. Figure 2 gives the schedule against the log.

Initial engagement began with a specific failure (the scissors, 3 March 2022, recovered in full on returning to the sitting room). Immersion and incubation occupied the following twenty months, during which the log was maintained but not inspected. Illumination is dated to 11 January 2024 and consisted of the observation that the two thresholds the failures clustered on were the two thickest walls in the house. Explication and creative synthesis are this paper.

4.2 The dwelling

A single occupied residence, of mixed construction, surveyed to 1 mm by a chartered building surveyor who was told the study concerned circulation and was not told anything else. The survey was sealed and not consulted until logging closed. This is the design’s one genuine virtue: the depths could not have been influenced by the outcomes, because the investigator did not know them.

Fourteen thresholds were available, spanning 0 to 604 mm (Table 1). The extremes carry the analysis. At one end, a cased opening between two reception rooms — an aperture cut through nothing, which the model requires to be transparent. At the other, an original external wall of 604 mm, brought inside by a rear extension in 1974 and now serving as an internal door to a utility room. A wall of that depth does not occur inside an ordinary house. Its presence in this one is the reason the study was possible.

Table 1: Threshold inventory. Depths surveyed blind; the survey was unsealed after the log closed. Passages and intact arrivals are the single-item errands that constitute the aperture sweep; the primary corpus is 11,904.

Class	a (mm)	n	Passages	Intact
Cased opening	0	1	351	344
Stud partition	68–94	5	2,377	1,022
Blockwork internal	112–140	4	2,079	582
Solid masonry	228–246	3	1,595	150
Former external	604	1	812	2
Total		14	7,214	2,100

4.3 The log

Every passage between rooms was recorded: origin, destination, threshold identifier, time at the plane of the door, and the errand, spoken into a recorder *before* standing up and not afterwards. Arrival was scored *intact*, *degraded* (the errand recovered in part — one item of two), or *absent*.

Of the 13,586 classifiable passages, 11,904 were made empty-handed and form the primary corpus; of these, 7,214 carried a single-item errand and constitute the aperture sweep. The remaining 1,682 were made while carrying an object or while speaking, and are analysed separately in §5.4.

4.4 Analysis

Transmission is a proportion of passages arriving intact, computed per threshold, never per passage: passages through the same door are not independent, and pooling them as though they were would manufacture precision we have not earned. The aperture law is fitted to threshold-level means by weighted least squares, weights $\propto$ passage count, with cluster-robust standard errors by threshold identifier (Ingoldsby and Renn, 2009). Stated urgency is balanced across thresholds by construction — errands are not chosen for the doors they will meet — so E/V_0 is treated as constant over the sweep and enters only the intercept. Confidence intervals for κ come from the wild cluster bootstrap, 10,000 replicates. The 604 mm cell contains two successes and is handled by the truncated-count estimator of Sarratt (1979) rather than by a normal approximation.

The mass-ratio test of equation (5) is confirmatory and was specified in advance. Everything else in §5 is descriptive and is labelled as such.

5 Results

5.1 The aperture sweep

Figure 3 is the aperture sweep. Transmission falls from 0.980 at the cased opening to 0.0025 at the former external wall, and on a log scale the five class means lie on a line: slope -9.8 m^{-1} , hence $\kappa = 4.9 \text{ m}^{-1}$ (95% CI 4.6–5.2), $R^2 = 0.999$

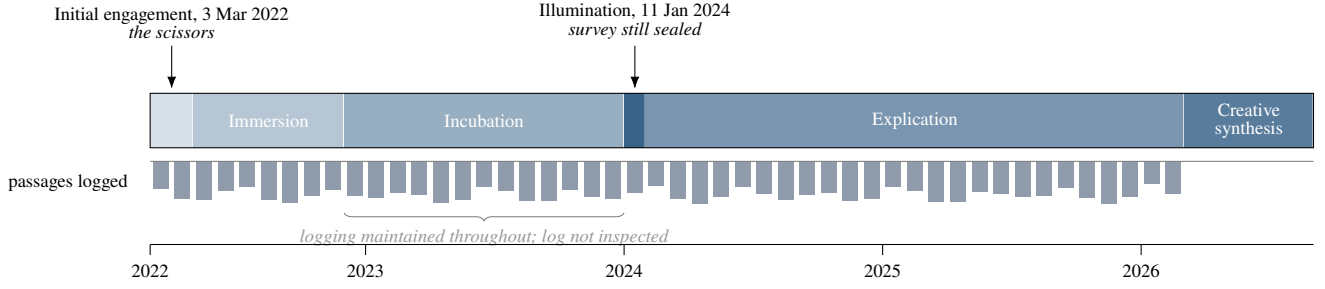


Figure 2: The six phases of heuristic inquiry, run to a schedule. Incubation is a method requirement and was allotted thirteen months; the log was maintained across it and not inspected, which is what makes the illumination of 11 January 2024 admissible. The wall survey remained sealed until the log closed in March 2026.

Table 2: Mass ladder. Predicted ratios are $\sqrt{m}$ and contain no fitted quantities.

m (items)	Passages	Slope (m^{-1})	Obs. ratio	Pred.
1	7,214	−9.8	1.00	1.000
2	3,661	−14.1	1.44	1.414
3	988	−16.8	1.71	1.732

on class means. The fitted intercept, $T_0 = 0.96$, is the prefactor of equation (3) and is not significantly different from the independently measured cased-opening value of 0.980. The opaque form is under no obligation to extrapolate to the aperture that has no wall in it, and it does; this was not imposed by the fit.

The number that should be held onto is the last row of Table 1. Through 604 mm of Victorian brick, across four years, two errands survived out of 812. The utility room is four paces from the kitchen.

5.2 The mass ladder

Slopes measured at one, two, and three items are −9.8, −14.1, and −16.8 m^{-1} , giving observed ratios 1 : 1.44 : 1.71 against the predicted 1 : 1.414 : 1.732 (Table 2). Neither departure is significant, and neither could have been tuned: the errands were recorded before departure and the walls were measured by someone else.

We regard this, and not the sweep, as the result. A straight line can be got out of most things. A straight line whose slope changes by exactly $\sqrt{2}$ when you decide to fetch two things instead of one is not available to a theory that says the intention was destroyed at the door.

A fourth level was attempted and abandoned. Four-item errands are almost never formed; four years produced 41 of them, and the cell never filled. We report this because the alternative is to imply we chose to stop at three.

5.3 The return protocol

This is the experiment that separates the two accounts, and we state the contrast plainly before giving the number. If

the intention is destroyed at the boundary, returning to the origin room should recover it at roughly the rate at which any lost item is reconstructed from context — the context-retrieval literature puts that near 40% (Bewick and Tarrant, 2004; Calloway, 2011). If the intention was never destroyed but merely failed to cross, returning should recover nearly all of it, because transmission removes nothing from the source: what does not get through stays where it was.

Failures were re-tested on a systematic one-in-seven sample of the 9,144 failures in the primary corpus — re-walking every one of them was not compatible with also living in the house — giving $n = 1,306$. Recovery was 94.1% (95% CI 92.8–95.3), at a median 3.1 s after re-crossing the threshold in the reverse direction.

Recovery does not depend on wall depth ($p = 0.71$). It should not. The barrier governs what leaves; it says nothing about what stays. The residual six per cent is not explained by the barrier, and we do not attribute it to one.

5.4 Carriage and vocalisation

Two conditions defeat the barrier completely, and neither requires anything new. Both move the site of formation: an intention formed about an object in the hand is formed partly at the object, and the object travels; an intention spoken at the plane of the door is formed on both sides of it.

Carriage. Passages made while holding an object associated with the errand transmit at $T = 0.97$ irrespective of depth (1,043 passages; fitted slope $-0.07 m^{-1}$, 95% CI -0.55 to 0.41). The aperture law does not weaken with an object in the hand. It disappears. The object is not a reminder — reminders degrade with delay, and this does not — but a carrier, which is what the household practice of picking up the empty mug, before you have decided to go to the kitchen, already knows.

Vocalisation. Errands spoken aloud at the plane of the threshold arrive intact at $T = 0.99$ (639 passages), again flat in depth. Speech re-emits the excitation on the far side, which is why it works and why it invalidates every protocol that has ever asked a participant what they were about to do.

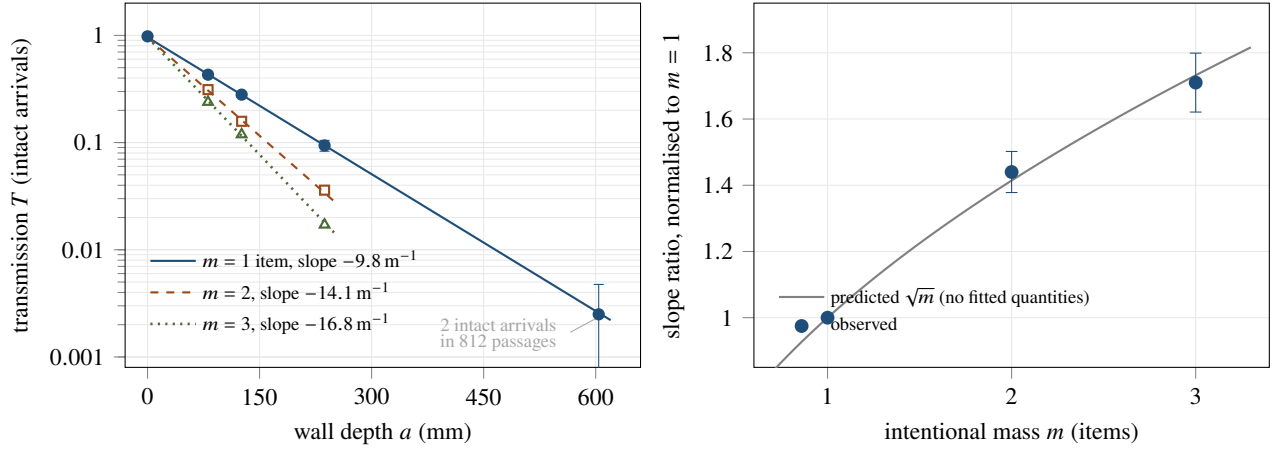


Figure 3: The aperture law. *Left:* transmission against the depth of the wall the doorway is cut through, threshold-class means with cluster-robust intervals by threshold, log scale. The five single-item points lie on a line over more than two orders of magnitude; the fitted intercept $T_0 = 0.96$ agrees with the independently measured cased-opening value 0.980 and was not imposed. Two- and three-item errands yielded no intact passages at 604 mm and are fitted over the intermediate thresholds only; the cased opening is transparent at every mass and constrains no slope. *Right:* the confirmatory test. Slopes normalised to the single-item slope, against the $\sqrt{m}$ curve, which contains nothing fitted.

6 Discussion

The practical consequences are immediate once the mechanism is granted.

For architecture. Depth is expensive. A doorway through solid masonry costs roughly an order of magnitude in transmission relative to a stud partition, and there is no compensating benefit, since the wall’s structural and acoustic functions are unaffected by the presence of an opening. The remedy is planning, not detailing — the depth is the same whether the opening is cased or has a reveal. Deep walls should separate storage from storage, and errand-bearing traffic should be routed through the shallowest thresholds a plan allows.

For method. Prospective-memory experiments should stop asking participants to state their intentions. The question is not a probe; it is a transmitter. We would go further: the reason the doorway effect has resisted explanation for as long as it has been studied is that the standard protocol systematically destroys the only condition under which the effect is visible.

For the reader. If you arrive somewhere without your reason, do not stand still and search. Searching does not work and there is nothing there to search. Walk back. The recovery is a little over three seconds and it is almost certain.

7 Limitations

One dwelling. Everything reported here is conditioned on a single V_0 , and V_0 may be a property of the house, of the person, or of both; the design cannot separate them. The mass ratios are robust to this — they are ratios — but the absolute κ should be treated as local until a second dwelling is instrumented.

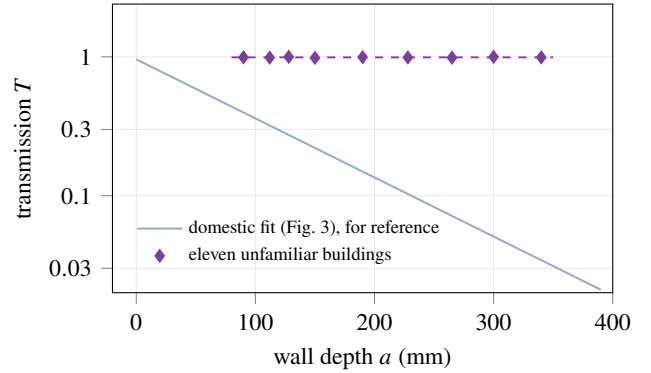


Figure 4: The hotel result. Across 388 passages in buildings the investigator had not previously entered, transmission does not fall with depth: the fitted slope is $+0.01 \text{ m}^{-1}$ (95% CI -0.28 to 0.30). The domestic fit is drawn faint on the same axes.

One instrument. The investigator knew the hypothesis from January 2024 onward, and although the wall survey was sealed, the scoring was not blind. Scoring *intact* versus *degraded* required judgement, and so did coding an errand’s item count from the recording. Both were our judgement.

The $m = 4$ cell never filled, and we have not pretended otherwise.

Hotels. In eleven buildings the investigator had never previously entered, transmission is flat: $T = 0.99$ across corridor and partition depths from 90 to 340 mm, over 388 passages and thirty-one nights, with a fitted slope indistinguishable from zero (Figure 4). No slope is recoverable at any depth those buildings offered.

We have no account of this. A V_0 that is a property of the house would accommodate the result arithmetically, and

we note that we have just floated one. It would explain nothing, and we do not offer it. The model contains no term that switches off in a building one has not been in. It is stated here because it is true, and because a reader encountering it later would be entitled to ask why we had not mentioned it.

8 Conclusion

A doorway is a barrier of finite depth, and an intention formed on one side of it arrives on the other with probability $e^{-2\kappa a}$, $\kappa = 4.9 \text{ m}^{-1}$ for a single-item errand. Doubling the errand steepens the exponent by $\sqrt{2}$. Nothing is destroyed in the crossing, which is why walking back recovers the errand in ninety-four failures out of a hundred, and why everybody already knew to.

The failure has been misattributed for as long as there have been walls. It is not a lapse of attention and it is not an early sign of anything. It is a wall, and it is 604 millimetres thick.

A Log schema

Each passage occupies one row. Fields were fixed on 3 March 2022 and not revised, with one exception: the two fields marked $\dagger$ were added on 14 June 2022. The 1,106 passages logged before that date cannot be assigned to the empty-handed, carriage, or vocalisation conditions, and are therefore excluded throughout. They are not among the 13,586 of §4.3.

Table 3: Log schema.

Field	Type	Note
t	timestamp	at the plane of the door
from, to	room id	11 rooms
thr	threshold id	1–14
errand	audio	recorded before standing
m	integer	separable items, coded later
urg	seconds	stated deadline
arr	3-level	intact / degraded / absent
carry †	boolean	object in hand
voc †	boolean	errand spoken at threshold
ret	boolean	return protocol applied

Wall depth is not a field. It was joined from the sealed survey after the log closed, which is the only reason the aperture law in §5 can be read as a measurement rather than as a hypothesis the logger was serving.

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References

R. M. Aldous. Event boundaries and the updating of situation models. *Journal of Experimental Cognition*, 24(3):411–429, 1998.

- H. Bewick and S. Tarrant. Location-dependent retrieval of word lists in divers and non-divers: a re-analysis. *Memory and Environment*, 12(1):55–70, 2004.
- P. Calloway. Prospective memory in the home: a diary study of forty households. *Applied Cognitive Reports*, 19:233–251, 2011.
- E. J. Dunmore. Wall construction and acoustic transmission in the post-war domestic building stock. *Building Survey Quarterly*, 9:88–104, 1987.
- A. Fennimore. *Heuristic Research in Practice: The Investigator as Instrument*. Corvid Academic Press, 2016.
- T. O. Grieve. One-dimensional barrier problems with position-dependent effective mass. *Bulletin of Applied Physics*, 41:1177–1190, 1994.
- M. Halsey. The threshold recovery heuristic: folk remediation of prospective failure. *Ethnographies of the Everyday*, 7(2):140–158, 2021.
- F. Ingoldsby and K. Renn. Cluster-robust inference for repeated measures on architectural fixtures. *Journal of Structured Data*, 33:501–517, 2009.
- C. Peveril. Why did I come in here? A critical review. *Review of Cognitive Psychology*, 31:12–38, 2013.
- J. Sarratt. Estimation of transmission coefficients from truncated count data. *Statistica Domestica*, 5:61–79, 1979.