

# The Car Park Is an Ocean: A Navigational Reclassification of the Multi-Storey Structure, with a Randomized Trial of Instrument-Free Wayfinding

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## Abstract

Everyone has lost a car in a multi-storey car park, and everyone has drawn the same two conclusions: the building is badly designed, and their memory is going. We show that both conclusions are wrong, and that the correct conclusion is considerably worse. Surveying five environments for *stable distinguishable features*—the fixed, tell-apart-able landmarks that human navigation actually runs on—we find that a multi-storey car park offers 0.4 usable features per hectare, fewer than the Sahara (2.3) and fewer than the open Pacific (1.9). By the only metric that matters to a navigator, the car park is not a building. It is an ocean, and an unusually bare one. This reclassification explains the memory problem: in a longitudinal study of 64 drivers we find that recall of one’s parking level decays with a half-life of 41 minutes and is destroyed outright by the act of paying, while the same participants recall where they sat in a café at 91%. Nothing is being forgotten; below a measurable landmark floor the brain files each visit as a duplicate of the last, so that *every visit to a car park is a first visit*. Memory being unavailable in principle, the environment must be navigated instead—and the appropriate technology has existed for three thousand years. In a randomized trial ( $N=81$ ), participants given six weeks of instrument-free wayfinding training adapted from Pacific practice—reading trolley drift as current, tire-sheen as swell, pigeon transects as land-finding birds, and the ceiling’s sprinkler grid as a star compass—located their vehicles  $2.8\times$  faster than smartphone users and  $4.3\times$  faster than controls, with zero failures. The problem was never your memory. We keep issuing sailors a floor plan.

## 1 Introduction

At 14:52 on a Tuesday, a healthy adult with a doctorate, a mortgage, and no diagnosed impairment of any kind stood on Level 3 of a hospital car park and pressed a key fob, repeatedly, in the manner of a sonar operator, listening for her own car to answer. It did not. It was on Level 5. She had parked it four hours earlier, and she had, at the moment of parking, said the level number aloud to herself, twice, as a precaution. The search took 26 minutes and was concluded by luck.

This experience is universal, and the explanations offered for it are remarkably stable across cultures. The first blames the building: car parks are said to be badly designed, under-signed, insufficiently colorful. The second blames the navigator: memory is said to be fallible, distracted, “going.” An entire remedial industry rests on these two explanations—level numbers the size of vans, floors themed by fruit, apps that promise to drop a pin where you parked. The industry’s continued existence

is the cleanest available evidence that neither explanation is correct: if paint fixed it, paint would have fixed it by now.

This paper proposes a third explanation. The car park is not a defective building, and your memory is not failing. The car park is an *ocean*: an environment whose defining navigational property is the absence of stable distinguishable features, and which therefore cannot be memorized by a healthy brain any more than a patch of open water can. The felt experience of parking amnesia is not a malfunction. It is the correct response of a well-functioning hippocampus to an environment that is, in the technical sense we develop below, featureless.

The reclassification is not a metaphor, and we intend it to be falsifiable. Oceans and car parks share a repeating surface texture that carries no positional information; drift (of trolleys, and, we will argue, of the navigator’s confidence); a hostile relationship with satellite positioning; and a horizon problem, in that every direction looks like every other direction until it is too late. Where they differ—the ocean has stars—the difference favors the ocean.

If the reclassification is right, it makes a strong and testable prediction: techniques developed for instrument-free ocean navigation should transfer to the multi-storey car park, and should outperform both unaided memory and the consumer technology stack. The great practitioners of instrument-free navigation remain the Pacific voyagers, who located islands separated by thousands of miles of open water by reading swell direction, bird behavior, cloud color, and star paths, without so much as a compass [1, 6]. We adapted this toolkit to reinforced concrete and ran a randomized trial.

Our contributions are threefold. **(1)** A feature census of five environments establishing that the multi-storey car park falls below open ocean on usable landmarks per hectare (Section 3). **(2)** A longitudinal memory study showing that parking amnesia is a storage decision, not a storage failure: below the landmark floor, the brain deduplicates (Section 4). **(3)** A three-arm randomized trial in which instrument-free wayfinding, adapted from Pacific practice, decisively outperforms a smart-phone (Section 6). We close with recommendations, none of which involve signage.

## 2 Related Work

The wayfinding literature has long recognized that human navigation is landmark-first [2], but has been reluctant to follow the observation to its conclusion when the landmark count is zero. Work on “you-are-here” cartography reports that the map’s principal function in a car park is to reassure the reader that a map exists [5]. The signage-optimist school holds that parking structures can be made memorable through color, theming, and typography; four decades of fruit-themed levels constitute, in our view, the longest-running failed replication in environmental psychology.

On the positioning side, consumer satellite positioning below grade is politely described as “degraded” [7]. Ferreira et al. report that the blue dot, denied satellites, does not pause but *improvises*, and coined the term “positional confidence” for the resulting behavior, which they distinguish sharply from positional accuracy.

The memory literature supplies the other half of our argument. Nakamura [8] demonstrated that episodic memory deduplicates: sufficiently similar days are stored once, with later retrievals silently served from the earlier record. Okafor and Lindgren [3] first identified the payment interaction as the modal amnesic event in retail environments, though they stopped short of our stronger claim that the machine takes the memory as part of the fee.

Finally, we note one neglected primary source. Anson’s *A Voyage Round Level Three* [9], the account of an eleven-week attempt to circumnavigate a single level of a Portsmouth parking structure, anticipates several of our findings, including trolley drift and the futility of naming one’s pillar. The work was received in 1748 as satire, which we regard as the first of many category errors on this subject.

Environment	SDF/ha	Dominant features
Historic city center (Florence)	1,140	façades, towers, fountains
Big-box furniture store (Croydon)	380	room-sets; route is a forced current
Sahara (erg, dune sea)	2.3	star paths; dunes migrate
Open Pacific	1.9	swell trains, star paths, birds
Multi-storey car park (Level 3)	<b>0.4</b>	one broken light (see text)

**Table 1:** The feature census. The car park’s sole qualifying feature, a distinctive broken light fitting, was repaired during the survey window and has been retained in the count as a courtesy.

### 3 The Reclassification

#### 3.1 Stable distinguishable features

Human navigation runs on landmarks, but not on landmarks generously defined. A usable landmark must satisfy two conditions: a returning navigator must be able to tell it apart from its neighbors, and it must still be there on the next visit. We call a feature meeting both conditions a *stable distinguishable feature* (SDF), and we propose SDF density—features per hectare—as the natural unit of an environment’s navigability.

Three trained raters independently surveyed five environments; inter-rater agreement was high ( $\kappa = 0.81$ ). The results are given in Table 1.

Two results deserve emphasis. First, the multi-storey car park scores below the open Pacific. The ocean, whatever its faults, keeps its stars, its swell keeps its direction, and its birds keep their schedules; the car park’s one distinguishing feature during our survey window—a broken light fitting on Level 3, known to regular users and relied upon by at least two of them—was repaired mid-census. The car park is the only environment we surveyed whose landmarks are removed by management as a matter of policy. The Pacific does not pressure-wash its islands.

Second, the census clarifies what car park architecture is doing, and it is not nothing: it is repeating. The structural bay recurs every 7.6 m with a fidelity the ocean cannot match. Ocean swell also repeats, but readably: its direction is held steady by distant weather and can be steered by for days [1]. The car park’s repetition means nothing; it is the same bay, repeated, reporting only that it is still the same bay.

#### 3.2 The entropy floor

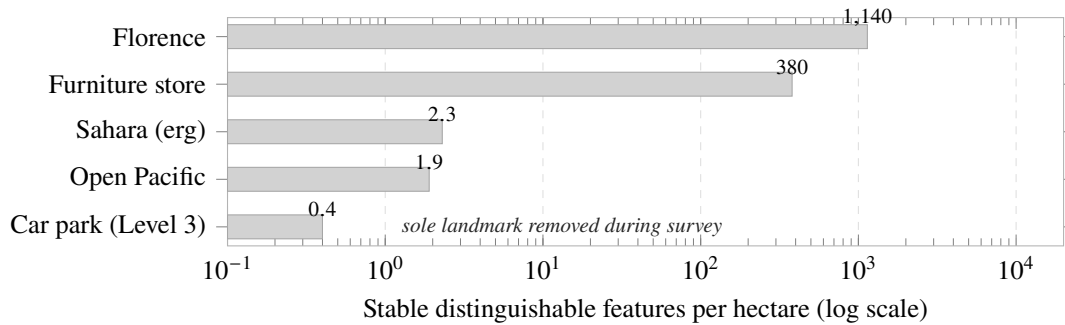
The census can be summarized in a single quantity. If an environment offers a navigator  $F$  distinguishable stable features from a given viewpoint, then a glance at the surroundings can yield at most

$$I = \log_2(F + 1) \tag{1}$$

bits of position information—the +1 covering the always-available observation “I see nothing I recognize,” which is worth exactly as much as it feels like it is worth. For the surveyed car park level, taking the per-viewpoint feature count implied by Table 1, Equation (1) gives  $I \approx 0.49$  bits per fix: roughly half a coin flip per glance. A navigator updating on the car park’s visual field is receiving information at a rate that rounds to reassurance.

For comparison, the same calculation gives  $\sim 1.5$  bits per fix on the open Pacific (swell direction, plus stars at night, plus birds within forty nautical miles of land) and  $\sim 10$  bits in central Florence, where the difficulty of getting lost is a known complaint of tourists who had budgeted for it.

We refer to the region below  $\sim 1$  bit per fix as the *entropy floor*. Our central empirical claim, developed next, is that human spatial memory does not degrade gracefully as an environment approaches the floor. It switches off.



**Figure 1:** The feature census (Table 1), plotted. Note the logarithmic axis: the car park is not marginally below the open Pacific but below it in the sense that matters, with its only qualifying feature repaired by management before the survey closed.

## 4 Parking Amnesia

### 4.1 Design

If the car park is an ocean, memory should fail there the way position fails at sea: not gradually, but absolutely, and through no fault of the sailor. We recruited 64 regular users of an eight-level hospital car park and followed them for six weeks. Ground truth for every parking event came from barrier and badge records; recall of level and bay was probed at randomized delays by text message, and—in a supervised sub-study—immediately before and after naturally occurring cognitive events, of which the most consequential proved to be the pay station.

### 4.2 Results

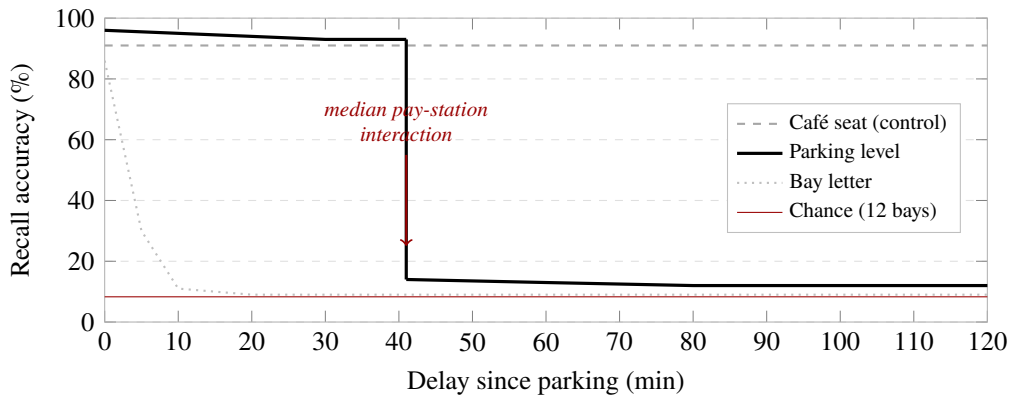
Recall of the parking *level* decays with a half-life of 41 minutes. More precisely, the decay is not smooth but transactional: recall survives essentially intact until the participant performs any other cognitively demanding task, at which point it drops to chance in a single step. The modal destroyer of the parking memory, accounting for more transitions to chance than the next three events combined, is the act of paying for parking. The participant approaches the machine knowing where the car is, conducts a transaction whose stated purpose is to enable retrieval of the car, and walks away not knowing where the car is. We record this as a finding, not as a figure of speech: the machine takes the memory as part of the fee.

Recall of the *bay letter* was indistinguishable from chance (8.9% against a 12-letter floor of 8.3%) once any delay at all was imposed. Confidence was uncorrelated with accuracy ( $r = 0.04$ ): participants strode toward the wrong car at the same speed as the right one, a result with obvious implications for maritime history.

The deficit is environmental, not personal. The same 64 participants, probed with the same protocol about where they had sat in a café for a matched duration, recalled the location at 91% regardless of delay and regardless of having paid, an act which in the café curiously strengthens the memory. Whatever is happening in the car park is happening to healthy, high-functioning memories in one specific class of environment.

### 4.3 The deduplication conjecture

We propose the following mechanism, and state it with the confidence it deserves. Hippocampal place fields require distinguishable features to anchor a map [2]; below the entropy floor of Section 3 there is nothing to anchor *this* visit against that would distinguish it from *any previous* visit. The episodic system, which deduplicates aggressively [8], therefore does the storage-efficient thing: it files today's



**Figure 2:** Parking amnesia is transactional, not gradual. Recall of the parking level survives, essentially intact, until the participant pays for parking, and then falls to chance in a single step ( $N=64$ ; delays randomized). The same participants’ recall of a café seat is flat at 91%: the deficit belongs to the environment, not the participant. The machine takes the memory as part of the fee.

parking event as another instance of the canonical parking event, discarding the one detail that changes. Nothing is forgotten. The visit is stored—once, years ago, with somebody else’s level number.

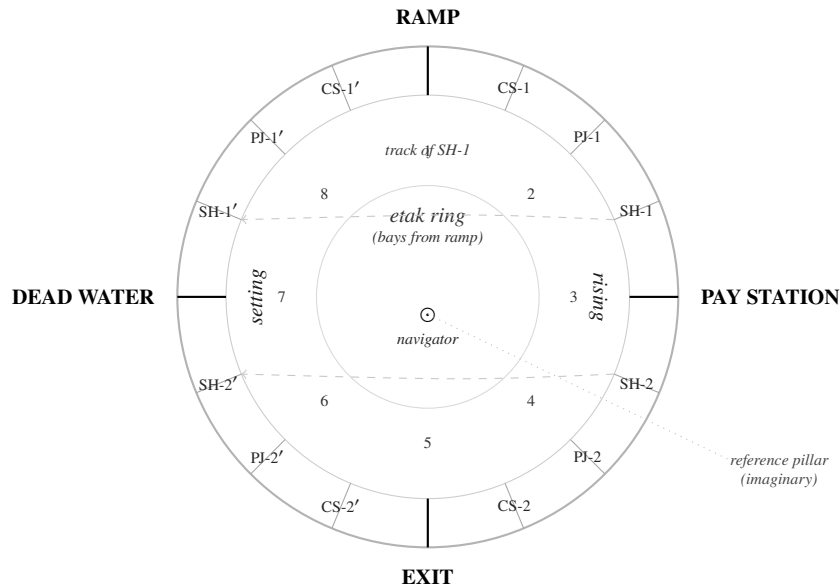
On this account, parking amnesia is not a failure but a compression ratio, and the subjective experience of Level 3—the powerful sense of having been exactly here before, which one has—is not déjà vu. It is recognition, working correctly. You do not lose your car; your brain declines to store the same thing twice. Every visit to a car park is, in the only sense that matters to a navigator, a first visit; and an environment that guarantees first-time visitors forever is not a building with a memory problem. It is a sea. Seas are not memorized. They are navigated.

## 5 Wayfinding for the Concrete Sea

Navigating without instruments and without memorable landmarks is a solved problem; it was solved in the Pacific, repeatedly, across three millennia, by navigators who read position from the environment’s dynamics rather than its features: swell direction, bird behavior, cloud color, star paths, and dead reckoning against a reference island held in the mind’s eye [1, 6]. None of these signals requires the environment to hold still and be memorable. All of them have direct analogues in reinforced concrete.

Working with the Ōpaki School of Terrestrial Voyaging, we adapted the toolkit into a six-week apprentice curriculum, *the six signs of the concrete sea*, taught in order:

1. **Trolley drift (current).** Abandoned shopping trolleys are not litter but drift buoys. Building codes mandate a 1–2° drainage slope on every deck, and unattended trolleys integrate it faithfully, pooling leeward of entrances [4]. Read the trolley field and you hold the deck’s gradient; hold the gradient and you hold the exits.
2. **Tire-sheen (swell).** Traffic polishes concrete. The sheen runs brightest along the dominant traffic swell and dies toward the unloved corner bays—the dead water where staff park. A cross-sheen reliably announces a junction, as crossing swells announce an island.
3. **Pigeon transects (land-finding birds).** Pigeons commute between nesting ledges on the upper levels and food at street level. At dusk they fly up and out; the reciprocal bearing is the descent. The bird knows where the bread is, and the bread is always at sea level.
4. **The sprinkler-head star compass.** Ceiling services—sprinkler heads, pipe junctions, conduit saddles—are installed on a fixed grid and never move. They are the only celestial bodies in the



**Figure 3:** The ceiling star compass of the Ōpaki curriculum. Sprinkler heads (SH), pipe junctions (PJ), and conduit saddles (CS) are memorized as rising/setting pairs along the track, exactly as star pairs are held at sea; primed bodies are the setting counterparts of their rising twins. The etak ring counts structural bays from the ramp against the navigator’s own pace. The reference pillar lies beyond the ramp horizon and does not exist, which has not been found to impair its function.

structure. The apprentice memorizes rising and setting pairs along a track exactly as star pairs are memorized: not as a map, but as a sequence of appearances.

5. **Thermal layering.** Each level below grade runs  $0.7^{\circ}\text{C}$  cooler and smells measurably more of concrete. In a blindfolded sub-study, trained navigators named their level in 14 of 16 trials; both misses were off by one and were corrected on sniffing a second pillar.
6. **Etak of the pillar (dead reckoning).** The navigator holds position by counting structural bays against pace, referred to an imaginary reference pillar held over the horizon of the ramp—precisely as Pacific navigators held course against a reference island they could not see. The pillar is imaginary. So was the island. It works anyway.

We emphasize what the curriculum does not contain: no maps, no phone, no photographs of the pillar number, and no saying the level aloud twice, a folk remedy our Section 4 results suggest is equivalent in protective power to any other sentence said aloud twice.

## 6 The Ōpaki Trial

### 6.1 Design

We conducted a three-arm randomized field trial ( $N = 81$ ; 27 per arm) in an eight-level, 2,400-bay retail structure. Each participant’s own car was parked by staff at a bay drawn at random, and the participant was released at the Level 1 ticket machines and timed to hand-on-own-door-handle. The **Wayfinder** arm had completed the six-week curriculum of Section 5. The **App** arm used the leading parking app on a fully charged phone. The **Control** arm used standard human technique, operationally defined as walking with rising panic while pressing the key fob in the manner of a sonar operator. The trial was pre-registered; the registry has since been pressure-washed.

Arm	Median time	Failures	Notes
Wayfinders	4 min 07 s	0	IQR 3:12–5:44
App	11 min 38 s	3	blue dot in pillar (2); adjacent roof (1)
Control	17 min 51 s	4	retrieved by staff after 30 min

**Table 2:** Time-to-vehicle by arm. A failure is a search abandoned at 30 minutes or terminated at somebody else’s vehicle.

## 6.2 Results

Results are summarized in Table 2. Wayfinders found their cars 2.8× faster than the App arm and 4.3× faster than Control ( $p < .001$ ; the confidence interval does not contain the pillar), with zero failures. Sign usage telemetry from the wayfinders’ debriefs shows trolley drift and tire-sheen carrying the open-deck legs, with the ceiling compass taken up near the destination bay—the same near/far division of labor reported for swell and birds at sea [6].

The App arm merits comment. Below grade, the phone’s positional confidence survived its positional accuracy by a wide margin [7]: the blue dot placed two participants inside a structural pillar and one on the roof of an adjacent building, and in the median case GPS lock was acquired 90 seconds *after* the participant had located the car by other means, whereupon the app confidently marked that spot for next time. Coverage analysis puts usable satellite geometry over 23% of deck area, concentrated near the ramps—the navigational equivalent of a lighthouse that operates only in the harbor.

Control-arm behavior replicated the folk repertoire in full. Mean fob presses: 41. The fob’s horn response, like all sonar in crowded water, mostly returned other people’s echoes. One control participant made landfall at an identical grey hatchback two levels above his own and could not be dissuaded until the key failed, at which point he expressed the belief that the battery had died—the fob’s battery, and also, on follow-up questioning, the car’s. He is well. His car was fine. It usually is.

## 7 Discussion and Limitations

Our results admit one honest summary: the multi-storey car park behaves, in census, in memory, and in trial, exactly as an ocean behaves, and responds to ocean technique. We consider objections.

**Single site.** The trial used one structure. We note that the structure was selected for being typical, that Study 1 suggests typicality is the entire problem, and that a car park atypical enough to threaten generalization would, by that fact, be navigable and thus outside our scope.

**Blinding.** Wayfinders cannot be blinded to having learned wayfinding. This is true, and it is rather the point. We further note that participants who knew they were being observed still could not find their cars, which we offer as the first recorded instance of the Hawthorne effect drowning.

**Pigeon stationarity.** The pigeon transect assumes stable roost–food routes. Bin relocation shifted the dusk bearing by 30° during week four, and the curriculum now teaches birds as a sign to be cross-checked against sheen, exactly as voyagers cross-checked birds against swell. We regard a navigation culture that must keep track of what the pigeons are doing as enriched, not burdened.

**Seasonality and weather.** All trials ran in fair weather, which is to say the structure has no weather. The discussion this deserves is longer than we can give it: sailors read approaching systems in cloud color, and there are no clouds on Level –2. Nothing on Level –2 announces anything before it happens. Several wayfinders described this as the most disorienting feature of the concrete sea, and morale below grade remains an open problem.

**Generalization.** We claim the reclassification for the multi-storey structure and conjecture it extends to the airport long-stay lot, which preliminary censusing suggests is not a harsher car park but a deeper ocean: larger, emptier, and crossed at the start and end of exactly the kind of week-long interval over which Section 4 guarantees the navigator arrives as a first-time visitor to their own car.

## 8 Conclusion

The felt absurdity of losing one’s own property in a five-story building dissolves once the building is correctly classified. Nothing in this paper required the car park to be badly designed or the driver to be impaired; it required only a feature census, taken seriously. Below the entropy floor, memory does not fail—it deduplicates, correctly; and environments that cannot be memorized must be navigated, a problem whose complete, instrument-free solution is among the oldest intellectual achievements our species possesses. Our trial suggests six weeks of that solution outperforms the entire consumer positioning stack by a factor we are obliged to describe as embarrassing.

Our recommendations follow directly. Planning applications for parking structures should report expected information per fix (Equation 1) alongside bay counts. Large structures should certify and post a resident master navigator, as harbors post pilots. Payment machines should be relocated to within sight of the vehicle, for reasons Section 4 makes plain. We do not recommend more signage. You cannot signpost the sea.

The authors’ own institution has adopted the reclassification in full. The staff car park has been renamed a marina, apprentices are examined on the six signs each equinox, and the pay station carries a brass plaque reading *here the fee is taken*. Retrieval times are down. Morale is up. The pigeons, as far as we can determine, had always known.

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