Incoherent mental imagery: Where imagination and episodic memory diverge

The idea that episodic memory and imagination are related is not a recent one: Hume, in *A Treatise of Human Nature*, claimed that memories and imagined events cannot be reliably distinguished based on either their constituent 'simple ideas' or their overall structure (Hume, 2003). It is only the 'superior force and vivacity' of memories that allows us to tell them apart from pure fancy. In the last two decades, research on episodic memory has begun to call even that graded distinction into question: The notion that episodic memory and imagination are functionally related, in particular that episodic memory is a specific instance of a more general mental capacity to simulate events, has gained increasing traction in cognitive science and neuroscience (Schacter et al., 2007; Addis et al. 2007; Addis, 2018), as well as philosophy (De Brigard, 2014; Michaelian, 2016; Mahr, 2020), and seems to be substantiated by clinical findings (Hassabis et al., 2007). So, was Hume mistaken, when he asserted that 'ideas of the imagination' are 'fainter and more obscure' – does it turn out that representations in episodic memory and imagination are on par in terms of vividness?

Here, drawing on our own new empirical work on imagination, we will argue that there are certain consequential dissimilarities between the *construction* of imagined scenes and the *encoding* of experiences in memory. We will conclude with a sketch of some theoretical arguments that challenge the hypothesis that episodic memory and imagination-based representations are of a similar format.

One of the essential characteristics of episodic memories is that they tend to change or degrade over time. How forgetting (Anderson & Hulbert, 2021; Radvansky et al., 2022) and the progressive abstraction or 'semanticization' of episodic memories (Nagy et al., 2020) unfold is a subject of ongoing research and debate. But when comparing imagination and episodic memory, it is important to keep in mind that fresh memories of even trivial events initially are often highly vivid and comprehensive (Talamini & Gorree, 2012) – which might be due to a tendency to 'promiscuously' encode details (Hardt et al., 2013). By contrast, a set of five preregistered experiments we recently conducted (see OSF links below), indicates that imagined scenes are usually highly 'incomplete' from the outset, at least as far as the representation of spatial relations is concerned.

In our experiments, participants had to complete a 'contradiction detection task' (Arslan & Kominsky, 2025), in which they were asked to imagine a short text as vividly as they could. All

vignettes we presented to participants contained an objectively contradictory description of spatial relations. For instance, an open door is described to be 10 steps across from a window at the beginning of the text; later, there is suddenly a couch in that very same place. Through a series of questions, we tested whether participants had noticed the contradiction. Our first experiment replicated the central finding of Arslan and Kominsky (2025) in a considerably larger sample, showing that only a minority of participants succeeds at detecting the contradiction. The four follow-up experiments investigated the phenomenon of incomplete or incoherent spatial representations in imagined scenes more comprehensively, by systematically modifying the texts participants had to imagine.

In Experiment 1, we observed that only 35 out of 100 participants detected the contradiction in a short (192 words) vignette that was very explicit in its descriptions of spatial relations. Experiment 2 replicated this finding (detection rate of 38.5%), and in Experiment 2.1 we observed that 'isomorphic' vignettes that contain the same error as the original text, but are entirely different in terms of setting ('cave' and 'clearing,' as opposed to the original 'living room'), are associated with similarly low detection rates. Experiment 3 showed that rephrasing spatial descriptions to make them somewhat more indirect significantly reduces detection rate (11%), $\chi 2(N=151,2)=11.90$, $p>0.01$. Experiment 4 varied the instructions, specifying more precisely how to imagine/read the text ('imagine vividly', 'read carefully', 'POV', 'bird's eye view'), yet detection rates were the same for all conditions, $\chi 2(N=180,3)=0.73$, $p=0.87$. Experiment 5 tested whether adding descriptions of salient causal relations would increase the detection rate. It did not, $\chi 2(N=150,2)=3.33$, $p=0.19$. Importantly, in Experiments 2.1 – 5 participants were asked how vividly they had 'seen' the scene they imagined in their mind, on a scale of 1 ('Not vividly at all') to 5 ('Very vividly'). These subjective ratings were consistently high (between $M=3.93$ and $M=4.21$) but consistently failed to correlate with success at detecting the contradiction. These results imply that imagined scenes are at no point as similar to on-line perception as relatively recent episodic memories.

While our empirical work is confined to representations of spatial relations, we want to point out a few other characteristics of imagined scenes that might set them apart from memory representations. First, there are reasons to believe that representations of *time* should be just as rudimentary as that of space: Whereas the encoding of potentially irrelevant occurrences (that later are pruned away) during the formation of an episodic memory might serve as an indicator of

duration, it is unclear how anything comparable can be accomplished by way of pure imagination. In other words: What would it mean to 'simulate' waiting for five hours? Second, imagination, in many instances, is a top-down process that starts with an abstract intention (e.g., trying to imagine a house) that initiates the generation of concrete mental imagery. The opposite –an ambiguous 'imagined percept,' triggering recognition – is difficult to conceive of: 'What is this supposed to be? Oh, it appears I'm imagining a house.' The formation of memories, however, clearly involves such perception-driven, bottom-up processes. Third, an episodic memory (ideally) eventually converges on *one coherent representation* of a specific event ('I still remember what grandma's house looked like on that day in 1981.'). Conversely, it is often useful to imagine *multiple contradictory drafts* of a fictitious scene (e.g., many different houses), which are never put together into a coherent final version and quickly forgotten, once they have served their immediate purpose.

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Anonymized OSF links

Preregistrations

Exp.1: https://osf.io/32md5/overview?view_only=2376c892bd5d4886862f6ad8cffcbaf6
Exp.2: https://osf.io/b6jhx/overview?view_only=060a316028b4489db50da5277384f16f
Exp.2.1: https://osf.io/ft58q/overview?view_only=f55a0ca3ea044ec58c998b97eb055798
Exp.3: https://osf.io/pqn8b/overview?view_only=6b189bea24cf4054a1f049ce6ea03c99
Exp.4: https://osf.io/z3jtv/overview?view_only=14aff2a50bad462e872fbcaa525b5f34
Exp.5: https://osf.io/ydaxv/overview?view_only=7f13a744ab1f4abeb3a13a6538c14c0e

Repository

https://osf.io/2t4cx/overview?view_only=7c3ea50703024627bab84223bfe9b4b0