The Night Shift

Out Of The Darkness

It is a doppelgänger of our waking life—the universe of our dreams. When we're immersed in them, those dreams often seem as real as the world in which you're reading this right now. Sometimes the worlds are almost indistinguishable. This is because, in both places, one thing is the same: we sense that we are conscious. And we are—but they are very *different forms* of consciousness. And there are reasons for this, because in our brain, there are reasons for *everything*.

So, why do we dream? In the view of Narrative Complexity, that's a relatively easy question to answer (particularly when dream research pioneers like psychiatrist Allan Hobson have laid such a strong foundation for our understanding of REM mysteries [1, 2]). One of the beauties of the brain's elegant systems is that once you've laid out their basic mechanisms, some of the more specific aspects of consciousness —like dreaming—quickly come into focus. The sharpest view of our dream world: it's the *night shift* of our consciousness.

When we're awake, our consciousness' primary purpose is to guide our decisions & actions. When we're asleep, we're not *acting* on anything. But determining actions isn't the only purpose of our consciousness. It's also sorting, filing, prioritizing & *associating* the incoming data in order to help guide both the actions of the moment *and* future actions for which the current data might be a useful reference.

It is these secondary purposes that are the reasons for our dreams: *sorting, filing, prioritizing & associating the incoming data in order to help guide future actions for which the current data might be a useful reference*. Of course, when we're dreaming, there *is* no actual incoming data—at least not a full set —for our sleeping consciousness to process. Therefore, instead of processing *incoming environmental* data, our dream-state seems to primarily process our most currently high-priority data (and thus, due to our memory mechanics—which we'll discuss in the next essay—it is very likely to process much of the *most recently recorded* data).

When that first piece of recent or high priority data slips into our *internal dialogue loop* as we enter our dream state—REM sleep—the associations & narrative-building that induce consciousness begin. How does our brain determine that first piece of data? It's hard to say for sure, but the most likely scenario is simply that the most recent and/or high priority piece of data when our consciousness shuts down is the same data that begins the loop again when our consciousness reboots in our dreams. In a way, your consciousness simply picks up where it left off when you fell asleep.

Here's Where Things Get Weird

Once this first piece of data has started the loop, literally anything is possible. There are a couple of reasons for this wildly-open dream world. One, our narrative loop is using the same associative subconscious mechanic that it always uses when processing data. This means that even though the most recent and currently high-priority data is most-likely to both begin & continue to reappear in our dream narratives, *all data* is up for grabs through that magical network of language, emotion & memory. So if your dream suddenly seemingly veers off track, what's really happened is that your brain has merely made one of those miraculous leaps of association into another buried network of ideas, memories & images.

As we said, there are *two* reasons for this wildly-open dream world. And the second reason is at the root of why the first reason (that associative neural network) results in more dream-randomness than awake-randomness. That's because, in our dream state, there is none of that *actual* environmental data to support our narrative loop. Our physical environment is what keeps us literally & figuratively grounded; it's the primary factor in the consistency of our wakeful consciousness.

When we're awake, our internal dialogue is driven first & foremost by what we perceive & identify to be most important/relevant/useful in our environment. Think of this environmental data as *the setting* of our narrative loop. Almost all wakefully-conscious narrative events happen in the context or in relationship to the context of our immediate physical setting. When we're awake, that's what our brain *needs* to be most concerned with.

In our dreams, there *is* no incoming data depicting a physical environmental setting. But our narrative loop still requires one. In a way, it more than *requires* one, our narrative loop simply *assumes* there's one. And just like so many other elements in our narrative-building process—if our brain can't find the appropriate data to complete the picture, it makes it up.

(As noted by our chart in the Appendices, *Distinct States of Consciousness & Non-Consciousness*—the only external input system that appears to be almost *entirely* shutdown during conscious (R.E.M.) & non-conscious sleeping states is our external *visual* input. External olfactory, auditory & tactile input systems are all obviously repressed during sleeping states, but still remain partly-active and are capable of processing & responding to intense external stimuli—which is why data from external stimuli like loud noises, powerful scents, and *sudden unexpected wetness* might find its way into your dream just before it helps to spark you awake.)

So, in the absence of *actual* environmental data, our dreams get their own brain-painted settings. And the brain doesn't have to go very far to get the necessary data to create those settings—all the in-dream, narratively-pinged memories have lots of visual, auditory, etc. data attached to them, which the brain can make use of when building a narrative. Usually most of this data is ultimately discarded in the process of creating our waking conscious narrative —overridden by the more *neurally prestigious* current actual incoming environmental data.

However, not all of this memory-pinged setting data is discarded while running our waking narrative loop. Whenever, for example, we have the normal gaps in perception during our observation of the "real" world, but suddenly require that unperceived data to complete a current or retrospective conscious rendering of the moment, we use appropriate pieces of that memory-pinged setting data to fill in the gaps.

This is why you might claim—upon almost immediate recollection—that *the man who stole the woman's purse* was wearing a *red cap*, when in fact, your brain ignored the color in the actual moment, using the more generic *baseball cap* visual contours and/or linguistic tag when it perceived & recorded the event. Thus, upon that nearly-instantaneous recollection, a common red cap from your memory is used when you replay the moment in your mind and return to that element in detail. Until you saw the woman's purse being stolen, your brain didn't care what color the man's cap was, and this data's low priority led your mind to neglect recording it. And after the purse was stolen, in those few seconds it took for the brain to re-prioritize & analyze the details of the man's appearance, he was lost in the crowd.

This vague version of the man is simply not good enough for your brain when someone immediately asks you *What did he look like?* Our brain knows that in situations like this the questioner—and thus *we*—want a better answer than *A dude in a jacket and a*

baseball cap. And, as explained earlier, our brain doesn't need to try very hard to give these demanding audiences a better answer. To make matters even more dodgy, once the brain gives this "enhanced" answer, it has a tendency—because of the mechanisms of memory—to make a quick believer of even *itself*. If you think this means that we typically trust our memory far too much, well—I don't think I could argue with that. (We'll discuss these kinds of memory mechanics in much greater detail in our next essay.)

And Let The Weirdness Be Unfettered

Getting back to our *night shift*...when we're dreaming, this "fill-in-the-blank" mode of setting & entity construction becomes the sole engine for the creation of a visual environment. And because there's no actual environmental data to override this mode, our dreams are wildly fluid in their settings. As soon as the narrative loop makes a big leap to another neural network, the setting is morphed by whatever environmental data is most closely related to the newly-pinged network.

And when we're in this dream mode, our brain doesn't seem terribly concerned with making believable situations out of this environmental data and often doesn't even attempt to make sensible narrative transitions between the settings. Although our dreams often seem to employ their own habitual, recurring, vague (& incredibly *lazy*) "solutions" to these nonsensical leaps. For example, many of my own dreams take place in massive-but-ambiguous "hotels" or "resorts" or "complexes" within which all of the variously incongruent circumstances/ settings are seemingly, vaguely & nonsensically contained.

This *unfettered weirdness* or unbelievability of our dream scenarios is likely because of another quirk of our dream-state consciousness: the normal path of our narrative loop seems slightly altered, entirely skipping (or not "awakening") that validity mechanic in our brain system.

This altered loop actually makes sense when we look more deeply into the real purpose of our dreams. As we mentioned, when we're awake, our consciousness' primary purpose is to make quick, reliable decisions, then move on to the next one. This means that there's a lot of possibly valuable information that might not get a full run through our association machine in the hectic course of the day. This information is valuable (as all data is) because it might actually apply to a current high priority problem that is not momentarily on the table (essentially, not of *immediate* importance) when the data is first encountered.

At some point in our evolution (or, more likely, in the evolution of a few stages of

mammals before us) the algorithms of time & DNA discovered that—since this consciousness system wasn't doing anything while we slept, and because we could run it without expending the energy to create (and risk) actual resulting actions —this big window of non-wakefulness was a great time to get a lot of that sorting, filing, prioritizing, and *associating* done that our brain didn't have time for during the day. And so, the brain put *the night shift* to work.

This night shift's main job is to make as many unlikely-but-possibly-useful associations as it can between all the recent, high priority narratives and that wealth of memory-stored data it has already recorded & filed. The result is that when you wake up, there are new pathways now available via those dream-created narrative associations. And although the brain can't be sure that this newly-pinged data is of actual use (one of the side-effects of not engaging our validity system, which we'll discuss more in a moment) it *does* know that the fact that it was able to associate the data inherently means it *might* be useful. *And* because it has created these new neural connections in the dream, we are now more likely to pull up that data when we next contemplate that narrative.

Thus, because dreams essentially are meant to help open up extra possibly-useful associations that we didn't have time to make during the day, inhibiting or switching off our validity systems aids us by broadening the scope of those associations—which are especially fluid in the absence of actual environmental data. When we're conscious, our validity systems help us to reject & limit narratives that don't seem plausible, because they're not very useful when making decisions. If we did this in our dreams, the inconsistencies & hyper-fluidity in setting that are inherent to dreams (& useful for broad associations) might lead to a near-constant rejection of our dream narratives.

In essence, our narrative loop would create the kind of "insanity" apparent in individuals like schizophrenics, whose neurological disfunction produces myriad narrative inconsistencies—resulting in an insanity rooted in the anxiety created by an ongoing negative-validity judgement of the world around us. When we shut down or avoid our validity station while dreaming, we are free to experience an illogical, invalid, but fluidly-associative world without the anxiety that our brain is trained to produce in the face of such a world.

Although it *seems* like our dreams are often *filled* with anxiety—in the view of Narrative Complexity's emotions hypothesis, the emotion we are actually feeling is *fear.* And this emotion (as discussed in my 2nd essay) is very closely-related to anxiety, but fear

judges only the potential value loss, *not* the *validity* of that value-loss prediction. Thus, our truant validity in our dreams likely intensifies the fear & excitement—because our dream-view of those potential gains & losses is unmitigated by any judgement of their likelihood. When it seems like we're constantly *totally stressed* in our dreams, it's because every potential loss we imagine in our unawake narratives feels, essentially, inevitable.

Then Let The Weirdness Be Forgotten

Another one of the other likely side-effects of this absent validity system: our dreams tend to be awfully slippery critters in terms of memory. When we record a waking memory, the validity of the narrative is a key player in how this data is remembered. The less valid the data, the less likely it is to get the call back when related data enters the system later. Therefore, an awful lot of our dream-produced narratives are labeled with the *don't bother* tag in our memory, if they were recorded at all.

Which is okay for our brains, because even if the actual narrative has been hidden almost beyond full recall, the new relationships it created between the associated data—no matter how faint—still remain. And these associations are all the brain was looking for, to add some new possible pathways for our next waking Google search of related data.

Plus, y'know, it *didn't* actually happen; it's *not* valid data and *doesn't* provide real evidence about the world—so we're much better off *not* remembering it as real. This is probably another reason why evolution found it useful to shut down these validity systems while dreaming: if they were active, a made-up dream narrative that accidentally seems very real and passes the validity test might ultimately —& incorrectly—be judged later as an actual event. Again, the *associations* are all our brains are seeking.

However, this absence of a validity tag doesn't mean that *none* of the dream narratives are well-remembered. The value judgement & tagging systems that are still up-and-running in our dreams are another key player in how strongly a memory is imprinted, so dreams that involve high value events (which create strong in-dream emotions, i.e. nightmares) can still create narratives that can be easily recalled & replayed in our minds when awake.

This in-dream combination of "online" *value-based* emotional/memory systems & "offline" *validity-based* emotional/memory systems is ultimately why we can *remember* some dreams & yet still intuitively *distinguish* those dreams from some other *real* memory—because those dreams lack that neural validity tag, which allows us to consciously "perceive" their *falseness*. Of course, once you start remembering a

dream while awake—and possibly begin too-closely associating it with some *actual* memories while those validity systems are now "online"—it can become easy over time (& the course of a very hectic life) to start accidentally tagging an old dream narrative with the tiniest bit of *wrongly-placed* neural validity. And once this dream has its toe in the door of *truth*, it can be a very slippery slope to it becoming a kind of *truly remembered* reality.

Returning to those more *useful* powers of our dreams—due to another key player in our memory (*repeated recall*, whose effects will be discussed at length in the next essay) *any* processing or pinging of that recently-consumed (*real-life*) data during our dreams aids in that data being more well-remembered and easier to recall. Which likely explains why it's been shown that studying immediately before sleeping aids in remembering & applying that specific material later. By studying the material immediately before sleeping, you're helping to ensure that this very-recent data will be used during the night shift, and thus, be easier to recall and use the next day.

About Those Wondrous Walnuts…

When we talk about these individual mechanisms of consciousness (like validity checks) being regulated—in essence, the regulation of those systems that both *determine whether we are awake or asleep*, and *how our consciousness-producing internal dialogue loop functions (or ceases)* in those different states—we are actually talking about two little walnuts tucked deep in our brain: our thalamus. This symmetrical pair of nuggets that rests atop our cerebellum is connected to myriad parts of our brain—serving as a destination, way station & departure point for the multiple interweaving loops of data, experience & response that turn the gears of our consciousness.

Generally speaking, almost all chordates (invertebrate & vertebrate animals that feature a nerve column—from round worms to sea quirts to sharks to humans) employ 6 primary systems to manage nerve-based "data & response" behavior. An external data input system (external senses), an internal data collection system (internal gauges of temperature, etc.), external & internal data analysis systems (to determine responses), a motor control system (to enact responses), and a *switchboard* (to help manage responses). In vertebrates, the thalamus & basal ganglia essentially serve as the brain's two primary switchboards—receiving data from their network of connections and using neural circuitry & neurotransmitters to help inhibit & enact a vast variety of scripted responses in other parts of the brain, and ultimately in nerves & muscle fibers throughout the entire body.

The more evolved the brain, the more complex the role of these switchboards in handling all of the neural traffic that generates the seemingly uncountable aspects of behavior & cognition. This means that in the ultra-evolved brains of humans, the thalamus has a long, broad list of responsibilities. For example, all of our sensory systems (except the olfactory, which is handled by the basal ganglia) route their data through the thalamus in its journey through the loop.

The biggest switch controlled by our thalamus is one that relates directly to dreaming: the *conscious/unconscious switch*. Without a functioning thalamus, consciousness cannot be achieved (i.e., damage to the thalamus can result in coma).[3] Because it's believed that the thalamus switches our brain from waking mode to sleeping mode, it's likely that the thalamus is also the key that starts-up our dream-state consciousness. Research has, indeed, shown that during dreams parts of the thalamus are active, and its connections to portions of the cortex and the visual system are also engaged (& interacting in uniquely *associative* ways).[4] In this dream-state, it is therefore also likely that our thalamic "switchboard" is what helps to regulate that altered loop of consciousness—i.e., switching off (or not awakening) those validity mechanisms used in the building & analyzing of narratives.

Evolutionarily, it makes sense that between our brain's two primary switchboards—the thalamus & basal ganglia—the former came to control our modes of consciousness. Although both first appear in ancient vertebrates like jawed-fish & sharks, and the two organs communicate reciprocally (inhibiting & enacting across their wires both competing & cooperating motor scripts originally generated via all their data input sources) the thalamus & basal ganglia originally controlled distinctly different sensory switchboards: visual & olfactory, respectively.

And when these switchboard organs first appeared in vertebrates, the olfactory system was still the more dominant faculty (invertebrates' rudimentary visual systems provided the olfactory with a developmental head start in those first vertebrates). In addition, those olfactory systems were intricately tied to vital & *unceasing* tasks like respiration. Thus, those systems ran 24-7 and its switchboard was perpetually lit. But those not-always-vital visual systems could be scaled-down or shut-off entirely during periods of rest (i.e., creatures closing their eyes when sleeping).

As brains evolved, and more advanced animals began to rely much more heavily (& complexly) on vision & the other senses managed by the thalamus (ultimately leading those early cerebral cortexes—

heavily-founded upon expanded, complex optical lobes—to become the engine of cognition in mammals) this visually-rooted switchboard took over as the manager of the most important evolved feature of those magnificent mammalian brains—the feature with that clever on/off & *on-but-only-dreaming* switch: consciousness.

Why The Weirdness Is Drawn in Crayon

As mentioned, science has suggested that our consciousness (via our thalamus) makes use of our visual systems while we're dreaming. And although we usually spend our time in these essays worshipping & praising the brain's ability to create beauty, there's something slightly unkind that needs to be noted about our consciousness's use of those visual systems, about its skill as a "set-painter." It's something that becomes fairly clear in our dreams: our consciousness is, frankly, *a hack*.

Our brain's real virtuoso creator of settings —its union-sanctioned cinematographer— is our *eyes*. But that part of our system is entirely dependent on actual incoming environmental data. Our memory-stored visual data simply isn't as rich & detailed as the real stuff consumed via those ocular organs. And it's not supposed to be. We only need the real stuff in the real moment, when we're navigating the chaos. In its memory-stored form, we just need the *general contours* of the visual data when using it for association, comparison & recall. (Another matter we'll explore in detail in our next essay.)

Therefore, when we're building the settings of our dream worlds, the *general contours* of our environment are all we get. You might think of this dream environment as a *low resolution* version of the real world. That incredible detail in a waking moment requires vast piles of visual data, resulting in a highly-detailed moment-to-moment rendering. With less rich visual data to build from, our dreams can only achieve a medium or low detail setting. Which means that dreams can still contain vivid, colorful, and powerful images—but ultimately, each individual dream scene or moment is limited in the quantity & quality of what it is depicting. And this leads to these scenes usually containing a handful of dominant & powerful elements, but a kind of *fuzziness* around the edges or in the more fine-grained detail of the situation.

What The Weirdness Tells Us

Of course, whenever we talk about dreams, the real question in the back of everyone's minds is the same, and it has nothing to do with image resolution: *What do my dreams mean?* The answer: that depends. Frankly, they don't usually *mean* much at all. In other words, they aren't *intended* to tell us things that we somehow can't express to ourselves consciously—our dreams don't have a

strategy for what they're telling us other than essentially random association to current high priority data & the narratives that flow from it.

Nonetheless, we can still *learn* things and *infer* useful information from our dreams both consciously & subconsciously. The primary "truths" that our dreams tell us are which recently experienced events or contemplated ideas our brain has tagged as fairly important during the course of the day, and thus have appeared in our dream narratives, which are more likely to include that higher-priority data.

And through those narratively-created associations, our dreams are capable of helping us to realize what distantly-stored data might contain useful information for comparison—which is really their main purpose. And by contemplating our dreams when awake, we can help to revisit those dream-built associations to yesterday's data, and possibly start to run a little of it through our now-active validity systems to see which new data relationships are actually useful in handling our ongoing challenges.

Why, Exactly, Must We Watch All This Night Shift Weirdness?

So then, our last question about dreams echoes that central question we asked about our internal dialogue loop: why do we actually *experience* dreams? In other words, when our sleeping brain is running its little cross-association night-shift sub-program, why does it bother to tell our consciousness this silly story to go along with the sub-program? *It can't help itself*. It's the only way our consciousness works. Our brain can still run the narrative loop without external input, and that loop can skip a side-station like validity (which recent science is showing happens in a very specific region of the brain). But that narrative-building, thought-generating inside-your-head voice is a *necessary part* of our consciousness' looping associative process.

Once we've closed off our external input data pipes, that narratively-built inner voice is the only possible source of data for our subconscious to process. We are conscious in our dreams because we need to be in order to run the association sub-program. As with every mechanic and effect of consciousness—our dreams *must* result from its narrative-loop internal dialogue system, because it's the system that's required to access *any* of our memory-stored experiential data.

More specifically, our internal dialogue is the system that's required to access that data *linguistically & syntactically*—which (as we'll discuss in our next essay) is how that experiential data is primarily *stored*, and thus the best way for us to make *useful* associations between the data. Think of it

this way: many pre-language mammals also probably dream and use those dreams to make *very* random (but still slightly useful) associations between their rudimentarily narrative & sensory-based experiential modular memory components. But unlike humans' *wacky-yet-still-narratively-based* dream state, pre-language mammalian dreams are (in that absence of real-world input) likely *highly* nonsensical & non-contextual in the way that they might internally "present" (via *their* sensory cortexes) this non-waking data-associating process. *Flashes of chasing a cat through the kitchen; flashes of eating kibble from a red bowl; a red fire hydrant; a donut falling from a park bench.* In other words, if we *didn't* run our own non-waking data-associating process via internal dialogue and merely limited ourselves to purely-sensory memories—our dreams would only associate data about as effectively as *doggy dreams*.

In the end, every aspect of our consciousness is generated by these nested systems. Repress external sensory input & physical action responses, close the off-ramp to our validity station, spark up the most recent (or most important) piece of data in the cue, and *voila!* Those nested systems of consciousness now produce the night shift: the universe of our dreams.

Ultimately, this *sub-waking* universe's purpose is, at its core, the same as the purpose of our internal dialogue loop in the waking universe: *to make us better problem-solvers*. To enhance the neural connections that fuel the human brain's majestic ability to achieve unique & creative solutions to our most vexing challenges.

In the most romantic terms, our dreams—in the most romantically unbound & mercurial of ways—show us what is *possible*. These doppelgängers of our mind's darkness are engaged in the tireless, shameless task of exploring the strangest & most unlikely paths through our world, finding in those folds of gray what little and possibly forgotten corners might bring the next beautiful idea that humankind has yet to have seen.

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Footnotes:

p. 86:
1. Hobson, J. Allan. *Dreaming: A very short introduction*. Oxford University Press, 2005.

2. Hobson, J. A., and K. J. Friston. "Waking and dreaming consciousness: Neurobiological and functional considerations." *Progress in neurobiology* 98.1 (2012): 82-98.

p. 93:
3. Schiff, Nicholas D. "Recovery of consciousness after brain injury: a mesocircuit hypothesis." *Trends in neurosciences* 33.1 (2010): 1-9.

4. Chow, Ho Ming, et al. "Rhythmic alternating patterns of brain activity distinguish rapid eye movement sleep from other states of consciousness." *Proceedings of the National Academy of Sciences* 110.25 (2013): 10300-10305.