

WHY I ♥ GLIDING

004. WHY I LOVE GLIDING

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To Soar or not to Soar

It takes a lot to get a sailplane in the air. You are well aware of the time, effort and money that go into our sport before you can even climb into a cockpit. It requires a lot of commitment and many sacrifices. On top of that, there is also a certain amount of risk involved with each flight.

There are many reasons not to go gliding.

And yet, within the 30 seconds that you close the canopy, the tow rope tightens, you accelerate, and lift off, something happens. Half a meter above the ground you enter another realm, and in a blink all those efforts to get there are long forgotten. And afterwards, once again back on earth after a great flight, you are left convinced this is the greatest pastime in the world.

So, how does that exactly happen?

Community

Let's make a sidestep.

If you ask a glider pilot what he enjoys about gliding, pretty high on his list will be the friendly, passionate, tightknit, worldwide community.

Sure enough, the social aspects of our sport are tremendously valuable: working together to a common goal, shared experiences, pushing and helping each other to do better, intellectual exchanges of ideas and concepts, camaraderie, hangar flying, It wouldn't be the same without any of that.

But this community would not exist without the passion itself. A great community is an effect of a great common purpose. Not the other way around.

I am also sure you can find great groups of people in other great endeavors. And even if this community would be an exception, why wouldn't we just have a gathering and collectively decide to go do something easier. Like bowling or fishing for instance?

Beauty of nature

Then, many would mention, there is the first-row seat to the beauty of nature. And yes, there is certainly that. The day I get tired of seeing the Matterhorn majestically basking in the sun, is the day I am tired of life itself.

But that same view can be much more easily obtained from the cockpit of a powered airplane, or even from the Gornergrat Bahn.

Besides, soaring also remains fascinating, even over the flatlands of Flanders and the Netherlands where nature is markedly less spectacular than over the Aletsch Glacier.

So, community and incredible sights are certainly important contributions to why we go flying, but they do not touch upon the essence of gliding.

Gliding as a physiological addiction

Why do people enjoy music?

Isn't it bizarre that a simple series of sounds can evoke so much emotion and bring such a tremendous amount of joy? It's also one of the things in life that almost every single person likes. And that's quite rare.

So why is that?

The technical answer is dopamine.

Dopamine is a neuromodulating and -transmitting chemical in our brain. When it is released, we experience it as a kick of pleasure. For instance, when you receive a nice compliment, the warm fuzzy feeling you get is caused by a little squirt of dopamine. Drugs like cocaine open the floodgates.

Our bodies use dopamine for many purposes, but a well understood major function is its role in positive reinforcement learning. The concept is simple: reward a certain behavior with a little treat, and your subject will be inclined to do the thing that you stimulate it to do. Our bodies are trying to do that to us by positively reinforcing behavior that it deems to be beneficial. More specifically beneficial to the survival of ourselves and our genes. Although imperfect, it is a very powerful and effective system. Much of our motivation to perform a certain action, is derived from this.

To find out why we enjoy music, neuroscientist have put people in MRI scanners, and made them listen to famous songs that are known to evoke strong emotions, from classical masterpieces to pop music

hits. What they found out has been confirmed over many experiments. When we listen to music the regions of our brain that are involved with movement, planning, attention, and memory fire up. We are processing music as a series of patterns, and our brain tries to predict what is coming next. When the music is predictable to us, we experience that as pleasing. That's why fixed beats, harmonic scales, melodic themes, word rhymes, and repeating the chorus are elemental to music: they are all patterns that allow us to predict what the next tune will be.

Especially if you hear a song that you are fond of, about 15 seconds before an upcoming emotional highlight of that song (such as the Queen of the Night's Aria in Mozart's Die Zauberflöte, or the end of a chorus in any Beatles, Michael Jackson or Taylor Swift hit) brain activity starts increasing rapidly in those movement, planning, attention, and memory regions. That signals that our brain is truly anticipating and predicting the emotional culmination. When that highlight is finally played, a whole bunch of dopamine is released as a reward for you predicting that highlight correctly. In some cases when you are particularly receptive, this can give goosebumps and send shivers down your spine.

So why does our brain reward predicting upcoming sounds correctly?

Well, our brains are wired to reward correct predictions of absolutely anything. It goes like this:

Recognize a pattern → make a prediction → if that prediction is right, receive a reward (dopamine)

Put differently: Being proven right feels good.

This prediction-reward-system is a subset of our dopamine-steered positive reinforcement motivational systems. Perhaps it's even the most important one. It's not hard to understand why our brain values correct predictions so much: if you can predict things with high accuracy, then you can successfully adapt your choices accordingly, which tremendously increases your chance of survival and the survival of your tribe and offspring.

It's not a miracle that our bodies evolved that way. Animals whose behavior leads to a higher chance of survival will outlive and surpass animals who are less well adapted. It's basic survival of the fittest. It's also a self-reinforcing system. And it's also not unique to humans. A hungry frog that accurately predicts the path of a passing fly so he can adjust where his tongue needs to go to catch it, gets to eat. A falling cat that can accurately predict how to twist its body midair so that it lands on its feet, gets to live another day.

People however, are exceptional at pattern recognition. Combined with a good memory, and great processing power, it made it possible for us to make great predictions about countless issues, adapt to many circumstances, survive with relative ease, build societies, and go on to thrive as a species. The dopamine fueled prediction-reward system keeps us motivated to become better at those predictions, which is the reason why we value learning and acquiring knowledge.

What has all of this got to do with gliding?

Pattern recognition, estimations and predictions are everywhere in our sport: you predict how the input of your controls in combination with the movements of the airmass will affect the behavior of your glider (an extreme form of that is experienced in aerobatics), you predict where you will find a climb under a cumulus cloud and how strong it will be, you predict where energy lines run during a glide, you predict how to avoid bad areas and remain in good ones, you predict when it is time to speed up or slow down, you predict how much to steer against the wind during a sidewind landing, you predict weather changes, you estimate the probable glide angle so you will make it to the next climb or to the airfield during final glide, an instructor constantly predicts what his student will do, how the plane will react to that, and when he needs to intervene, ...

Anytime you are correct in any of those predictions, you feel good.

Of course, just as in predicting the next musical note while listening to a song, most of those estimations and predictions we make in a flight are not strictly rational or calculated. We use rules of thumb, guesstimates, intuition and common sense. That's called heuristics.

Any kind of predictions that turn out to be correct can trigger a positively rewarding dopamine response. It is even true for successful predictions of neutral events (like in the music example) and negative events (making "I told you so" a sentence so satisfying to say, and annoying to hear). However, being right in predicting an outcome that is regarded as beneficial or "good", triggers a much more powerful reward. And the more important and exceptional you perceive this benefit to be, the larger that reward will be. If you find the best climb of the day you feel very good. If you fly a record or become world champion after a tremendous amount of effort, you feel on top of the world.

The system isn't perfect.

The dopamine release system doesn't seem to have a well-working feedback system to check if the prediction you made was based on actual knowledge, or just a lucky guess. When you gamble, you put a lot of money on the line (high risk, so stress hormones that make you more emotional are released as well) to have a chance at winning a large payout (a very important benefit to your future wellbeing). You then make a fake prediction, based on nothing of actual knowledge. When you win, and thus your unfounded prediction is correct, your brain still rewards you tremendously. This reinforces that behavior and causes gambling addiction.

In gliding, we can see this in the problem of leeching during competitions. I once talked to a pilot who I had known as a friendly acquaintance for many years. He had just won the day in a large international competition, which wasn't a common occurrence for him. He was overjoyed and talked passionately about his flight and the correct decisions he took that brought him the victory. He didn't mention seeing any other pilots. When I looked on Soaringspot in the evening, I noticed that a well-known pilot from yet another country's team flew the task with very similar times. Analysis of the IGC-files showed that the winner of the day had followed the other pilot religiously. From start to finishline he had flown a couple of meters behind the other pilot's wingtip. He lucked out because the difference between starttimes was a bit larger than the difference between finishtimes. Not a single prediction and decision was made by himself that day, he was just copying everything. Now, this happens quite a lot. But what was fascinating to me was that I didn't regard this guy as meanspirited or unsportsmanlike. I still don't. I think he really believed the decisions and predictions that brought him the victory were his own. I can for sure tell you that the dopamine-high he was experiencing was just as real as if he had done it all by himself.

This is of course very different from each person to the next. Just like some people are apparently more susceptible to gambling addiction, it's very likely that some people are more prone to leeching.

Overexposure

Another important aspect is that the prediction-reward system can become exhausted through overexposure. When you hear a song for the first time, you either like it or you don't. When you do like that song, your appreciation for it rises rapidly with each additional listening. That appreciation then plateaus for a while. If we overconsume the song, it becomes less enjoyable to listen to: you get bored of it. This is why pop hits rise fast in the charts, stay there for a couple of weeks or months, and then inevitably disappear. That exhaustion itself does diminish over time. When you listen to an old favorite song that you haven't heard in a while, you will experience it as enjoyable again.

So the dopamine prediction-reward declines if you are exposed too often to the same thing. That can happen in gliding as well.

Half a year ago, I was talking to someone about this topic. More than a decade beforehand, he was one of the lucky junior glider pilots selected for the German sporting soldier program. He flew 1000 hours or so in 2 years during his time there, with many once in a lifetime experiences. Somewhere at the end of that period, he launched for a flight from his home airfield on a not particularly brilliant day for a 300km XC task. After about an hour of flight, a question popped in his mind: "What am I doing here?" He couldn't find a satisfying answer. He flew back, landed, cleaned up, left, and didn't return to the airfield for a half year. He went back to flying enthusiastically afterwards, but at that time he had been overexposed and lost all motivation. His prediction-reward system for gliding had become exhausted, especially since the flight he was doing was much less challenging than the exciting experiences he had had in the year before.

Also this definitely is different from one person to the next. Some people are always searching to try out different things, others don't seem to mind repetitiveness at all. Luckily gliding offers enough variation to last a lifetime, even for the easily bored.

Our brains are of course much more complicated than that

The prediction-reward system is not the only function of dopamine. And dopamine is also far from the only mood-altering chemical that has an effect on us during gliding. Serotonin for instance has many purposes, but it is involved with overall mood regulation and it works together with dopamine to reinforce learning. Endorphin (famous from the Runner's High) helps to destress after healthy stressful situations. Adrenalin is released when our body notices that we must be highly alert, such as when you fight a saber-toothed tiger, or during close-proximity ridge running, aerobatics, winch launches, difficult competition situations, and flyby's.

Oxytocin, Norepinephrine, Cortisol: There's lots of stuff going on inside of us.

It's extremely complex, and most is much less well understood than the dopamine-regulated prediction-reward mechanism. How it all affects the pleasure of gliding and contributes to motivation, one could make a few guesses. But I am absolutely not in my field of expertise, so I will leave it at that.

So is the biological addiction a sufficient explanation for our love of gliding?

A hedonist would be satisfied with this. "Why do we like gliding?" Because our brain derives pleasure from it. And that's enough reason to go do it.

But when hedonistic pleasure is all you're after, why then not just go gambling and using drugs? It might be even cheaper.

Gliding as a search for knowledge

Glider pilots spend a lot of their free time trying to understand all aspects of engineless flight better. Hours and hours of discussions about all possible topics with likeminded people, reading magazines, books or online publications, and of course our favorite: experimenting in flight ourselves. Searching for knowledge is a big part of gliding.

Dopamine as a physiological reward for being right leads to a more profound insight: our body regards searching for knowledge as "something worthy to support", because it has proven itself as an effective method in improving the chance of survival. In most moral philosophies, sustaining life is closely related to the concept of morally "good". Losing a life is losing something of irreplaceable value. Actions that strive to help preserving life, are thus regarded as moral. This is true for most religious and non-religious worldviews.

Due to conflicting desires and needs of different members of a society, it gets complicated. Exactly which life is worth preserving more? The life of the individual, the survival of your tribe, or perhaps the potential for our planet to sustain life? It's there that different moral and value systems make very different choices. And in that complexity confusion arises, compromises and mistakes are made, and the notion of what is valuable gets perverted.

Nevertheless, most moral systems agree with our biology, that in general the search for better understanding of our world is helpful in making the right choices, and thus a morally worthwhile endeavor.

But is it even necessary for knowledge to be useful in our struggle to survive, to be worthy of our time?

In 1783, Benjamin Franklin was living in Paris as the first United States ambassador to France. On the 19th of November, he went to witness the first manned flight in history. The balloon that took off was invented and built by the Montgolfier brothers. Like most spectators, he was in awe by the spectacle. All the sudden, a skeptical bystander posed the question: "What good is it?", to which Franklin famously quipped: "What good is a newborn baby?"

This story shows us two things. Firstly, it's impossible to predict which knowledge will be useful. Nobody of the onlookers of that first flight could have imagined how profoundly aviation would change the world, turning the globe into a village. Trying to increase knowledge should never be dismissed right away as useless, no matter how inconsequential it may seem at first sight.

Secondly, it puts into question the value of life itself. The fact that life is intrinsically valuable might be a common belief, but it is not self-evident. It is very possible that it isn't an objective truth. We just don't know enough to be certain of anything. That ignorance is a problem.

And thus, it becomes necessary to strive to obtain more knowledge. Kant would call it a moral imperative. We seek out truth and knowledge, not only for mere survival, but to get a better understanding of the universe, our place in it, and our purpose. And thus, the usefulness of the knowledge we try to figure out should not be significant in our decision to pursue it.

So what is the knowledge about the world that we try to unravel in gliding?

This brings us back to the beginning of this article: what happens between lift-off and landing? What is it that we do in that time in between?

As competition tends to cut out the irrelevant, it's convenient to take that as an example. During a competition flight, once you cross the start line, only one question remains in your mind: "What is the quickest way to get to the finish line?"

That question can only be answered by answering two other questions:

I. "What is the atmosphere doing?"

And

II. "How do I optimally exploit the answer to the first question to achieve my goal?"

And that is the essence of gliding: We try to understand and predict the movements of the air, and then interact with it to the best of our abilities to achieve a goal.

Things like a number on a scoresheet or on OLC are just rough approximation of how well we did.

From the two questions, the first one ("What is the atmosphere doing?") is by far the most important.

The more I think about it, the more I see the atmosphere and its movements as one of the most miraculous facets of nature. Depending on the circumstances it can be smooth, or chaotic. And even in that chaos we can see glimpses of order.

As a young kid on vacation in Serres, I listened to Klaus Ohlmann talk about how he visualizes the air as a river. To learn more about it, Klaus spent time watching water flow. How it twists and turns over and around rocks, how turbulences, eddies, and vortices form, how waves propagate and interfere, what happens when two streams collide, This powerful image always stuck with me.

We are thus surrounded by this massive invisible river in the sky. We cannot observe it directly. But luckily we are helped by 1000s of little clues: the meteogram that you saw in the briefing, the subtle feedback of your stick, feeling pressed into your seat, the tail that suddenly lifts a bit, noise changes in a glider you are very familiar with, a sudden acceleration in your airspeed indicator, the beeping of the variometer, a cumulus cloud popping up, the different shades of gray of that cloud, the edge getting fuzzier, a little wisp of moisture falling out of the cloudbase, a smooth shelf in front of a rainshower, the edge of the shadow on the ground of high level clouds, a bird or glider circling, a dust devil, your knowledge of the terrain, a wind vane or smoke plume indicating a shift in wind, the sun hitting a bare rockface on a ridge, the flickering of tree leaves indicating the start of a thermal,

You combine all those little hints with your experience and create an image in your mind of what is going on, and a prediction of what is going to happen.

Again, that process happens partly rational, but mostly intuitive. Nobody is solving Navier-Stokes equations in the cockpit. Being a more calculating pilot or a more heuristical one is different for each person. Some good pilots are professional meteorologists, others can't even read a temp chart. It comes down to personal preference, and most use a combination that fits their abilities and interests.

Once we have made an image of the atmosphere as good as we possibly can, we move on to the second part: how do we make use of the situation?

For the pilot on a delightful relaxing Sunday afternoon flight, his goal is to stay up, maybe experiment a little bit to hone his skills, and then use his judgements to make a safe landing.

During cross country flying or competition flying, it becomes a much harder problem. The options that we have available are actually pretty limited. We have only 3 factors that we can influence: should I go more to the left or to the right, should I fly faster or slow down, should I climb or not.

Knowing how complicated even a game with simple rules like chess is, that apparent simplicity of options is of course deceitful. A shortest path problem like gliding is incredibly hard to optimally solve, especially with the presence of uncertainty.

Also this part of the gliding problem, is solved by pilots partly rational, but mostly intuitional.

A last thing I want to point out here, is the universality of this knowledge. It's fascinating that what works over the Schwäbische Alb, also works over the Pampas of Argentina. What works in the Inn Valley, works over Antarctica, and also on Mars or elsewhere.

Gliding as a personal connection with the universe

Humans have a tendency to admire the best: world champions, the most respected flight instructors of a club, experienced local pilots, Our own knowledge and abilities can seem small compared to those, and one is left to wonder if your own search for knowledge matters at all.

Most of us will never master the air as well as world champions. And even amongst world champions, there is a hierarchy. There's always a bigger dog. Does that mean everyone but the best shouldn't bother?

We also celebrate people who contributed a lot in the past through hard work and sacrifices. People like Otto Lilienthal and many others even gave their life to the progress of human flight. We are getting ever closer to the end of history. Any technological and knowledge progress follows an S-curve. When a new technology or science field is discovered, after initial years of hard struggle to get the basics down, you see an exponential explosion in progress. After a few years or decades, you reach a plateau again, where very little progress is left to be made and limited additional knowledge is left to be gained.

In gliding we have certainly passed the stage of explosive progress. Gliders still get better, but at a much slower pace than in the previous century. Our knowledge of gliding theory has been well fleshed out. There is still a little progress to be made, but the big leaps are already taken. Our meteorological knowledge and forecasts are also incredibly good already.

For myself, whatever articles I have written in the past and will in the future, my own contributions to the overall knowledge of gliding will never come close in importance to "Der Vogelflug als Grundlage der Fliegekunst." by Otto Lilienthal, "Meteorologische Navigation des Segelflugs" by Walter Georgii, the MacCready papers, or the popularizing book "Streckensegelflug" by Helmut Reichman.

Our own potential and will to seek knowledge might thus be small compared to others, and our own potential to contribute to the combined knowledge of humankind might be insignificant. Is it for each individual then still worth it to strive for knowledge for himself, limited by his own abilities, and according to his own ambitions?

Absolutely.

As explained above, the value of seeking knowledge should not be limited to direct usefulness, and thus not to how much your personal knowledge is of benefit to all. The objective is to increase your personal understanding of how the world works. Your mind is all you are. Your body is your gateway to connect your mind to the rest of the universe. It's not much, but it's all that is available to you. By using your senses to absorb information, and by directing your movements to communicate back, you connect with the world. Again, it's crude, it's limited. But it's all you have.

Gliding is an excellent exercise in experiencing that. Your sailplane as an extension of yourself lets you connect to a specific aspect of nature: the wondrous complexity of how the atmosphere behaves. You try to read how the air moves, you interpret it, you try to find an appropriate reaction, and then wait how that reaction is responded to.

Gliding is thus a way of trying to personally deeply connect with nature, trying to understand it, and work with it. However seemingly small in the grand scheme of things, it's a very genuine attempt to become part of it. Through a cycle of observation, action and response, you blend your mind with the universe. And that is a very worthwhile personal journey, independent from other people's experiences.

Gliding as meditation

Once you are that half meter above the ground, all the complexity in the world is reduced to those two very simple questions, which are very complex to answer perfectly. They are more than enough to keep our mind preoccupied. All worries and doubts of everyday life are of no matter, once in the air.

In our most memorable flights we succeed in focusing on only the flight itself. The feeling of being in the zone is very peaceful. You also feel slightly euphoric, especially when you seem to be understanding the atmosphere well that day. In this state of mind, time is also perceived differently. I do various flights a year that last longer than 12 hours. It always amazes me afterwards, how quickly they went by.

Focusing on a single task to blank out the rest of your thoughts, entering an altered state of mind, all to try to find a connection with the universe: that is pretty much what meditation tries to achieve.

Years ago, long before I put any thought into any of this, I started using various mantras to get focused. For instance, I literally utter the sentence: "What is the air doing?" when I notice that I do not completely have my attention where it should be. It works well.

The peaceful and joyous state of mind has a therapeutic effect. Meditation reduces overall stress-levels, increases emotional health and rebalances values. That positive return is carried over to your everyday life. So, the sacrifices it took to finally get into cockpit, are most often well repaid.

So, why do I love gliding?

It is a combination of all the above: it's a biological addiction as an effect of a deeply ingrained pattern recognition and prediction-reward system in our brains. It's a challenging and stimulating way of seeking knowledge, which is worthwhile in its own right. It provides the opportunity to a deep and personal connection and interaction with the universe. It is a form of meditation that has beneficial therapeutic effects that carry over in other aspects of your life. And it's topped off with a unique perspective on earth's beauty, while providing a passionate welcoming global community.

That's a pretty decent reason, if you ask me.

