There Is No Such Thing as Bad Weather

Anja Wagner

Interview

Le Bicolore

Maison du Danemark

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Anja Wegner is a transdisciplinary researcher doing her PhD at the nexus of behavioural ecology, environmental philosophy, and education. In collaboration with different artists, designers, and researchers from other fields, she studies the behavioural ecology of marine fish to investigate the interplay between physical structures and social space. Through these collaborations, she contextualizes her scientific work in a bigger picture, expands her work to questions of coexistence between humans and marine animals, and reflects on her own scientific practice in and with the ocean. When she is not observing fish in the field by scuba diving or conducting experiments in the lab, she also develops educational workshops, such as the Marine Makers workshop in Jamaica, combining making, design thinking, and marine science. Her work is currently funded by the Max Planck Institute of Animal Behaviour and TBA21-academy.

Interviewer: Would you tell me a bit about your scientific background and your research interests?

Anja Wegner: I work on the question of how physical space influences the social interaction of fish. Right now, I'm studying coral reef fish in Jamaica, specifically focusing on damselfish. I developed my questions around the idea of structure and that's where SUPERFLEX came in, with architectural ideas that helped me design my recent experiments.

INTV: I heard that you did an experiment in which you created virtual reality for fish. And so I thought it might be interesting to start with the idea of fish perception and fish perspective. I wonder if you could tell me about that experiment?

AW: Well, it's not like virtual reality for humans, the fish don't get little VR glasses. They are basically in a fishbowl and—working with engineers and programmers—we projected a 2D environment that looks three-dimensional to the fish. If you look at the bowl as an outsider, everything will look distorted, because you don't have the perspective of the fish.

INTV: How do you know it looks 3D to the fish?

AW: Well, it's an illusion: it's designed so that from a certain perspective, it appears to be three dimensional. But the question is, of course, how do we know that the fish actually perceive it as something real? So I projected another virtual fish that looks like the fish in the bowl, and I had it move around, swimming in circles. I gave it very a typical movement where it wiggles its tail and then just glides through the water. I wanted to see if the real fish followed.

But you will never know if the fish just follows because something is moving. Personally, I cannot say that I am convinced that the fish thinks the projection is a real fish.

INTV: Were there conclusions from this experiment? Or is the question of what it perceives unresolved?

AW: I saw movement patterns that show that the fish is perceiving something and swimming next to something. And I could see that because I varied the speed and the movement patterns of the virtual fish. But, to be honest, I think I could also just have projected a sphere and it would have been the same.

It's the same for humans. If you're in a virtual environment, of course you have the visual stimulus, but you're missing a lot of other things, like the olfactory system. Smell is a very important thing, as is sound. I work with larvae because their lateral line organ is not developed, which is an organ that they use to sense vibrations. In the water, when they school for example, they feel the other fish through this organ because they feel the movement of the water through the lateral line organ. That's something which for us humans is a mystery. How could you imagine that you're walking with your friend and you feel their movement? This is a sense we don't have and to circumvent that, we worked with larvae because they're so small that for them swimming through water is basically like swimming through honey.

But there's so much more in a social experience than just the visual cue. Other animals have other senses than we do, or they see in a different color range. They have a completely different perception from us. We think we are visual so therefore the fish should be visual.

INTV: Let's come back later to perspective and perception. For now, can you tell me a little bit about the project you are working on in conversation with the SUPERFLEX studio?

AW: The project explores the relationship between architecture and social behavior. We're working with biologists but also with artists.

It made sense to look at Bicolor damselfish because they will settle on a structure with a group and then they will never leave that structure again. They live within three or four square meters, or less than that. That's their world. And that makes the science easier. I can put up cameras and track the fish in 3D space, because I want to know where they are and who they interact with, and at what point in time. So I have a group on a structure, and I want to understand if there are certain aspects of that structure that are really attractive to a damselfish and how those affect their social network. Their group is always organized on a hierarchical system, there's always a dominant male. When I look at the structure over time, I can see whether, for example, the dominant male always occupies a certain space.

And then the next question is, what structures do fish like? Right now I'm looking at the fish on a natural structure in their habitat, which unfortunately is a very damaged reef. There were a lot of major bleaching events. There are a lot of dead corals, so the question is: if I give the fish different structures, what do the fish prefer? And how do the different structures change the social dynamics of the group?

INTV: How many different structures do you use?

AW: There are already a couple of structures designed by SUPERFLEX out here on the reef. Right now in the lab, I'm using five structures, including two SUPERFLEX structures. One is way more complex than the other, but they have the same amount of blocks. Those are the two artificial ones, then I have live coral, dead coral, and coral rubble, because those are the three natural structures that they live on in the wild.

INTV: I understand that you're using an approach that involves a lot of data mapping. How do you analyze or understand that information?

AW: In the field, I've constructed a little camera array structure so I can track the fish and follow their trajectories in 3D space. From that, I have a 3D model of the space the fish live in. And then I can basically map the trajectories onto information I gather. When I'm underwater I score their behavior. I sit there with my little book and I record every social interaction. I look at how they interact and at who interacts with whom. And I look at three different network layers: one is the social network, another is the physical network where they are in their territories, and then there's the network of the structure, which can be entry points and exit points of the structure and things like that.

INTV: Do you think that these experiments will provide information on how humans might build underwater in order to benefit the fish who live there?

AW: SUPERFLEX's idea was to build structures that humans can live in now and that fish can live in later, once everything is flooded because of climate change. Which is a good idea. But in the short term, it's about mapping the space to see what fish like and the possibilities of structure. And it's also very valuable to know that if we put down, for example, certain kinds of cement structures, the fish might prefer that, or maybe their survival rate is higher. That kind of information is useful for conservation measures.

There are very basic questions: do fish prefer white concrete over dark concrete? Of course, both will at some point be covered by algae, but what attracts fish to a reef? White would normally suggest bleached coral, right? And a lot of work shows that bleached corals are not attractive to fish, but probably not just because of the color, but also because they stink for the fish somehow.

INTV: Well, that leads us back to the question of perception. What has your research taught you about thinking about other conceptions of reality, or about conceptions of reality that might be had by other species?

AW: Well, as I told you, fish perceive the world in such a different way than humans do, and we will never understand that. But when you study them, your appreciation grows for other animals. For example, there's this myth of the seven-second memory of the goldfish, which is absolutely wrong, but people think it and so they think that goldfish are stupid. But fish managed to survive for millions and millions of years. Obviously, they cannot be that stupid. They're older than we are.

Part of the idea of coexistence is really to appreciate this otherness, this part we can never understand. I will never understand how fish perceive the environment. But I have a very unique experience of watching the same fish over and over again, and those fish now recognize me when I'm around. And I feel like I'm starting to build a relationship with those fish. I have no idea what they think. The only thing I know is that most of the time they don't think that I'm about to eat them, since they don't hide in my presence.

It's about accepting that we cannot fully understand. But by studying them and trying to understand certain aspects of their lives, I feel like I can start kind of a dialogue with them, I can start having a relationship with those animals, though of course I don't know if they have the same feeling. Everybody's talking about coexistence and interspecies living, and it's important to understand that we have to initiate this kind of relationship with animals—a lot of change has to happen in our heads.

INTV: Do you think that fish contain multitudes?

AW: Yes. Life is not binary. For example, the damselfish live in a social hierarchy. They prefer to live in a social group, but the group is maintained through aggression. The interactions are sometimes antagonistic. They could move just one or two meters away, and they wouldn't see the other fish anymore. But they want the group. And in that way they are just like humans. We do things that might be contradictory.

That's why behavior is so interesting. Because we cannot predict it with certainty. If it was just a one-dimensional thing, then we would not need to observe them. But it's rarely obvious, and maybe there is not clearly a direct benefit for the animal. And that's behavior in general: for humans, for fish, for other animals. It's also what makes behavioral ecology a very messy field, because we look at behavior and we see so many different behaviors. I think it's just as messy as if you study human behavior, or if you study fish behavior, or spider behavior, or whatever.

Animals are complex, their interactions are complex. They live in a space, they are aware of each other, and they recognize their neighbor — obviously, they have complex relationships. They know where they are in the hierarchy, but they also challenge this hierarchy sometimes, and sometimes not. To live in a social group is a very complex process. Humans have thought for a long time that we are very smart, and that only we, along with some other very smart animals like primates, can actually maintain social groups. But even fish can do that. Fish have those multitudes, they are complex. They have an interesting experience of their world.

This interview will be featured in a book published on the occasion of the exhibition, which will feature images of SUPERFLEX's work along with conversations with scientists, art historians, and an AI.

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