Machine-assisted transcript of the discussion on Dec. 15, 2021, Chapter 1; Loet Leydesdorff

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Jaimi Hendrickx: Hello, everyone. I'm delighted to welcome you all to this. The slow reading of Loet's latest book, "The Evolutionary Dynamics of Discursive Knowledge." We will be doing one chapter at the time, and my co-organizer is Mark W. Johnson, who will be giving the first presentation, but very quickly, first, an outline of what will happen today.

So, there will be three presentations of about 15 minutes with five minutes for points of clarifications. And after that, this we hope we get plenty of questions and comments for an interactive discussion. That's for each question or comment. It'll be about seven minutes and then we will stop, probably exactly up to two hours later. Another discussion can continue on the Google Group and for those who have not joined it yet. Please do so that you don't have to join if you don't want to, because everything is open so you can follow the discussion either way. So now I would like to give the word to Mark.

I just wanted to make one more point. Once you have questions or comments, please start putting them in the chat room. But also when you want to speak up, put up that lethal hub's feature in the reaction area because it kind of allows us to see who came first in the queue. So it makes it much easier to to kind of move from one question to the next. OK. All right. OK.

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Mark W. Johnson:
So hello, everybody, my name's Mark Johnson. I've been involved in this sort of organization of this with Jamie, and I think it's a very special thing that we're doing and that's really going to color the theme of my presentation today because I think, well, I'll explain in the second. Loet and I have been talking for about just over 10 years now, I think about about his work and it's a real pleasure to be able to to contribute this. And I think there's something very, very important that we're doing today and over the next few weeks, which we rarely do, that we rarely see academics get together and teach each other's work, particularly while the academic is the author is present. That's a very special thing. And I think what impresses me most about doing it in the context of this particular book is that in a way, Loet has given us a kind of compass for understanding this, for understanding what happens when we talk with one another about ideas in this particular way. And, you know, being able to talk about a book that one of us has written and in a meaningful way. And that word meaning is so important. It's so central to what this book is about. And I think perhaps, you know, without getting into the complexity of it which I want, I will hope to try and do justice to during this presentation.

I think one of the things we're going to do over the next few weeks is express the same ideas because they're written in the book and we're all. Each of us going to do it in different ways. Each of us is going to give our own interpretation, our own, our own version of of this of of of what Lotus written and the ideas that he's had. And I think there's something very important. At a technical level that each of us is contributing to the generation of a redundancy, there's a redundancy between us and this is a sort of key mechanism in doing meaningful, doing meaningful things, having meaningful communications. And this this is a core. This is not just the exercise that we're undergoing in meeting together like this, it's also what the book is about. And so that's makes it special. I think. And you know, this this **generation of redundancy** is contributing to **a dynamics for producing meaning**. And Loet belongs to a tradition in thinking about meaning and redundancy, so this is **Gregory Bateson** talking about the importance of redundancy and meaning assists and steps to ecology of mind. I was also a dug out this quote because I know Eva has had some association with Bernard about **Gordon Pask**. This is this is a quote from the cybernetics of human learning and performance, where Pask is talking about the process of teaching. And he's saying that the resilience of memory will depend upon the number of explanations produced in teach back. That's why the student teaches the teacher. And so he has many ways of reconstructing a concept, and this redundancy will combat the effect of interfering and incompatible learning experiences. This is this is this theme has been part of cybernetics for a long time, but I don't think it's been considered to this depth. And with this coherence before. Now. I suppose getting into slightly more technical territory, I mean, this diagram on the left hand side is something that's been key to the ideas in the book.

This is the idea of **double contingency**, the idea that we can communicate because we entertain models of each other. And indeed, could we utter the words that we do if we didn't have some idea of how they were, how they were received by another person, and how the other person would respond to them? And so our utterances sort of exist in this cloud of communication, which which is drawn on the left far left hand side. But somehow there must be a well, first of all, there's an overlap in the utterances that we make, and the overlap is drawn in that in that cloud and that that's the sort of you can talk about the mutual redundancy between our communications and.

The most important thing is that our **utterances are selected**. We have to have some mechanism for selecting an utterance based on the model that we have of each other and the real. The really important question that I think voters addressing in this book is how is this selection mechanism constructed? How is that higher order selection mechanism constructed, which steers our communications so that we understand and engage, engage in each other in a meaningful way? And can we see it, can we study it? What does it look like? What new insight does it give us if we can do this? And fundamentally this is this is the these are the core contributions that I think the book is making.

And just to sort of emphasize the point, this is a direct quote, so the meaning of a communication is a second order variable attributable to the communications, the latter a first order attributes of communicating agents and meanings originate from communications and feedback on communications. So we're making utterances. But there's a higher order mechanism which is steering those utterances, and that higher order mechanism is a is a derive from the patterns in those communications. Now, just a step back, because what's also in chapter one is a very nice mapping of the provenance of these ideas.

There's a mapping of the provenance of these ideas, the history that has led to these ideas of **double contingency,** which obviously comes from **Niklas Luhman** and the historical trajectory that Loet is building on. So we begin with **Edmund Husserl,** who has who has an idea of consciousness as something between between minds is something between the communications in people. And although Husserl really considers the sort of situation of communication between two people, Alfred **Shultz** develops this into a much more elaborate communication and into subjectivity and. The next really important connection is the friendship between Schultz and **Parsons.**

This is very well documented because Richard Grant Health wrote a wonderful book of the Parsons Schultz correspondence in which is probably fair to say Parsons and Schultz disagree with one another in a very polite way. Parsons is after a more functional theory of communication, and Schultz is trying to sort out his a bit nervous about being too functional. But Schultz himself inspires the next generation of social constructivist Berger and London's social construction of reality. While Parsons is developed this idea of double contingency and it's that idea that which is then picked up by Niklas Luhmann. Luhmann picks Parsons ideas up in the context of the cybernetics of his time, particularly the cybernetics of Campbell's immature honor. And later in his life, he picks up the cybernetics of George Spencer Brown mathematical cybernetics as George Spencer Brown. This is the tradition really where Loet is is building on, and I think his influence is well, that's **Daniel Dubois**, who was a student at **Robert Rosen** and developed a way of thinking about the computational aspects of what Rosen called anticipatory systems. I'll talk about that in the second and also classic treatment of his often in this group who has done so much work on the complex dynamics of communicating systems in more than two dimensions, which has been a sort of a cybernetic question since **Ross Ashby**. It is useful to know this history, and I think this is beautifully laid out in Chapter one. And and I think the influence, the the influence of her, so on Luhmann, this is something I personally have really gained from talking to lot over these years, whose sales work is very complex and very difficult. And to see it in this sort of historical trajectory, I think is very valuable. And and I think, you know, this emphasis of the importance of herself on luminous is critical. Now, from a more practical point of view, of course, the cybernetic heritage gives us some operational tools, gives us ways of making measurements of communications and I think, you know, perhaps why is Shannon so useful?

Why is **Shannon** so important? And because in a way, it's just statistics. It's just probability. But but it's it's got something that other statistical techniques like, for example, variants don't have. And that's because it's relational. It's all about the relation between the sender and the receiver and their interactions. And that is such a key correlate of this idea of double contingency. And I think it's a stroke of real brilliance that Loet has sort of put these things together to give us a way of making measurements and empirically exploring something which until this point had only really existed in theory and the best diagram. This is not in chapter one, but the best diagram in probably in the whole book is this elaboration of Shannon's communication model, where, first of all, it was actually Warren **Weaver** who introduced this idea of semantic noise in the communication between sender and receiver. But then, of course, points out, well, that that's language. That's how we resolve these differences of **semantic noise with correlations in language**. But then again, this question of, OK, so what steers the process of that correlation? What steers a selection mechanism as to the words and the codes that we're using? And so there must be a higher level. But the beauty of this, I hope, I hope I can make this pretty clear is there is a metric.

There is a correlation between the use of the Shannon equations and this conceptual scheme. And that's what's really powerful here. Now what's going on at the top here is some kind of anticipatory mechanism. It's some kind of anticipatory system where each of us is able to imagine the future communications of others in the light of our communications with them. And that is something that that's a key question here as to how that works. Now, Luhmann had some insight into this, and this is the sort of his or her autopoetic model, I stole this diagram, but it's quite good because it brings out the importance of the biology and the relationship between the sort of biological foundations and the communicative operations. And obviously much. Sharona was the key figure in Luhmann's conception of how communication systems operates as sort of quasi biological systems and actually does some nice critique of that later in the book about whether this is a kind of metaphor biology, which it isn't or at least Bloomin might be, but Loet argues against that.

More importantly, is the work of Robert Rosen, because biological systems, as Robert Rosen pointed out. Well, biological systems and communication systems are anticipatory. The double contingency idea is an anticipatory mechanism again. I can only utter these words because I have some idea of how they're received. So I'm predicting how people are going to respond. And Rosen really pointed out the in biology. The same thing happens in biological systems. Biological systems contain models of themselves, which are anticipatory of their environment. There's plenty of evidence and in biology proper to to suggest that this is actually the case and our immune system wouldn't work unless unless something like that was going on. And because we've got this anticipatory mechanism, then the possibility is there to do simulations around these anticipatory systems. And this is this has been such an important part of its work. So it's

not just an analysis of communication based on Shannon, but also the ability to do some kind of some kind of simulation and to explore the difference between the dynamics of the simulation and the the observed dynamics of those systems that we actually see around us. And just to add the Rosen's ideas, this is this is what this is, what he says.

OK, well, I'm nearly done so. So this idea of anticipatory systems that says fine, we talk about people and communication. What about organizations? So organizations operate on the same principles, and this is really building on the foundation of the the **triple helix**, which Loet and contributed to and and it talks about the relation between universities, governments and industry as a kind of anticipatory dynamic. In these terms, it's a hyper cycle. But, but but basically these are discursive entities or contributing to a discourse which is anticipating the operations of each other, and there's a dynamic that forms through that. There must be some kind of fractal tamatic. I suppose this is more medium load, but there must be some kind of practicality in the communications where past events can be codified in a way which map onto possible futures. But and it's very interesting to think about current A.I. counter to artificial intelligence, which looks very much like an anticipatory system. I don't know if anybody's seen this stuff, but this this looks very similar to the kind of things that nobody's talking about. So I think this is work which is pointing very much to the future. And this is my last slide. I just want to talk about one final key idea in the book, which is about the distinction between **dualism and monism**. And really, there's a lot of discussion about **structure and agency** in sociology at the moment.

As a sort of either, a duelist is portrayed as a duelist thing within the critical realist view, for example, I know one or two of you here are interested in **Roy Bhasker** and **Margaret Archer's** work. There is a kind of a distinction made between what's called an intransitive domain, a sort of mind independent reality and the transitive domain. But this is not very satisfactory because it leads us to a sort of metaphysical assumptions which aren't really testable. There's very interesting ideas around in **Gidden's** structure, action theory, very similar to critical realism. But Giddens doesn't say that there's onto logically distinct, transitive and intransitive domains. He basically says these arise out of intentionality. So it's basically there's some single source all of this, but it's never really articulated as to what the dynamics are, whether the dynamics come from in that situation. And we get a similar problem in nature.

Now, if you compare these with what I think is Loet's Dualism, which is between expectation and communication, I think this is much more satisfying. It's much richer. And I think the also the connections between this dynamic, this dualism not only gives us a motive for explaining how knowledge organizes itself in society, but it also gives us tools for measuring it. So that's it, really. And I think just to just to come back to the idea of teaching that when we teach you. So this book we're going to be doing over the next few weeks is enacting this dynamics of knowledge. OK, that's it. Thank you very much.

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Jaimi: Yeah, thank you, Mark. If you could perhaps put the link to your slides in the chat room. Yeah. If you could also enlighten me that I can put it in the Google Group. Yeah. And are there any immediate or is there any need for a clarification and not done? I'm going to give the the the screen to Andrea Scharnhorst, who will give the next presentation and off. We will have Eva Wood walking out if I pronounce it correctly, I hope. Andrea?

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Andrea Scharnhorst: The floors mine, right? Yeah. Yes. So I have not prepared slides, but I have prepared a text and I will try to read it to you so that I don't kind of get talking and talking and don't find an end to it. And I would like to thank the organizers very much to creating this platform and this kind of exchange. And I feel very, very privileged and very honored to be able to say something about the book. The title of Loet's latest book "The evolutionary dynamic of discourse of knowledge" is not vain or idle, or just an aspiration. I've I feel when I when I read the book and then I look back to the title, I find it very appropriate because to us, a parallel between the kind of bridge Loet is creating its own academic theory, which covers the years of the rise of what Derek de Solla Price ones called "big science". So Loet's book is dedicated to understand knowledge, dynamics and the chapter of the book. Take us to any possible method or to any possible type of method. Still, of course.

Many methods, but I think the book quite covers representative types of methods which can be applied to bring this understanding of knowledge and knowledge dynamics forward. So that goes from measuring to mathematical modelling, and it goes from system theory to fundamental philosophical questions. And this is what chapter one, as my previous as the previous speaker already so beautifully unfolded, is mainly about. Chapter one draws the big lines of the conceptual framework Loet operates in, and it gives us also the motivation I found and the why he does it.

Now, let me allow me a little side remark. So on the surface, or how to say that in the usual expectations, if you look at academia more in an ocean, it's taken way, so simply an oversimplified way. The signs we are supposed to be objective, rational, we are supposed to be truth guided. Right. That's what Luhmann would have said. But the science is also science. This is also the work of human being. It's mentioned back. And I know Loet. Since more than 30 years in my Dutch new home, he became an invaluable counsellor, a good friend next to an inspiring colleague he already was. So over Ricetable Foods, which is an Indonesian dish? Very little. Now we discussed the state of the art, the state of the state, the state of the science system. The state of society. And in this discussion, Loets deep humanity was penetrating. Always what we spoke about and the deep, the deep conviction that science is not to be done for science, it's also not to be done lightly. It needs to be dedicated to make the world better.

The welfare in the Western societies and probably in all societies, is based on knowledge production and society ought to take care of all of them which build it, which are part of it. So

education and participation is crucial, but also freedom. Freedom is an essence is a legacy of life of all of that. So I was deeply touched when I started reading the book and I read in chapter one in the very first kind of section systematically written up what you often had told me include in our delightful story, kind of telling men at dinner. Loet's work is rooted in the philosophical an ideological debates in the 50s, 60s and 70s when in Europe, I would like to remind us we had two very different societal systems which fought for the right path, and they fought bitterly and often dangerously.

So we now we summon that on the Cold War. And if I sometimes read kind of reflections about the Cold War nowadays, I know some of them scratching my head and I think, Oh, maybe the people who were not did not live in this decade saw kind of thinking this was a fancy game or something like that. I'm born in 61, so I also haven't lived through the 50s. But my parents in law were in Berlin when there was when it was an open, forged such an open city and and they often told that they really had fears that there will be an atom bomb falling. And if it falls in Europe, it probably falls in Berlin. So I think it's important to remind ourselves to the to the historic context, which has shaped Lute's reflection and thinking, and he she has that response and I find it very, very special. So this existence coexistence, cold war between two very different societal designs. We are also challenging provoking the I think the scientists on both sides provoked each other, which stream of philosophical thinking would now be the most appropriate to better understand and ultimately better act in this complex growing societies.

So for me, the chapter one, the light next to all the rich information that brings only different philosophical concepts and frameworks and persons, you depart from loot the one the light is also on another level. It's you would probably call it a second, a second or the kind of level or second order manner. Namely, that you are able to convey an argument together with. Elements which allow us to also have an emotional access to this argument. And yes, science history does this, but also to be autobiography autobiographical remarks illustrated. So I'm really enjoyed when I read not only about your own journey, but also what you built into about the journeys of those figures you rely on. So why when under which circumstances they had developed a certain approach and chosen a certain kind of conceptual way?

I think this way to describe things makes it much more easier to relate, to ingest and to re-appropriate sort. Thoughts and I found that a loot finds a very fine masterly balance and never leaves the scientific argument out of sight. He never loses himself in sentimental memories, so it's not an autobiographical kind of going back by, but suddenly by all the seemingly mundane kind of little drops and arguments. The choice of the philosophical approaches becomes logical and convincing. And I was wondering if maybe such a culture of writing should be more promoted, not because it is in joyful and pleasing to read, but because without it, we are doomed to drown in the world of literature, which we have at our fingertips.

I learned from Jonathan Beckett, who is an East German philosopher, psychologist and also a writer and and the father of Jeneyah, who is a very known contemporary German writer. So I learn from him something which is, I think, obvious and known in psychology. Since. And for that, we learn best when we are emotionally involved. The same John Allen Beck also uses to emphasize the value of science history to achieve true interdisciplinarity. So we often discussed it because we also worked in interdisciplinary settings and, he said, to teach or to introduce somebody to a concept used in a discipline, applying to the discipline this person is coming from. The best attempt is actually to tell something about the history, how this concept came about in the history of that field. And I think that we all share and the more so, the science system keeps growing. We share the experience that **sorting out terminology is at the root of any interdisciplinary collaboration.**

The audience of this book is large and diverse and still the Chapter one manages, I think, to give at least everybody elite into further literature. Sorting out just shared vocabulary is tedious. It is often no fun. I work in a lot of interdisciplinary projects and I see people doing it over and over again, and people don't get excited about sorting out each other differences. It's also in principle, simple but not easy to be achieved, and it is still underestimated. luJ takes us with him step for step in his own sorting out process, sentence for sentence. And sometimes I stop and think, Hmm, would I choose in the same words, do I actually agree? Would I probably use another analogy? And very often I'm just enlightened, and sometimes I'm baffled, but I'm always provoked in a very kind of positive manner.

I write these thoughts in our Berlin Flat and library, and I'm surrounded by literature, by books in Russian, German and English, on systems theory and cybernetics. Great designs which emerged in the first way of computerization. So if I was thinking of knowledge, move in preparing this lecture and how his his book, which gave in to metric. So the quantitative studies of his name, how that was influenced by his being, by his being forced to be in a gulag, in a in a camp in Soviet Union for for many years. But he was there to actually sort out and optimize the technological processes. Those can also sometimes places of production. Yeah, and that has triggered a lot of his kind of ideas on measurements of the of the sciences. So. So it is not an accident that I am now referring to those books from the 50s, 60s, 70s because I sometimes I feel we live in a time that a journal article has totally taken over and their books are sold by chapters. Even your book route and they are holistic approaches are more seen as something for the idle or retired or old fashioned people, at least in a lot of fields. Yeah, but what this book also shows is that we cannot truly understand the details of a scientific argument, the nature of the phenomena we measure and observe. So take, for instance, assigned to metric examples.

I'm familiar with the growth of publication in a certain field, the emergence and decline of a new journal as a certain hop in a network topology, the invention of a certain drug and when and if it is pushed to the market. We cannot understand those detailed phenomena without a larger

reference frame. And I think this is this is what this book offers us to embed a very concrete questions, very sides, politically irrelevant questions, societal questions into a philosophical setting. There's always a philosophical setting to to our reflections, but it's often not articulated and I like that that it's here articulate. So here the book stands out, and it is kind of against the current zeitgeist. Maybe it's running prior to it. It does not avoid these philosophical approaches, epistemological questions behind any scientific exploration, and it brings them to the surface and it articulates them and shows the consequences. And while the book is still based on articles, I think bringing them all together in a book gives us something to chew on for a long time. That's all.

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Jaimi: And that's the first 15 minutes, is anyone is there anyone with the specific point of clarification question? And if not, then if you have the floor.

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Eva Buchinger: Thank you. Time. Hi, everybody. Likewise to Andrea, I have also not prepared the presentation because I feel there is a kind of presentation tiredness in our CO read online votes, so sharing the screen and having one presentation of the other, and I thought it might be nice if I give my reflections and seeing faces so well. Thank you very much for the opportunity to taking you participating in this journey, which is starting now and is going over the next half year or so. It's quite a good thing and what I especially appreciate is that there is some slowing down, taking time, digesting thinking a little bit so, such a gift. So this is really great. And thank you, Loet, that you gave us the opportunity to use this, this book, this collection of your articles in that book to do this so well.

First of all, I wouldn't take part here if I wouldn't be a fan of what you are doing, not what I always appreciated all over the years was that you have a broad access, not a real one, narrow one, but a broad one. And this is something which I appreciate very much and I like today, since I people, everybody who knows me knows that I have. I have two souls my my professional ways to being an innovation reversion policy consultant, and my heart is as sincere ethical grounds with social systems theory and only from time to time as if things are overlapping. Also, I use a social system theory as a very helpful juristic background and to say, really, this was not by accident. I use it as a heuristic. I'm not a believer in some kind or a hard core Luhmannian certainty.

I would like to take up something which comes in various places in the book, but especially what is the one point eight point one who sell into such a big intentionality? So I take this as an opportunity to draw the attention to the fact that not followed followed. This is perfect, but for many of the community, there is sometimes. I would maybe I would not say a kind of misunderstanding, but a kind of underestimating how much we are now.

Of course I'm referring to Merton. We are standing on the shoulders of giants, so we are not starting at zero, but there's a lot of sinking fund. It's it's laying down in books and articles and presentations what era we are relying on. And so I was I found it so good that in this book, there are references to the basics, to origins of ideas and and and it was also mentioned just previously before where ideas are coming and how they can be taken up. And further developed. So the next set, this will deal a lot with taking up our ideas, develop them, giving a new form or or to a certain form, a new content. And so I will make this couple of minutes I have here and this round to focus on on who. So and this contribution or how this work, thus they can act. And this chapter one point with one started with saying that no man's disciplinary backgrounds in into human communications. **Parsons and Maturana** and I cannot cannot enough to say yes. Yes, yes, yes. This is so good. So you stated so very clearly, I'm sorry.

I have I had the privilege in the last 20 or even maybe 30 years to go into discussion of how philosophical and other concepts are taken and transformed and how much use one can make up of this up taking and. Again and again, I had the impression that concerning Luhmann and his focusing on the on how to police this even beat people are talking about the outwit out of poetic turn, and the series is overestimated compared to what no one takes in all his considerations from **Husserl**. Because when I studied and I have to say also, I studied philosophy before I went to sociology, I think that came through my philosophy, a philosophy study, the closer I came via the woman to hustle because I read a little more and at a certain point, I I knew I have to read certain text. Otherwise I will never understand what is terribly arising. This is this this has in the head and this moment. And so after investing quite a lot of time going on under the logical investigations of us as opposed to reading into a cohesive crisis, the crisis and others. I got such a strong understanding that one of the great contributions Luhmann has made is to use those proceeds basics, idea and adapt, adapt and adapt them. And for me, after going deeper and deeper into this, the philosophical backgrounds, I got more and more in understanding the person had already. More or less outlined all basic ideas when it comes later to things like. But spirit or self reference or ideas of operational closure, which leads to first idea such as structural couplings, all things which in the book are different places in different contexts are very, very well treated. So I have today, this is my I thought, do I have one message today? So yes, I have one message.

I have a mission for today. I gave myself permission for today, and this mission is absolutely symbolic. This to draw attention to one of the roots which is coming into it here and how much I appreciated that in the and in the book Evolutionary Dynamics. This route is taken a violent. Since I'm a human expert, so I'm focusing on luminol, which does not mean that Luhmann is the only way to go into that. So if you look what Husserl has prepared concerning the thinking of mental acts concerning the thinking of meaning of the meaning horizon of life, will you see how I would even say far ahead? He has been in a certain respect and how important it is to understand this thinking. Even if you go further and think about and ask questions like, Is there a

cell? Is there an ego? How does an identity come into existence or about thinking about questions from complexity? There are complexities sinking and considering what means emotions, what does it mean when someone talk about an emergent thing thinking of check system, whatever? So I cannot, I cannot.

Over the following my mission now over emphasize the importance of think trust. Such is also not the only one. Also, he lost someone standing on the shoulders of a child. And so. So I think we should be so aware that for. Maybe I can say all social scientists on not sure, all but many social scientists. The meaning is a very, very important element in theoretical considerations of despair or face and that how meaning comes into the world and can be exchanged or even cannot be exchanged but can be accessed, can be reconstructed in ourselves. Now that we talk about things of understanding that we can do it, that communication is possible. What are the rules of communication? What are the constraints of communication? What does understanding mean that we have really, really very good theoretical backing to talk about it? Talk about maybe in a better way than now.

I explicitly refer here to the dialogues I follow concerning the college fund they make. Sometimes it's so frustrating to listen to dialogues and you can turn on the radio, you can turn on the TV, you can look in the internet, you can read a newspaper and understanding and communications seem to be the most difficult thing ever possible. So but I would not like to talk about code with now. I would like to talk about a theoretical up thinking of us as a thinking heritage, which has been done in such an interesting way in this book and. And also, there are many things I command will ask questions or contradict. I just want to say how how important it is for me to find in this book that beyond and beside others, the contribution of Husserl is honored is is made explicit and what I would like to put note on top. No, I do not do something on top of something I would like to put on the side of me. If you allow me to use this metaphor to this picture on the side of it is that when we think of something like something like systems, cybernetics references, self-awareness, it's communication. Understanding that and then referring to your mom that one should not bother. So just my opinion every time. Happy if someone has another opinion.

My opinion, my understanding is that we should not care so much about the biological roots. They are existing and they have their importance. Yes, because like, it's so much more helpful to read back, slow down to wholesale and how he constructs our psychic ex and how meaning is emerging and how communication is possible. So if I was able in this couple of minutes to anchors this a little bit or even to find people who see in the same way, I mean, maybe not in the same, but in a similar way or in an accessible, responsive and some discussion can arise out of some exchange and discussion. I would be so happy and let me and began was thinking not too, giving this opportunity to start such a reflection and such an exchange. Thank you very much. And all the others. And you guys

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Jaimi: Thank you, Eva. And now we are ready for the discussion, and I think you did an excellent job in a way to stage the discussion by your attention to reminding us all about the importance of who settle. And so there is a question that appeared in the chat room and Mark follow up on it. So Mark, owners of. Facilitating the discussion now, perhaps.

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Mark: Yes. Well, I mean, it's, you know, I'll do my best. Well, Jerome's question is, did I find it hard to understand, I think going to Husserl's original writings is, is there's a lot of it and and of course, there are lots of periods in his thinking, so it's very hard to sort of find your way through this. I have a note to thank for my appreciation of Husserl's contribution and that really came through not herself directly, but through **Alfred Schulz**.

I'm particularly there was one conversation that we had, which in the end led to a paper which is Schultz' paper about music and which is a beautiful thing. It's called making music together if anybody knows it, but it's as really an elaboration and a deepening of who sells theory of into subjectivity directed at answering the question **How does music communicate**? And this? This made me realize the importance of soul, both historically and in terms of, you know, the contribution, the ideas that then feed into Parsons. And of course, that Parsons Schulz correspondence is incredibly that's such a key moment in sociology. So I didn't find going to Husserl straight away easy. Schultz was my introduction.

All right. Perhaps, Jerome, since you raised the question, do you would like to tell us something about who settle in and how you think he relates to Loet's work? Or is anyone else interested in?

Jerome Nikolai: Yeah, I was saying I was I'm probably not the best person as I read Husserl as an undergraduate student at the University of Alabama more than 10 years ago, studying basically religious studies well, basically studying courses that I found interesting. But I just wind up doing a lot of religious studies. And one of my professors, Timothy Murphy, who was unfortunately no longer with us, is a big was big on semiotics. And so, among others, all that I'm about and this whole tradition. And it was by a hymn that actually I was exposed to this, I guess somewhat. You might consider it part of the **post structuralist or post modernist** tradition, even nature and in particular, who said, I found very, very refreshing this notion of phenomenology, dealing with sensory, basically perception things that we perceive as opposed to looking at as much of the traditional philosophy does with ideal concepts.

If you look at Aquinas and sort of this, this tradition, there is more this notion of finding a separation. And I think lute deals with some of this between mind and matter, between thought and concepts and reflection and actually just maybe even. Getting beyond these sort of dichotomies, I guess, Mark, this was your discussion from the dualism and moaning moan that is

true as well. And basically, yes, moving towards again communication understanding. So that's how I grasp who said it again. It's been many years, so I have to refresh my memory. Hmm. Anyone ready or anyone would like to chime in?

Can I just say one of the things that really I mean this is sort of coming out of both Andrea's and Eva's talk is that this book is bringing this stuff to life. I mean, on the one hand, we've got the historical context, which is still very much with us. And, you know, it's only got to look at some of the stuff that's going on in Eastern Europe at the moment. And then the philosophical context. These are things which are incredibly relevant and important to us when we're when our world is in a very perilous position, it seems to me.

Perhaps I would like to also on …. George Spencer Brown. Well, he's about making distinctions. He's the one who introduced the idea to think of the human mind as making distinctions and does the things that we do or that we need to do before we actually say something regarding logic and other things we do. I think 13 of the wrong route is commenting on George Spencer Brown, who who kind of really perfected. What does it mean to make a distinction? And so I'm giving us a question to everyone. Does the man could say that there are different versions of George Spencer Brown, the ones who really, really take him on? And also the ones who say, Yeah, he is interesting. He gave us a model of a distinction. There's actually something missing in it. So my understanding is pointing out that **making a distinction is different from making an observation**. And I'm just curious how all of you think about whether you. Think it's really important to realize making a distinction is an action that there are all sorts of other things that need to happen before we actually done. Do something productive.

Jerry Chandler:
Thank you, Jamie. And first, to look very directly, very happy to see your book and see your efforts to clarify your various works. As you know, we've been friends for many, many years and have heard each other's viewpoints for these years and have a very profitable discussions. Nevertheless, I really would like to raise out point here, which I think I see as a sort of a grounding distinction between particularly the work of Husserl and that of anticipatory systems and Robert Rosen's writings, as you're well aware of those rules, contributions or in the general area of mathematical set theory and its associated philosophical, if you would, the annotations of the meaning of anything it is. Is that there is not a complete, absolute killing softcore void. It just often appears to be. Now, the point of anticipatory systems in the sense of Robert Rosen and his use and not upset theory, but rather category theory is to attain the notion of identity identity within some context. And this he addresses in terms of his relationships between causality and inferences and his demand for a dictionary that relate causality to inferences. This sort of philosophical perspective of causality is very, very remote from the notions of just a real and set theory. So I do see and what this then comes to in the pragmatic setting of **Charles Sanders, Peirce** or others is a necessity for the notion of identity and the role of identity in communication

and this role of identity and communication between the sender and receiver is if you would simply be erased in in the context of **Shannon information**. So it's part of this, then, is that I see this necessity to develop some sort of notion of communication that embodies how you make the distinction here in this sense of identity is obviously very crucial to social systems and is part of the grounding set of the notions of a democracy and **the rights of the individual** as an individual, as someone with concrete rights again in Husserl's writing, all this sort of view is simply erased, I guess would be the way I would look at it. So I'll stop there and invite comments and counter positions and whatnot. I did with also and I did enjoy Mark Johnson's presentation, although I missed the first part of it and I look forward to seeing his slides and having the chance to study them. Thank you.

Mark: Jerry, can you say something about Rosen's insistence on a dictionary? I'm I don't know Rosen's work in that level of detail, but I would agree with you if that's if that's where his thinking. Well, there are two things. If that's where his thinking was, yes, that's that. That would be a problem. I also think, however, that Daniel Dubois development of Rosen in terms of the sort of computational anticipatory system would get around that problem. But if you can say something a little bit more about Rosen's ideas, about a dictionary of causality?

Jerry: Well, yes, actually, I addressed it on two separate occasions on the club of Remy. YouTube videos, and so you you can find it. Yeah. Okay, all right, well, I can give you 70 minutes worth of. All right. My view is there, which is probably more than you probably asked. But anyway, so for for this immediate purpose, we. Rosen's view, starting from the highly abstract conceptualization of relation or elation in terms of language, uses category theory and his his personal perspectives of category theory, which is somewhat different than the standard mathematical formula. He has fact a box on the left, which he labels as causality and sees some flow through that box. And on the right, he has what he called another box, which he calls inference. And in that inference box, he puts mathematics and whatever else you want, and he links these two boxes one to the other by a dictionary. And it is the nature of this dictionary, which he then should have, in my opinion, should have developed.

But he (Rosen) doesn't. He just leaves it open in terms of the reader can put into the dictionary what the reader so chooses. And of course, if you're a philosopher, you will put in philosophical terminology in the dictionary. If you are a physician, you'll put in signs and symptoms in the dictionary of the patient. If you are a a mathematician, you'll put in mathematical terminology regarding the structures of mathematics. And so what Joseph will put in that dictionary is his notions of set theory as derived from Fragen character and others. Yeah.

All right, I'll have to think about that, I mean, to be honest, I. I'm not. That is a question without really, but that perhaps we can explore that in the group chat afterwards, but. It seems to me that Daniel Dubois, his contribution to this has been really critical. And Dubois concept of an

anticipatory system is much more consistent with people like people like George Kelly, who talk about the nature of the construct being an anticipation and under it says, Well, it's a kind of it's a pattern. It's a it's a sum. Something happens in the past to which a pattern is constructed, which can help you steer your actions in the future. And now you can call that a model, a systems model of itself. But. That's certainly. That's certainly what I've gained from its work in terms of situating this, this sort of model of the system itself in the communication dynamics.

Yeah, Mark, I would just add to this. Yes, I agree very much. Daniel Dubois, who is a personal friend of mine colleague and I've attended many of his meetings in early age. He has expanded, extended Rosen's work in in new directions as as others have as well. And so it's it's. One has to be very cautious, and when you use the word anticipatory system whose anticipatory systems you're addressing, and I'll leave it at that.

Richard Klavans: Yeah, completely agree.
And my view of anticipatory systems originally ordered originated in the notion of how could a mutation in the single DNA base result in the change of an entire organism? And in this case, the standard model is this is well known across the field of genetics, from bacteria to human beings. A single DNA base anticipates an entirely different new organism. Yeah, well, at least a dynamically different organism that's not, not entirely new, but dynamically different. So there's this gap in in language between a simple chemical change and a major biological shift. That's thanks. That's that, in my view of it.

Let's let's explore this in the chat. I think it's really fascinating. Jerome has got a question. And Andrea, so Jerome and then Andrea.

Well, question comment reaction. I don't know what will come out, but regarding what Jerry Chandler just said, I thought of a passage in the book, If you don't mind, I just read this very short paragraph from it. And it's on page 21. And then this is a win that you're now to. Or, for example, quoted Castro or Louis Pasteur as saying, Give me a laboratory and I will raise the world. The resulting world was a new option attributed by Latour to pustules imagination of a vaccine. Historically, Pustule demonstrated his capacity to vaccinate cows against cowpox to journalists. The journalists had to formulate into reflexivity, interpret sorry, interpret flexibly the translation of scientific news to newspaper items. Their work is both through reflection and action. The relations between scientific and journalistic coding are made specific instances. To me, this seems to be what to how it would respond to you and your ideas or your your reservation about the dictionary.

And in fact, I thought when reading this that I wrote in the margins here do chick flick chick flick who talks about the social nature of science and the idea of thought collectives and even refers to esoteric versus esoteric but collective? You know, you have, for instance, in medicine,

there are specialists and there the nurses through general practitioners who have varying degrees of specificity. So our specificity of knowledge. So that's the that's the comment. And then I guess my question part also relates to what Jerry Chandler said in relation to this whole notion of communication and the relation between even the notion of that freiheit that loops advances and the notion of pragmatism again, the third term or just mentioned, I think it's a very interesting question. Again, to what use some of these concepts are put you to what extent one must, I guess, escape from even the communicative framework in order to, I don't know, discuss topics like ethics and power relations and so on. Again, this is just very broad questions. I'm not sure how and who would respond in what way.

Does anybody want to respond? OK, so. Again, if people have any thoughts, there is a there is an online chat. Andrea, did you have you had your hand up briefly to?

Andrea Scharnhorst:
Yeah, actually, I wanted to share another kind of observation which puzzled me when I reread the chapter in the preparation of today. And I was wondering if the if the rest of the audience kind of has similar it's similar disrupted by it or inspired by it. And I'm referring to. As you as you heard already, me talking, so I'm kind of so I'm also thinking a lot about history. We probably all do on Page Eight at the beginning of Page Eight. Loet writes about Max Weber's book. And here he cites the bonuses, says according to labor values, I argue, typically constructs to operate in history as coordination mechanisms. And there in this in their weight fight, in the social sciences service, our ability to study these values without an prior commitment to them.

So I can I understand that later on that page Loet comes back to the role of history and in the last paragraph, right? The historical events provide variation, but the system dynamics are structural. They operate in terms of selection mechanism. And while Loet is not, he is not really talking about that. But I was wondering, I sometimes wonder if there is something in this ethodological kind of tradition to think that the the number of problems we are confronted with is actually not infinite but finished, but that they take another shape whenever they kind of whenever, whenever a reality changes. And I'm bringing this to this table because in my in my own personal quest of of trying to orient in the different discourses in different fields, I'm more and more felt the need to get kind of very simple, almost like school-like first grade student, like reference systems.

And then I discovered that actually the graphical domain. So the idea to evolve large classification systems applied to **library** as **Dewey did or Paul Otley** did in Belgium, that they actually were kind of they they they had the same kind of struggle and they tried to find solutions. So if you today look into those systems, you see you see you see concepts as expressed in terms and you see flavors flavored them and you see them at different places. But I'm still wondering if this is if this is an illusion or maybe a desperate kind of hope that there is a kind of a limited set of generic problems and the hope of this, the desperate, the hope in that is that we

are able to find examples to which we can map the current problems we are dealing with. So can we find translations of of current problems into into other problems? Yeah. In a in a in a deeper way than just finding examples which look the same at the surface. And I'm just curious what this audience think about. Maybe you think about. It's all very unstructured thinking of mind, which most likely it is.

Mark: Can I? So anybody got a response to that? I know Caroline's got a hand up for another question, but Richard. We can start with Caroline and come back to it, it doesn't really matter if we let it go. I think that Rice got a different question, but I'm just wondering if anyone wants to respond to Andrea's question about. Well.

Richard Klavans: Probably the most influential person in my understanding is. And what I always liked about him is he defined research in terms of this, a serious problems that people have socially constructed and these are wicked problems, which means they never get solved so communities never die and they are more than a little part of his career. He actually characterized research more in an evolutionary process where you take a problem and you break it up into little tiny pieces of the global experience of which most of them fail. And a few of them work really well, and we communicate in the literature. We never communicate in literature much of what fails when we have a really great success, we usually hold it back for a year or two so we can monetize it in some way, either. And so there's this whole tradition, and it's also I there are a couple people you and right and looking at that research and innovation, rather, they look at it in terms of a series of problems that health problems evolve. So you're not alone in that. It's actually the way I tend to model research, and it's very much informs my entire history of what I've been doing. I view them as a series of no defined problems.

The problem that I tend to work on is how do we characterize the structure of research using the open literature? It's a problem that can't be solved and working on for 40 years, and I guarantee you, no matter what we do, it will not be solved. But it's a worthwhile problem, naked joy in cracking parts of it. So I will see that as one way of looking at this phenomenon, and I'm trying now here to learn because that's not the way that this group looks at it and look at it more interested in the. But I do resonate with what you brought up because I very much look at this is as a shared state, a shared set of debt problems. There's 100 hundred people working on a problem in the community, and there's over a million people, 10 million people, hundred 100000 problems. But we do the math and can we actually identify them and show their evolution so that there are people that get follow that that's one of them that I care about?

OK, thank you.

Stasa Milojevic: OK, so, yeah. This is a fascinating discussion. And while I agree, like I'm inspired also on the idea of working on problems, but isn't, as Andrea was saying, are the

problems the same? It really. Or can we translate or can we translate the problems or the problems? It occurred to me that actually, while we see that the problems are the same, the way we see them is they reflected in this book and they are the same because we have the same worldviews, right? If we view the world as a system, then we can start. Seeing each of these separate problems is a systemic problem, and we can see the solutions being similar in a way. So my like, the flip of that is are the problems the Saudis themselves similar so we can learn something from them? Or can we go deeper in finding solutions that can be translated? Or is it our views? And in this instance, it's the view, which is the systems driven deal making us do that. Yeah. So I don't know.

OK. I've got a question, I suppose, Andrea, which is what do you mean by a problem?
That that's that's the that's a good one.

Gerard de Zeeuw: I'm just thinking
I wouldn't be able to to give a no. Oh, you caught me not able to give her an explanation. What do I mean by a problem?

Klavans: Well, I'll give you a couple of examples, if that would help. Right now we're sitting here trying to understand Loet's book, and we all have different perspectives and that's the interesting thing. We come together and it's kind of a social group. It's not a hundred people here, but, you know, twenty point five this, you know, within the range of a group to understand this, and we all present different parts of it. But we're engaged because we share an interest in trying to understand and learn. Physicists are searching for new pieces of matter. There's a whole series of looking at that all other billion magicians, if started going back to ISIS, how do we commercialize the ISI database? I hate to say it, but a lot of our research is all too to a database driven by profit. Hmm. I'd be an interesting way to think about the history of the metrics, and two metrics is Garfield's attempt to try to commercialize the idea, say databases. How would that explain here all of the actions and debates that have gone on in the field for 30 years? So it's it's that reflection of what the problem might be and the fact that any one of the members of that community will have slightly different definitions. It's like you go to a church or synagogue. They go there for so common.

But I guarantee you, everybody thinks differently, slightly differently there, but they are in the same roof. So it's a very set in the evolution of problems. It's a fun thing to do because you actually see how you say, Gee, I can't solve that problem, but somebody over there has a solution that might help my problems. So I will build upon that. We're not building on the shoulders of giants. We're building on people that have made some abilities to solve bone problems and some incomplete way, and we think that might help us.

OK, I'm going to I'm going to move the topic because Caroline's been waiting for ages to ask a question and that preceded this discussion. So Caroline, do you want to ask a question?

Yes, thank you. Thanks. It's great to be here. I'm sorry, I had to come in a little bit late. And I think Andre would agree with me that most problems that we deal with day to day are presented to us by our children. So, yeah, aside from that, that's laughable. I'm sorry, but if I'm older, Carolyn is the grandchild that's quite literally crying in the next room. So Richard? Right? exactly. OK, so let me I want to ask a question. And and you know, I would like to know what people think about this. So it seems to me in reading this chapter and I need to study it more, but that, you know, really what? We're what my sense of perspective is that at some point we have an emergent order that is, you know, to a great extent precedes us, right? That we really have no control over and that at some point the emergent structures meet our kind of social system and that the social system then feeds back on the emergent structure. And that's somewhere in there. There is kind of liminal space where some freedom is is offered, but the freedom and uncertainty are combined. And so at least that's how I read it and that that at the moments of freedom and uncertainty. We also see a great deal of cultural influence there in terms of norms of behavior. And so it seems to me that one of the challenges of the book and that particularly, I think, in relation to my own interest is in innovation, particularly innovation in, you know, new ideas and new technologies. You know, if we wanted to encourage that liminal space between freedom and uncertainty, what what are the features of our meeting between determined and social structures that would increase that right?

And Loet talks about the fact that we want to reduce uncertainty. And a lot of times it's because uncertainty makes us uncomfortable. But do do we want an innovation system to actually increase that? And how would we do that or how would we begin to even think about measuring that space? So that's my question.

I have to say I'm a big fan of increasing uncertainty because I think it stimulates dialogue as anybody else got any thoughts on this?
I would just throw in a little bit of a facetious remark in the sense that the gap between uncertainty and freedom is the opportunity for creativity. Yeah. Yeah.
So how would you measure that, how would you measure?

Depends on what domain or discipline you're in. Creativity is sort of part of human intelligence or a part of if you wanted some sort of notion of understanding of utility or any number of possible measurements, but it's very much dependent on which discipline you're in. Obviously, the choreographer's notion of creativity is very different from that of a poet, which is in turn very different from that of a mathematician. These are different facets of human intelligence in my. But that's how I'm using the language of these.

I mean. Oh, I would like to up, perhaps. What do we mean by uncertainty? Because if we go in the literature and I'm thinking of Gigaton Sir and Lauren Dusten, who looked up the history of, well, if people meant by uncertainty over the last thousand years or something. So I'm raising them more as a question to your question. So what do we mean by uncertainty and also what the force or are using and maybe met the force might be helpful to get a better understanding of of what we mean. So that's my comment. Any thoughts on that?

So, so I I I think that I like the idea of your you call, you called it liminal space of this kind of this space, liminal women.
I like this. Yeah, and I was typing it. I started typing into the chair. I think to a certain extent, the freedom which is also needed. Yeah, is also illusionary because if you if you really commit ourselves to a system dynamics you saying Stasia for reminding us for the shared perspective, then then you never operate outside of a boundary. You always have boundary conditions given by by being part of something. So mathematically you would model that by adding noise. Yeah. So and that noise mathematically is an expression of uncertainty, but uncertainty can have different flavors. So we know from evolutionary theory. So mutation can be as disruptive as it can be constructive. So you create a lot of mutations and and you cannot have anything new without mutations created. Yeah, that's not possible. But that doesn't mean that any mutation created is leading to something brilliant in terms of selection. I think this is also what we can learn from the book, which is exemplified over and over again. So then the question is from a systemic point of view, how much of that space the system is willing to provide enriched kind of form without kind of without running the risk of becoming an functional? So in the when I studied statistical physics in the in the 80s, yeah. And then there was very popular. I think it was Manfred Iyang who wrote about a mutation kind of off window. But I also remember there was also an injured, an engineer and German engineer in question back. It's all the context of evolutionary algorithms. So that's very early kind of playing with with find trying to find optimal solutions for very hands on problems stretching back, try to develop a pipe in which the turbulence was lost or was almost turbulence free so that the stream of water could be better. Yeah. And then he they they literally they played around with carts, and that indicates they changed the parameters and then they built the model. Yeah. And then they would build it again and measure did the turbulence or the kind of the flux through. So and and and then I think it was also arrested back. Or maybe I can. But they then argued, if you have too much mutation. And I think a lot also wrote often about if you have too much mutation, your selection mechanism breaks down. Yes, because you cannot test all of them. Yeah. So you have. So there is no building up. It all exists next to each other. If you have too much selection, yeah, then whenever something changes, you have not enough of the crazy kind of mutation stuff to start anew. Then you also die and in between those two kind of characters? Yeah. And Skylar interruptus, you need to find an optimum. And where the optimum is, I think is is different for each of the systems we are in and how you then translate that. I know that from the U.S., but maybe Erlich knows that better. They used to have this kind of NSF used to have this kind of crazy programs.

My husband also a theoretical physicist, a high energy physicist, sometimes told me stories about it. So they had these programs. You had to submit an absolutely idiotic not of the kind of project. So, so they try to instrumentalized this kind of free floating way. Yeah. Well, and I think to bring back to the two to our to our perception that we need to have this free floating, even if we kind of not producing anything beautiful at the first glance on the first attempt that that's also needed for us. Sometimes I think we optimized ourselves, but so. So this is how I would relate in my own kind of language to to what you describe. But how to measure that, that would be interesting. The idea here, I think you started the your discussion with the notion of your background in theoretical physics or physical language and physical mathematics. I would argue. Lutes view point is that if you well, I shouldn't put it out, say this is how I interpret loot, but it's basically my own opinion as well that if you start with the mathematics of theoretical physics, you're imprisoned in a prison, which will never release you to have create the freedom of being open and compassionate and otherwise a normal human being. This language is a straight jacket, a linguistic state ticket. It paints mathematics as something firm and established and full of boundaries of this and that and rules are dotted by you, young. It's a nonsense language if you try and translated into normal human communication. And the point is that mathematics is much richer than that, vastly richer to that. And you just have to find the gaps which you seek and then find the mathematical languages in which to express them.

Andrea: I mean, this is also an interesting reflection on the history of of epistemological kind of flavors of of different disciplines. So yes, I moved from statistical physics to philosophy of science. And so but what I still what I still treasure from my statistical physics first kind of impregnation or first kind of teaching is is this is Boltzmann. So is the understanding that how you do, which is actually then at the root of complexity theory. So how you handle large scale kind of ensembles of relatively homogeneous kind of units and how you can derive phenomenological? That's the physics kind of contribution he did to how you can derive phenomenological explanations on the level of of a system. Yeah. So. Well, I think I think mathematics, I'm also not I also not think that one can do that the kind of mathematics finally determines, I think it's a weakness. I think there is an agnostic tricity, at least in the methods you use and the and the way you think. Yeah, isn't it?

Well, I would not agree with that. I really wouldn't. The notion of how you approach systems theory depends on which language you wish to express it in. And this then depends on the ontology of information and the ontology of information as part of communication is one of the major points. And this is certainly not constrained in at least as I read it to a particular scientific domain such as physics.

I'm conscious Jerome has had his hand up for ages, and he's got two points.
Yes. One to the discussions ongoing, right, not one to the prior one. So I'll start with the current discussion to not confuse people. So to the question that that Marguerita asked for that Jamie

asked, and also to what Andrea was just saying, I think that maybe an agreement also with what their agenda was saying that maybe this perspective on noise in terms of uncertainty is not always very informative when we're discussing uncertainty in social situations. Usually, I mean, correct me, if I'm wrong, we're usually talking about choice. So we're presented with a selection of choices, a menu of choices, however you want to say. And I think uncertainty to me is what arises or what exists as the perceived probability of of the events that we associated with those choices tends towards 50 percent. So I'm not sure it's a flip of a coin. And as we have more information or knowledge about the individual choices, we can restrict the choice set down to, you know, more whatever more of reasonable subdomains and say, well, the rest we can ignore, of course, then that raises the question of on the basis of what are we ignoring those choices? That's my my view on that, on that issue. Others may have different views.

I welcome the contribution on the other on the earlier discussion. I think this is really interesting. This this dichotomy that at least raises in the book between historical events and this is evolutionary dynamics which have or compliance logics, which can be various ones of. And so in terms of the question that Andrea asked, how can we determine whether there are choices that are similar or whether these are just at a superficial level, comparable problems? I think that Newt and the make may think differently would suggest that it is in the interaction of these different logics that at that the observation of similarities would arise in the sort of this is a triple helix as I understand it and that again interacts again upon the historical events themselves. And it's sort of a second order of the cybernetic event.

I like the reference and I appreciate the reference value to the writing of David Noble, who wrote, You know, in America by Design, also forces of production, a number of his other books on the interaction between them. For instance, the machine gets industry in the United States during after the Second World War, and the influence on that of the military spending say the logic of machine goods was in some sense a dependent factor variable of the funding coming from military sources that influence again how investment was going on, how innovation was going on in that industry. So, OK, I've talked enough.

Mark: OK, I suppose one of the things that is still sort of lurking said one of the key ideas here is that there is a mechanism for the construction of the selection mechanism for communication and. So it's not so much, it's not so much about, you know, we say, oh, well, they must be selected, the communications must be selected, but how is that selection mechanism constructed? Now that seems to be the really key operational question here. I mean, there is a proposal in the book as to how that's that's done. And personally, I find it very satisfying. I'm just wondering if there are any thoughts about that because it sort of ties in to what you were saying, Andre, really?
I guess I perhaps as a general comment, these are the Little Jedi will sing and relating to Andrea when we talk about the multiple systems. We're actually dealing with two very different

mathematical philosophies, and I think it's impossible to avoid discussing it and one of the multiple blatant ism and its many varieties. And now we have the intuition is that they would be a form of psychology, some of Brouwer said from the Netherlands. But then we've also the beautiful sort of activism. And so I see three very, very different engagements with mathematics. And I think that this may be those below what Judy was saying, but also how we move forward developing models that we need to check in with our interlocutors, how they think about mathematics before we actually can really make. A productive engagement with the. This is an open question that I'm raising. And so as a footnote, my background is not in cybernetics or in scientometrics or in system science. I'm coming from strategic management, but the here because I think we need some sort of cyber cybernetic or a way of thinking where we really look at the feedback loops and how everything is in some sort of bundle of feedback loops and how we think about that and how we communicate about that. So that's. Via helped organize this book reading, and I look forward to your feedback to this question, it diaries.

But I would just say at this point that discusses the selection in this sense as being different from natural selection in that I find this discussion very interesting. This distinction in the genome typical the phenotypic role within this social realm of selection versus the natural and that they are not given. So I think a lot of this has to just occur on the plane. This is my view and my reading on the historical plane. You know, we have things like social movements again, bread riots, you know, if things are not working correctly and our social systems, you know, people go to the streets. So. A judge. Many questions have been raised, and we still have many months to answer them, so I have resisted trying to answer the questions because I'm sure we will be dealing with them in the future. So I would like to introduce another question myself. Mark, at some point, um, was talking about anticipatory systems, and he seemed to be saying, I have written that down, but maybe I didn't understand it correctly. You seem to be saying that anticipatory systems use a model of the past in order to predict the future. No. That, to my mind, is not an anticipatory system, but it's a prediction system. Just like science actually is because that's the reason we build models.

For me, it is quite interesting question what is **the difference between prediction and anticipation**? And just checked in chapter on page one of the wrong because it says here anticipation as a selection mechanism and evolutions. So there is a type of of definition of participation, but it focuses on selection. So that raises for me the question what is it that we select? So if we talk at all, that's my question and I'm not expecting to. You immediately answer that, but I would raise the question Where do anticipations come from? Yeah, we can say that their predictions come from the past, but where the anticipations comes from. So.
I'm I have to apologize to my slightly careless use of language in my presentation then because I completely agree with you. And it is in its work. It is in the distinction between **incursion and hyper incursion**, and the anticipatory system is in that interference between, well, Dubois three dimensions there, which are recursion incursion and hyper incursion. But it's not in chapter one.

You've got to get to Chapter four to get that. But I think that's a much that I think that would cover your concern. So I was careless.

No, I'm not. I'm not criticizing in any sense, but I still raise the question where does it come from? Because in the definition that you just mentioned, there is no source of the anticipation. We can only say if there are certain movements, then maybe they're interacting with each other and somehow something emerges that is an anticipation. Well, I think that's it. It's not anticipation.

Well, OK. So I think in the interaction between those three dynamics. You see this this is such an important. This really gets to the heart of the argument, I feel I think yeah, because it's it's an ontology of it's it's an ontology of stratified relations and social systems between matter system and system, which does not presuppose an ontological distinction between those systems. That's why I mentioned the critical realism because the critical realism makes an honest, logical claim, which I don't think it's defensible, whereas Loet is doing something much more sophisticated because he's not presupposing a mind independent reality. But he is saying that there are strata in society. There is there, they're different. There's a dualist dynamic, which is the result of a self-organizing process in communications.

Gerard de Zeeuw:
I still have the feeling that there is something more to this issue. Mm-Hmm. For example, if I understood you correctly, but it doesn't matter whether there is a general tendency to consider the addiction as one of the aims of science. But very often people realize that there is a different process, which is called anticipation. Now, prediction always uses the past. Otherwise, it would prediction, so anticipation uses something else. Now we got to give mathematical terms to Italy. They can give dynamic terms to it, but it still doesn't explain where their anticipation comes from.

Just to give an example, we are here and there are now 24 people here. None of it is, um, well. Every one of us has a history. But the fact that we are together is independent of that history. So the fact that we are independent of that history, talking to each other actually helps us, each of us, to anticipate certain events that we can use. Maybe in some future time. So the questions that arise here and the answers given actually help us to anticipate our personal future. But it's not dependent on our past, but it's dependent on the patterns in which we actually talk to them. So I just trying to get a little bit more of the width of this notion of anticipation.

Yeah, I think this this is incredibly important. This is really this is why I feel this book is extremely important. It's a very important contribution because it is presenting an answer to this question. You might disagree with it. And there are plenty of people in the social sciences who've got different views on this. But I think it's a very, very important and original argument

for how anticipation works. My own, my own feeling is, you know, ultimately we're dealing with some kind of interference between dire chronic processes and synchronic processes. And it may be that those processes. It maybe there's something in the biology that we still need to look at. So I mean, we've got a crisis, but we know that, you know, biological systems are not. There's more to it than that.

Jaimi Hendrickx: Well, I would like to explore adaptation I've seen in the program. I will talk as well on book The Notebook. We know each other already. Also, more than 30 years, there are connections.
This is but this is wonderful. And, you know, so I think that the group is there and and obviously, I think your your reflections on this later and later in the series are going to be also very, very important. So. Well, thank you. Does anybody else got any thoughts on what Joe was just said? If I may seize opportunity was presented, I'm a wonder the relation between anticipation and imagination. And in the past, Loet and I have talked about **Freud** and the Sigmund Freud become a sociologist or not. And what I really is about is just the fantasy life of the individual mind. And so that's what I'm kind of interested in is finding the connection between the fantasy life. Or imagination? And how that translates into a productive research, constructive can be used to actually solve problems, so to say. So that was my first thought when I heard you asking your questions. Yeah.

Yes. No. I think you are very close to what I would think. That's the source of anticipation is it's still the humans, and we are able somehow to extract something out of the imagination that helps us to anticipate.

Andrea: But I I mean, I'm very much on your side concerning that we shouldn't forget the persons and I think a lot and I had a lot of discussions about where the communications are and where the persons are and the communication and what's the trigger of what. But if I understood the concept right, then there is anticipation not only on the individual level in our mind. There is also an anticipation. Which can be probably attributed to a system also that kind of sounds strange. Yeah, but there is something collectively we share. We are member of a group, a system, a society or some parts of that. And this this thing also forms that anticipation and it doesn't talk to you. It's not the orca, which kind of you can go to a temple and then it talks to you, but it expresses itself by various means. And then and that cannot be bound back two to one individual or group of individual isn't. This isn't is not correct. So you have anticipation. Also, on another level, any individual mind.

Caroline Wagner: Yes. So I wanted to follow up on Andrea’s has come out because this is my I completely agree with Andrea's comment because if we think about anticipation and ability to see something new, let's say we wanted to be able to see something new in science. We'd have to have a deep knowledge of what has come before. And so the system has to provide that

knowledge to us in order for us to see the new and be then be surprised by it. Right. So Isaac Asimov says, you know, the word in science isn't Eureka. It's Oh, that's funny. Right? That's a funny finding. Why is that the case? And that if we think about any ability to anticipate it has to be deeply rooted in history?

Otherwise, we wouldn't know. It's funny, right? How would we know that something is new or different if we didn't already know a lot about the system underlying it? But then I'm getting back to my liminal space here. Obviously, I'm kind of stuck on that today, but you know, in order to get there right, there has to be a range of possible possible findings. Right. And so we have this kind of idea of the adjacent possible right one, what is adjacent to what we know that is possible and my understanding of Loet's recursive knowledge is that we are continually kind of trying out our ideas against a whole range of possible things and then we make a choice. Now the choice, it seems to me, is the point of both history plus freedom or history, plus creativity that that is the place where we are most independent, let's say, or individual in our choice. And that then and then I think I'm saying what I said before I because the question is then how do we expand that space? If the idea is to increase the possibility the adjacent possible, then we have to first educate people to a great extent. But then we also need to leave the space for them to provide information into the system and then to find the surprise or to find the item that is new or different. And it seems to me that's how we create knowledge or how we create new information across the across that adjacent possible space.

I find this I find this fascinating, and I think hopefully over the next few weeks we'll have a chance to explore some of this. I think the creativity issue is really important. We are going to stop in five minutes, so I know Jerome's had his hand up for ages.

No, not this time. I just I find this discussion very fascinating, and many of the speakers have very interesting and creative points of view. And I also am looking forward to these discussions in the coming months and hope I will be able to dedicate the amount of concentration that's necessary. But as to what Caroline was missing, I would slightly. I was agreeing with you until you mentioned the freedom, which I'm not so fond of in this context. I would say that the logics that we learn and that we impart influence through our careers and lives, that those are the determining factors. But anyway, if you don't have to agree, we don't all have to agree on every point. I was thinking and responses Gerard's point and also this discussion of these contributions by Carolyn of the the notion of Counterfactuals that Judea Pearl has made such a central part of his research program and in recent talk that he gave. He mentions the book by the very popular book by Harari. I'm sure many of you have on your coffee table or somewhere and says, basically, Harari says, that the the key point of human intelligence is, is this ability to look into the future to sort of develop counterfactuals? And Pearl tries to develop more of a analytical framework in which this this notion of counterfactual exists and basically has three stages.

The first stage is action. You know, all maybe sentient beings, or maybe even some artificial intelligence have some form of action. You know, I carry out an action I eat, you know, I, I fly away from danger and so on. And the second stage for Perl is this abstraction into the future, which, you know, many animals have the ability to do with limited extent to do. And the third stage for for Perl is this notion that the counterfactual if I intervene in this particular context and carry out this particular action or a surgery, the potential outcomes of that are such and such versus the outcome. If I were not to carry out this particular those what he calls surgery. I think these are very particular particularly useful notions in terms of this concept of anticipation. And I think they are very much wedded to, you know, what? Know we human beings are so.

OK. Thank you, Jerome.

Richard: we got a grant. Yeah, really, really quickly. Story systems and weapons said in the past, dismissing me when I hear her calling a vote, it's the. That's really cool idea. What's missing in what I think is an insistent anticipation is the emotion. It's the joy. It's what we feel. And how we essentially have. How important that is to the entire process. It's not straight, rational. So when you look at the predictions, for me, a prediction has no real Typekit. When I hear the word anticipation I can see with my body. I can feel it in my heart. It's part of in initiative, we're following this, that, and that's why I'm interested in the rest of this chapter. The feeling in my heart is implicitly, I've noticed in all this conversation. So I'm curious about how that plays itself out more in the next couple of chapters. But I don't want us to forget the fact that there's a heart involved here.

Yeah, I'm going to go south, plug the paper that Loet and I wrote about music, but she's trying to trying to address precisely this question. Yeah. Look, folks, we need to stop and we have got plenty of time to explore this further. But thank you so much for your time. It's been a wonderful discussion and it raises so many issues. And I'm just. Jamie, do you want to say anything but I to Loet if you just want to say something? Just as we sign off today, because we will continue this on the Google Group and note will engage on that group.

Mark: But so Jamie, I was just going to mention I put the link to the Google Group in the chat room for those who haven't signed up yet. And we will dispute all the questions that have been raised in the group too, so people can connect and think further. Now, Loet, let's give you the the last word or the first word of the day.

Where it's loose. I'm here, and yeah.

Yeah, loads.

Oh, I'm sorry. I was not. I'm just fine with it. It's too much to react at this moment.

OK. All right. Well, well, thank you. Thank you, everybody for coming. Thank you. Load for writing such an amazingly powerful book. And it's very interesting how our discussion is so concentrated misses the power of of having effectively a code of communication, which is in the book. And so our communications are being coordinated by that. That's a very powerful thing, it seems to me. So cool. Thank you ever so much. And we'll see you again. Next time, I'll post the videos up and you can watch it all again.

OK. Everyone's wearing red today, it's almost like we had to coordinated the uniforms. Yeah, well, thanks, Jamie. Yeah. All right.

Thank you so much. See you again soon. Thank you. Bye bye. But I.

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Loet Leydesdorff, on the basis of the machine-ranscript by Amberscript.
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