ANTHROPONIX: UPCYCLING URINE AS COLLECTIVE DESIGN PRACTICE

Markus Wernli

Integrative flourishing stems from patterns of eating, living and engaging with the world that promote well-being and a healthy environment. For proliferating integrative flourishing, we need to explore novel, design-led collaborations for remaking artifacts and human organization. In this study, participants-cum-makers fermented their urine for a substrate in which to grow lettuce (*Lactuca sativa*) and thereby create a simple material relationship between their bodies and the plants. Process documentation and interviews with the twenty-two participants evaluated the key aspects that promoted their social engagement and thriving during the two-month experiment. The analysis revealed how jointly encountered technical ambiguity stimulated curiosity and how a unifying purpose promoted adaptive co-creation and mutual support. In synergetic dynamics, these factors contributed to the integrative flourishing in the waste upcycling collective. The findings indicate the importance of recursive self-regulation following interaction with an 'other.' The study outlines a systemic model for practitioners' use to orient collectivist design that positively affects environmental relationships.

Human Waste as Social Design Material

The vision of using resources sparingly through upcycling endlessly and starting with one's bodily metabolism has propelled this design research. Unlike biological systems that function in cycles – plants growing in the soil; animals eating plants; excrements replenishing soils – our industrial systems, including sanitation infrastructures, are mostly linear. In 2015, humans harvested 22.2 billion tons of biomass to feed themselves, but recovered only 3 billion tons, or 12 percent, of the total through recycling, composting, or land application (Kunzig 2020). It means that after human needs like feeding and excreting are met, hard-won resources are squandered. A third of all food is spoiling before reaching eaters, while most nitrates and phosphates drift into oceans, landfills, or the atmosphere.[1] Experts see this 'circularity gap' (de Wit et al. 2018) in our shared metabolism with planet Earth as the root cause behind all environmental problems (Perolini and Fry 2012).

William Everdell (1997, 351) describes the essence of our linear, wasteful culture 'as the postulation of ontological discontinuity.' It means that humans tend to understand reality by cutting it into discrete fragments and studying its parts

in isolation. This selective perception helps to reduce the complexity of the world by distinguishing between an intentional 'figure' and its un-noticed, contextual 'ground' (Logan 2011). Yet our ecological crisis shows how the broader context is never really separable, and 'the whole is other than the sum of its parts,' as Gestalt psychologists would describe it (Koffka 1936, 176). By reconsidering the human role in life-regenerating biological circulations, the conundrum thus goes beyond the respective socio-material processes through which we organize our lives, nourish our bodies, and manage our metabolic wastes, including urine.[2] While conventional design 'solutions' like flush toilets may be efficient waste removers, they make it prohibitively costly to recover essential agricultural nutrients. Moreover, they disconnect peoples' mindsets from the biophysical foundation they depend on (Waltner-Toews 2013).

Questions of (Un)Desirability

Why would a social designer implicate urban citizens in sanitation matters when long-established hygiene regimes so conveniently are ridding us of our 'dirt'-expelling, mortal body? The justification is twofold. *Firstly*, reconnecting with our bodily selves as holistically functioning Earthlings is not about trading a purity ideal for messy existence but about better integrating and embracing both aspects at the same time. In this health-promoting contradiction of living with the ambiguities of our impure bodies inside purification regimes, we can establish a middle ground for learning to relate to each other through the very impurities that make our lived existence possible (DuPuis 2015; Caslav Covino 2004). In this sensibility, defecating – like other forms of disposal – makes us ambiguously human since we start addressing the qualities and impacts of wasting that range from mutually beneficial to detrimental. Turning to the needs of the body in identity formation and decision-making exposes our ruling bodily self that is simultaneously ruled by others. It is about thriving *together* rooted in codependency. *Secondly*, since the arrival of sewage infrastructures, applied research in biomass recovery like composting or fermentation has mainly been neglected over the last century (Waltner-Toews 2013). Making room for alternative and diverse ways of waste handling seems prudent when in the face of climatic-environmental shifts, we need to feed and clean our growing populations much more resourcefully than ever before.

Since given (infra)structures enact essential functions, designing alternatives prompts the question of what could motivate the community to take on these material responsibilities (Hawkins et al. 2019). In response, this research sought a participative inquiry that coupled material-technical practice with a conversational search forward. Here affirmation meant to confront acceptance issues and reframe local circulations of human waste from indifferent abjection of the body into a gateway

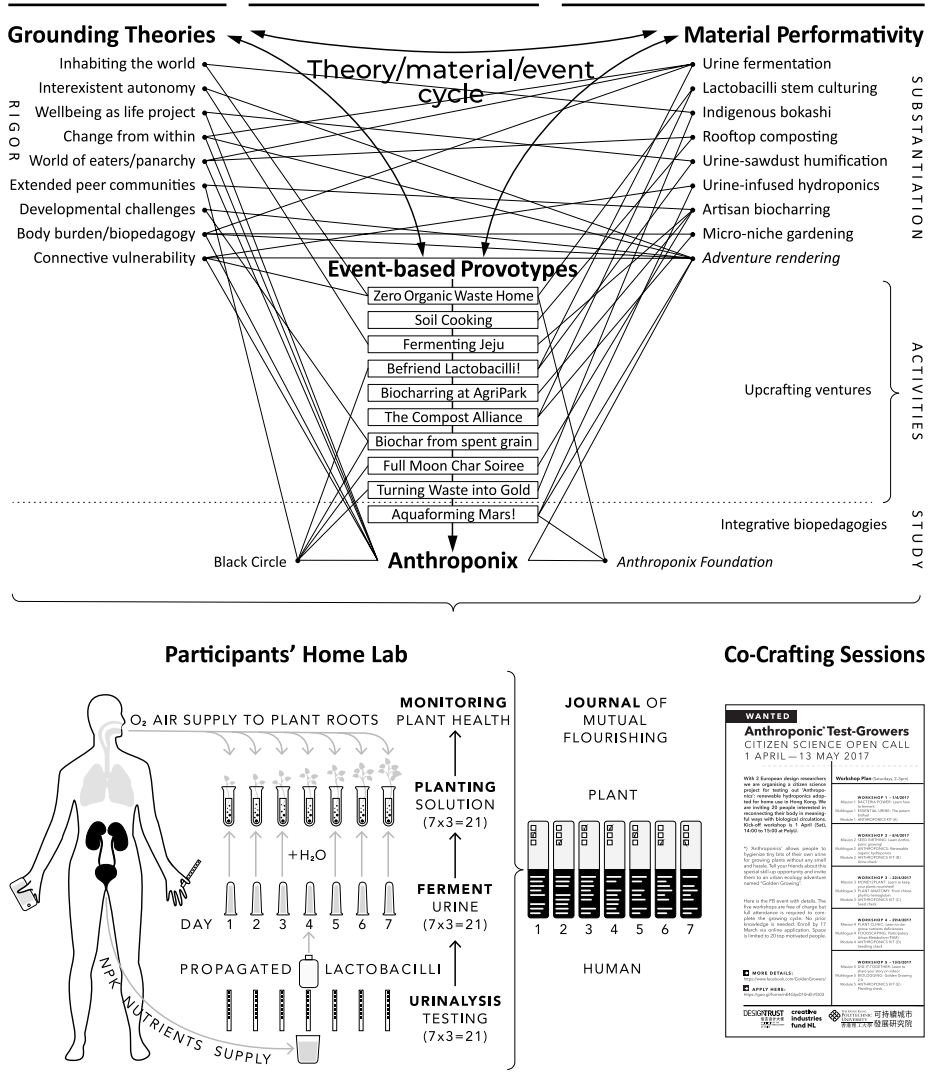
to 'deeper commitment' (Carolan 2016) with living systems on relational and durational terms. Such research on designing yet-to-be social systems is asking questions in the category of desire and desirability. These are undecidable questions that cannot be answered by the collection of evidence but by what the collective deems as possible, significant, or desirable (von Foerster 2003, 293). The co-designing researcher here worked both as instigator and facilitator within the community, which inevitably entails power relations and conflicts. Thus I was challenged to account for my participative involvement in ways that produce useful source material – ideas, theory, knowledge – for others interested in co-designing society (Richards 2019, 274–5).

Methods of Performative Exploration

Following up on these questions, I employed action research (Heron and Reason 2001) in playful and profound ways for collaboratively exploring the agri-cultural reintegration of human waste, in particular urine. This led to a 'provotypes approach' (Mogensen 1992), whereas a fluid cohort of citizen designers initiated a series of small-scale social experiments for testing and feeling out meaningful avenues for overcoming the prejudice surrounding the reuse of human 'waste.' Through short, action-based change experiments, different cultural framings of the topic were explored and deliberated in-the-doing, as illustrated in Figure 1. These 'up-crafting ventures' (Wernli 2018) included educational 'soil cooking' workshops in the park, or speculative 'urine donation rallies' for future Mars colonialization in the gallery, which proposed resourceful ways of dealing with human 'waste' through their revelatory defamiliarization, and provided cycles of action and reflection.

This approach grounded the research with local insight by hosting social events, guiding theories from dialog with the research community, and technical feasibility from biomass cultivation experiments in my rooftop garden. My research evolved from a continuous *Material/Theory/Event Cycle* [Figure 1] that started with the specified topic of exposing our biophysical inter-existence, through evaluating collective actions that reach beyond pre-established formulations. Continually engaging with local and personal concerns helped test the adequacy of the methods, shape field experiments, and scrutinize the relevance of theoretical tools towards alternative human arrangements that resonated with the situation and conditions at hand (Fletcher and Tham 2019).

Initially, I sought direct engagement with established organizations in education, industry or government, only to realize that in the institutional outlook, drivers for pro-environmental conduct are likely tied to incentives or pre-defined value propositions. This bias can impede systemic change, since personal action is made dependent on external standards or given precedents – thereby are neither imaginatively engaging nor radically expanding the possibilities (Bollier 2016). My research,



1 Work Flow and Bio-Pedagogical Methods: The methods employed constant-comparative, mutually informing oscillation between theory discovery and material experimentation for configuring public activation events, which gradually shaped the two-month-long, bio-pedagogic ANTHROPONIX study.

therefore, took on a decidedly adaptive orientation for overturning the stigma attached to human waste, and making it into a joint quest for direct sovereignty and control over the spheres in everyday life that matter most to people: healthy eating, personal fulfillment, and relatable others.

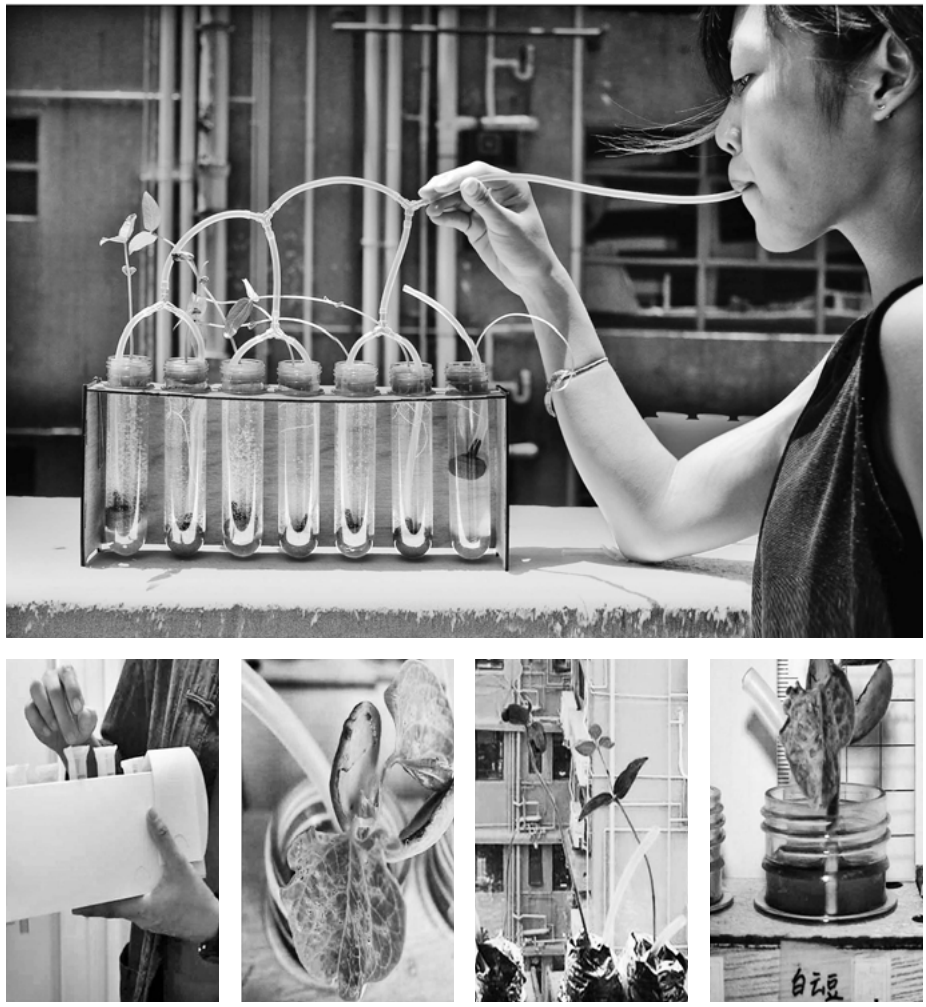
Reframing from Collaborative, Disciplinary Crossover

Rehabilitating human waste as worthy co-creation material became viable over time through applied collaboration with sanitation microbiologist Nadejda Andreev, horticultural engineer Henrique Aiveca Sanchez and industrial designer Sarah Daher. This disciplinary crossover made it possible to prototype a miniaturized, urine-powered plant growing system for household use that combines convivial techniques of biomass nurture with science-assisted monitoring for the processes involved (Andreev et al. 2017). This epistemological complementarity helped to 'contemporize' age-old resource recovery skills. It meant to uphold the values of the handmade. Bodily sensing capabilities or cultural heritage (Ihde 1978), in deliberate combination with the ubiquitous and dematerializing efficiency of digital technologies (Pallasmaa 2009), can suspend the limiting schisms of tradition versus progress, and creativity versus conservation for loosening their operational confines (Ravetz et al. 2013).

Admittedly, time restrictions in this three-year short doctoral research did not allow us to thoroughly test all technical procedures involved, because we were dealing with bacterial successions, plant growth cycles, and seasonal conditions. Since the ensuing study became technically unstable, it was emblematically named ANTHROPONIX as in 'human-powered, hard labor.' Since the outcomes could not be guaranteed, the interested public was invited to an 'urban metabolism adventure,' and the participants' role as *alpha testers* and co-researchers was communicated up front. This candidness allowed us to carve out a protected space for shared exploration and penetrating deeper into the issues underlying our socio-natural disconnect. Framed as a bio-pedagogical laboratory in everyday life, knowledge and transformation potential could be produced here through insightful mediation of the body's biophysical processes (Halse 2009; Foucault 1979, 47–8) for perceiving one's consequential relation with the environment.

A Constraint-oriented Co-creation Experiment

By recovering human urine as fertilizer for crops as part of a collective conversation, the ANTROPONIX study proposed an approach to design that starts with the question of what we want to avoid as consequences of our designing. Participants in the eight-week-long study became conditioned to ward off undesirable results from their cumulative actions (Fischer and Richards 2017) – like jeopardizing plants through unhealthy eating habits or compromising the overall research trajectory through lack of personal attention. Inspired by Joseph Beuys' '7000 Oaks' venture (Eichel 2010), ANTROPONIX evolved around the collectively redistributed material responsibility for precluding conventional responses and instilling urgency where new ways of thinking and acting can emerge. Inside this constraint-oriented design



2 Participants Documenting ANTHROPONIX-in-progress: The ANTHROPONIX study enrolled 22 participants and entailed a simple material relationship between humans and plants that grew on fermented urine specimens accompanied by food journaling and scientific monitoring of substances involved.

stance, my research evaluated the social dynamics behind navigating desirability and undesirability amid the unpredictability of this urine-cycling experiment, as indicated in Figure 2.

ANTHROPONIX shaped up to a university-endorsed work alliance (Sonne and Tønnesvang 2015) with twenty-two Hong Kong households in spring 2017. Participants answered a public call to become *test growers* in urine-powered, water-based

horticulture, as indicated in the *Bio-Pedagogic Work Flow* (Figure 1, bottom). They agreed to collect, examine, and ferment daily 20ml samples of their morning urine into fertilizer for growing lettuce. In urine fermentation source-separated, fresh urine is infused with propagated lactic acid bacteria – generated from sauerkraut – thereby stabilized and odor-neutralized by acidification over three weeks in airtight containers. Unlike industrialized biomass capture, the living processes in fermentation necessitate bargaining relationships with unsafe partners for invigorating the culture's overall resilience (DuPuis 2015). Each fermenting urine specimen in ANTHROPONIX became part of an annotated self-examination passage (Meiselman and MacFie 1996) that involved medical dipstick testers ('urinalysis'), diet monitoring, and plant development tracking. Participants consolidated this into a detailed food diary, *The Journal of Mutual Flourishing.* For access to mutual assistance, a text messaging group was established that ensured continued connectivity across the participating households over the eight-week-long period.

ANTHROPONIX was structured around five biweekly co-creation sessions, each with a thematic focus, such as nutrients fermentation, water-based horticulture, and comparative human/plant anatomy. The sessions consisted of guided peer-to-peer exchanges, lectures to introduce technical concepts, and skill acquisition with the horticultural contraptions – made up of modular components, they were handed out in parts, one per session. This modularity required participants to attend every session in order to secure access to tools, materials, and knowledge needed for advancement. Participants were asked to bring their material experiments back to the sessions regularly for joint consultation. Since most of the ANTHROPONIX activities took place at the homes of the participants, they had to maintain a good rapport with suspicious household members, obscure peers, exuberant bacteria, and volatile plants. This material vibrancy (Bennett 2010) required close attention to processes – rather than ideals – while bearing with the consequences of previously made decisions, which inherently entailed dexterity-influenced judgment and risk-taking (Pye 1968) for every urine fermenter.

When an adverse combination of out-of-season seeds, hastily down-scaled planter size and insufficiently aerated urine concoctions made it challenging to grow anything at all, which tested the resilience of participants and facilitators. Yet despite the technical shortcomings, all involved remained, for the most part, fully dedicated and enjoyed the shared struggle over the two months or longer. While growth in plants was stunted, people prospered in the expansion of harm-awareness, cascading of purpose, and accelerated learning. Precisely, the humbling limitations gave way to 'play with the imperfect' (Gaver et al. 2003), which could engender a 'feeling of shared ownership' (Muller 2002) through direct appropriation or intervention, as depicted in *Participants' Progress Documentation* (Figure 2). Shared ownership in joint unpredictability derives from the flattening of power relationships between the researchers and the collective. As researcher-cum-facilitator, I had to become explicit about my complete involvement with the collective, where

the status of the design expert is replaced with 'designing citizen' or 'citizen designer' (Brown et al. 2010) inside a peer group. By being honest about our inability to live up to expectations, and clearly articulating early on what we did *not know*, my co-facilitating team made room for being led and corrected by participants. The collective experience of obstacles, frailty, and 'impotentiality' (Agamben 2011) was essential, since avoiding them would have also prevented the full gamut of positive emotions. This disarming genuineness helped to let go of external impositions, thus instilled courage for inventive adaptation from *within* the participating person, household, and group.

Eventually, participants' trouble-shooting efforts were not in vain. Instead, they provided technical pointers for improving the urine growing system and conducting productive follow-up trials that provided a sense of accomplishment and a late win for all involved. ANTHROPONIX became a niche platform for expanding the limitations of institutional frameworks and testing out practices of societal change. A higher-order collaboration that reaches beyond knowledge transfer and explores action potential into a previously unknowable territory requires close attention to the quality of relationships and team consciousness (Wood 2010). The co-creation of research and outcomes depends on the quality of emergence from inputs and synergies that is unpredictable when setting out. Such complexity makes co-creation and interdisciplinarity challenging to grasp and implement due to the stern and longstanding work this entails. Possibility-opening co-creation is a practice situated squarely in the middle of complexity, where decisions are made on the go; thus, relevance stems from grounding in a specific context, engaging multiple stakeholders, and drawing on other contexts. Therefore research with emphasis on co-creation processes is difficult to empirically classify, measure, or annotate and thus notorious for lacking rigor and proper knowledge manifestation (Agnew 1993; Fletcher and Tham 2019:34).

In response, I developed an analytical model for approaching the emerging aspects of participants' observable existential journeys by reconciling them with concepts drawn from neurophysiology, humanist education, developmental sociology, design cybernetics, and motivation research. This 'pluriversal' (Escobar 2018), multi-centered modality, was gradually developed and articulated into *Co-creation Diagraming* (Figure 3). By tracing the existential expressions and journeys of a person in correspondence with the group and evolving situation, this psychodynamic annotation format offers a conversational tool for directing attention to contingencies in joint creative processes. In this approach to analysis, social engagement, adaptation quality, and kinesthetic-affective learning in person and cohort become 'challenges by choice' (Schoel et al. 1988), with the self-obligation anchored in the thriving of the whole. By embedding assessable efforts, observable conduct, and experiential interpretation into iterative co-creation diagramming, the quality of co-regulation dynamics in response to the situation can be mutually reflected between all involved.

Findings and Reflections

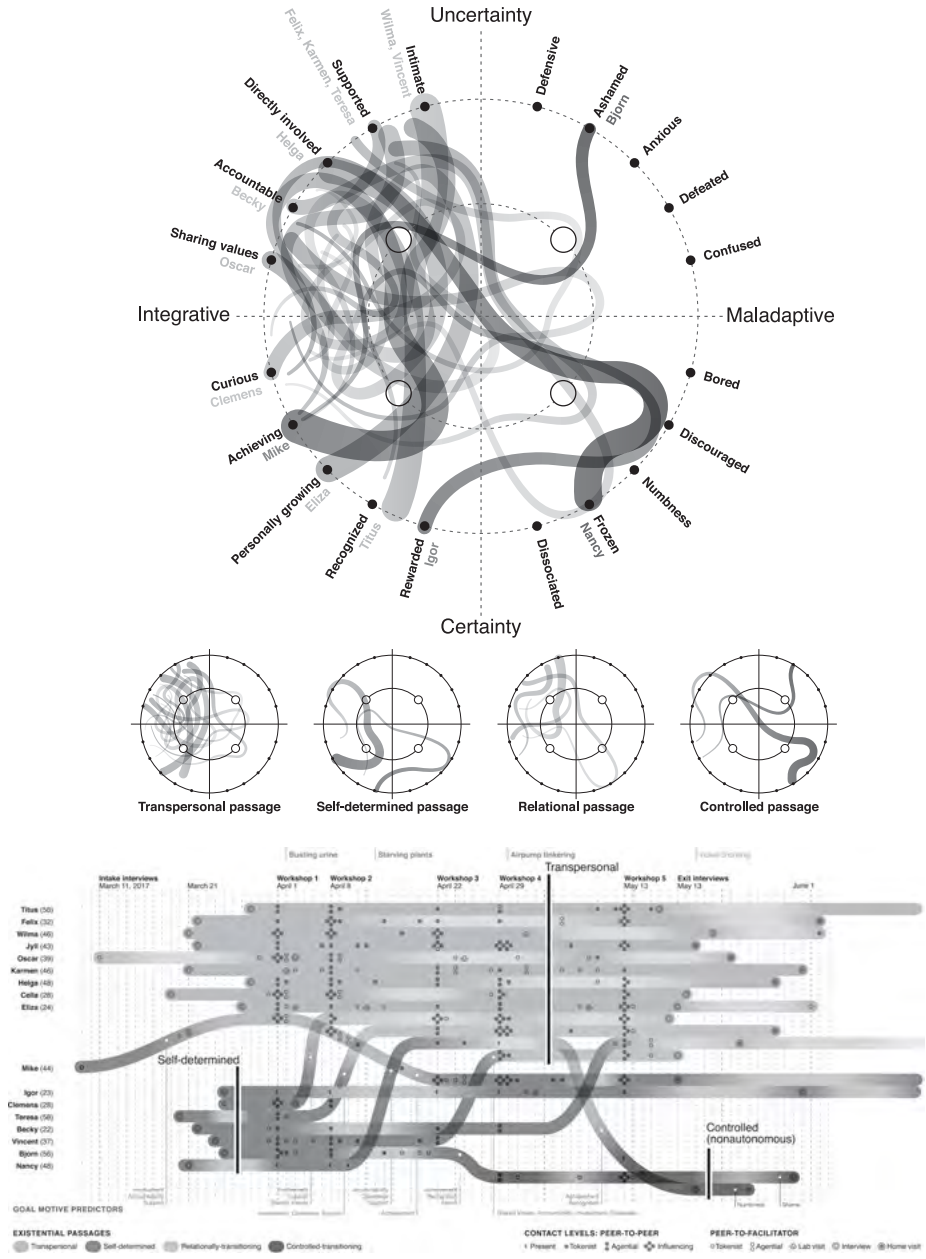
The findings from the ANTHROPONIX research indicate how the collectively encountered uncertainty, together with the self-contracted, urine-integrating goal pursuit, created a supportive, failure-permitting arena conducive to sociality, inventiveness, and rich emergence of meaning. Here close attention to mutual ephemerality and frailty became the catalyst for deeper insight (exposition of self) – thus the basis for more bodily informed, kinesthetic-affective exchanges with the environment (composition with otherness). The research outcome confirms Emmanuel Levinas' conception of 'inhabiting' the world, where person and group are constituted within the simultaneous connectedness to both self and otherness. Paul Harrison (2007, 643) refers to this inter-existent dynamic as 'heteronomy', which was analyzed by rendering co-creation dynamics, as shown in Figure 3.

Constraint-oriented co-creation, therefore, is not fixated on learning from the external world. Instead, leaps of insight derive when people can reconcile the present conditions with the significance of their possible responses. Albert Borgmann (1995, 39–40) refers to this confidence-building in the emergent here-and-now as 'commanding presence.' Awareness routines like stipulated journaling, good social rapport, and multimodal tech-engagement brought the focus of attention and trust in what *emerges* during the ANTHROPONIX study. This affective vigilance generated an arena of mutual care and fulfillment (Praetorius 2015) despite a technically doomed mission.

Tom Atlee (2009) indicates how self-interest in the welfare of the overall condition is at the heart of durable flourishing. Commitment in ANTHROPONIX stemmed from the fragile coordination between the unifying call for duty (contributing to ecological health), and the pleasurable desire of making sense (finding personal closure), where neither element was driving each other out (Ryff and Singer 2008). It meant that the efforts could be justified as long as the venture was desirable, which also defined its 'boundary judgment' (Findeli 2010) – the scope of intensity and duration deemed appropriate for participating or not.

Advancement in complex issues depends on confronting challenges deliberately for circumventing the invisible operational logic behind them, since such norms or paradigms influence everything we think and do, both as individuals and as communities. ANTHROPONIX was energized by the urgency and scale of change that is necessary for tangibly enacting the paradigm of flourishing together over time. In its intransitive meaning, the word *flourishing* postulates the ostensible signaling for changing course. Such a 'call to arms' toward co-thriving is then about gaining critical awareness of the various perspectives in complexity that incur the least amount of harm. The value-explicit desirability framework that directed this research included diverse knowing, co-creation, action research and recursive awareness practice for supporting simultaneously the self and the world.

Engaging with fundamental change causes resistance that typically entails ridicule, redirecting attention ('whataboutism'), discrediting the messenger or



3 Co-creation Diagramming: The analysis visualized participants' experiential passages in chord diagrams, which depicts an overall prosocial and cohesive group (strokes concentrated in the upper-left segment of the chord). The Sankey diagram (bottom) contextualizes these experiential passages on the shared timeline of events and encounters.

reverting to the dominant paradigm to find explanations (Fletcher and Tham 2019). Behind this resistance is the avoidance of relinquishment – the loss of extinct species, acquired lifestyles, fundamental belief systems, and what it means to be human today (Bendell 2018). Overcoming this impediment requires more courage than ever before, expressed by resourcing ourselves with socially, mentally and physically affirmative practices. Such resourcefulness practice is located within 'new social design' (Koskinen 2016, 28), recent design approaches where social matters and harm-aware responses are of primary concern above material outcomes. In this conception, desirability-oriented work seeks its esthetic propensities in the creative tension of the agonistic and convivial. By implicating disparate parties in durational collaboration, the multiform value finds affirmation in the sociable for pursuing adversarial strategies (DiSalvo 2012) and pulling marginalized issues back into the everyday domain.

In Conclusion

ANTHROPONIX was about making human waste *re-source-able* into a convivial proposition for holding conversations on its desirability, experimenting with neglected biomass upcycling practices, and inviting self-organizing forms into our living arrangements. As the consequences of human activity become more acute and complex, the understanding of co-creation processes and collective thriving is a matter well worth understanding, since problems and opportunities presented to designers require the expertise of manifold disciplines and affect a myriad of intended beneficiaries. Collectivized waste intervention, co-creation diagramming, and the dynamic tension of curiosity underlying them, can help foster flourishing-oriented designing as we are entering increasingly volatile futures and territories of the unknowable.

1 The human organism excretes up to 80 percent of the nutrients ingested. With appropriate measures in place, the excess nutrients in urine per year and per capita would be sufficient to grow up to 230 kg of cereals (Heinonen-Tanski et al. 2010; Wolgast 1993).

2 The term 'waste' for naturally degradable, regenerative biomass is here considered as inadequate human framing, since it is the result of systematic social constructs and disconnects, as Mary Douglas (1966) reminds us.

References

Agamben, Giorgio (2011). *Nudities*. Stanford: Stanford University Press.

Agnew, Kenneth (1993). 'The Spitfire: Legend or History? An Argument for a New Research Culture in Design.' *Journal of Design History*, *6*(2): 121–130.

Andreev, Nadejda, Mariska Ronteltap, Boris Boincean, Markus Wernli, Elena Zubcov, Nina Bagrin, Natalia Borodin, Piet Lens (2017). 'Lactic acid fermentation of human urine to improve its fertilizing value and reduce odor emissions.' *Journal of Environmental Management*, (198): 63–69. https://doi.org/10.1016/j.jenvman.2017.04.059.

Atlee, Tom (2009). *Reflections on Evolutionary Activism*. *CreateSpace, Seattle, WA*. Seattle: CreateSpace.

Bendell, Jem (2018). 'Deep Adaptation: A Map for Navigating ClimateTragedy.' *IFLAS Occasional Paper*, *2*, 36. www.iflas.info.

Bennett, Jane (2010). *Vibrant matter: a political ecology of things*. Durham, NC: Duke University Press.

Bollier, David (2016). 'Commoning as a Transformative Social Paradigm.' *The Next System Project*, 23. https://thenextsystem.org/commoning-as-a-transformative-social-paradigm

Borgmann, Albert (1995). 'The Nature of Reality and the Reality of Nature.' In *Reinventing Nature? Responses to Postmodern Deconstruction*, edited by M. E. Soule & G. Lease. 31–46. Covelo: Island Press.

Brown, Valerie, John Harris, and Jacqueline Russel (2010). *Tackling Wicked Problems: Through the Transdisciplinary Imagination*. London: Earthscan.

Carolan, Michael (2016). 'Adventurous food futures: knowing about alternatives is not enough; we need to feel them.' *Agriculture and Human Values*, *33*(1): 141–152. https://doi.org/10.1007/s10460-015-9629-4.

Caslav Covino, Deborah (2004). *Amending the Abject Body: Aesthetic Makeovers in Medicine and Culture*. Edited by M. A. Massé. Albany: State University of New York Press.

De Wit, Marc, Jelmer Hoogzaad, Shyaam Ramkumar, Friedl Harald, Annerieke Douma (2018). *The Circularity Gap Report: An analysis of the circular state of the global economy*. *Circle Economy*. Amsterdam.

DiSalvo, Carl (2012). 'Adversarial Design as Inquiry and Practice.' *Adversarial Design*. Boston: MIT Press.

Douglas, Mary (1966). *Purity and Danger: An Analysis of the Concepts of Pollution and Taboo*. London: Routledge.

DuPuis, Melanie (2015). *Dangerous Digestion: The Politics of American Dietary Advice*. Oakland, California: University of California Press.

Eichel, Hans (2010). 'Eine geniale Provokation.' Kassel: 7000 Eichen. https://www.7000eichen.de/?id=23.

Escobar, Arturo (2018). *Designs for the Pluriverse: Radical Interdependence, Autonomy, and the Making of Worlds*. Durham & London: Duke University Press.

Everdell, William (1997). *The First Moderns: Profiles in the Origins of Twentieth-Century Thought*. Chicago: University of Chicago Press.

Findeli, Alain (2010). 'Searching for Design Research Questions: Some Conceptual Clarification.' In *Questions, Hypotheses & Conjectures: Discussions on Projects by Early Stage and Senior Design Researchers*, edited by R. Chow, W. Jonas, and G. Joost. 286–333. Bloomington: iUniverse.

Fischer, Thomas, and Laurence Richards (2017). 'From Goal-oriented to Constraint-oriented Design: The Cybernetic Intersection of Design Theory and Systems Theory.' *Leonardo*, *50*(1): 36–41. https://doi.org/10.1162/LEON_a_00862.

Fletcher, Kate, and Mathilda Tham (2019). *Earth Logic: Fashion, Action, Research, Plan*. London: The JJ Charitable Trust.

Frayling, Christopher (1993). 'Research in Art and Design.' *Royal College of Art Research Papers*, *1*(4): 1–5.

Gaver, William, Jacob Beaver, and Steve Benford (2003). 'Ambiguity as a Resource for Design.' *Proceedings of the Conference on Human Factors in Computing Systems – CHI '03*, (5): 233. https://doi.org/10.1145/642651.642653

Halse, Christine (2009). 'Bio-Citizenship: Virtue Discourses and the Birth of the Bio-Citizen.' In *Biopolitics and the 'Obesity Epidemic': Governing Bodies*, edited by J. Wright & V. Harwood. 45–59. London: Routledge. https://doi.org/10.4324/9780203882061

Harrison, Paul (2007). 'The space between us: Opening remarks on the concept of dwelling.' *Environment and Planning D: Society and Space*, *25*(4): 625–647. https://doi.org/10.1068/d365t

Hawkins, Guy, David Boarder Giles, Catherine Phillips, and Alex Zahara (2019). 'Myths of the Circular Economy.' *Discard Studies*, November 18.

Heinonen-Tanski, Helvi, Surendra Pradhan, and Pälvi Karinen (2010). 'Sustainable sanitation: A cost-effective tool to improve plant yields and the environment.' *Sustainability*, *2*(1): 341–353. https://doi.org/10.3390/su2010341

Heron, John, and Peter Reason (2001). 'The Practice of Co-operative Inquiry: Research 'with' rather than 'on' People.' In *Handbook of Action Research: Participative Inquiry and Practice*. 179–188. London: Sage. https://doi.org/10.2307/2392246
Ihde, Don (1978). *Technics and praxis: A philosophy of technology*. Dordrecht and Boston: Reidel.
Koffka, Kurt (1936). *Principles of Gestalt Psychology*. London: Kegan Paul, Trench, Trubner.
Koskinen, Ilpo (2016). 'Agonistic, Convivial, and Conceptual Aesthetics in New Social Design.' *Design Issues*, *32*(3). https://doi.org/10.1162/DESI.
Kunzig, Robert (2020, March). 'Is A World Without Trash Possible?' *National Geographic*. https://www.nationalgeographic.com/magazine/2020/03/how-a-circular-economy-could-save-the-world-feature/.
Logan, Robert (2011). 'Figure/Ground: Cracking the McLuhan Code.' *Compós: Revista Da Associaçao Nacional Dos Programas de Pós-Graduaçao Em Comunicaçao*, *1*(3).
Lupton, Deborah (2018a). ''I Just Want It to Be Done, Done, Done!' Food Tracking Apps, Affects, and Agential Capacities.' *Multimodal Technologies and Interaction*, *2*(2): 29. https://doi.org/10.3390/mti2020029.
— (2018b). 'Vital Materialism and the Thing-Power of Lively Digital Data.' *Social Theory, Health, and Education* (May). https://doi.org/10.13140/RG.2.2.13191.09129.
Meiselman, Herbert, and Haliday MacFie, ed. (1996). *Food Choice, Acceptance, and Consumption*. London: Chapman & Hall. https://doi.org/10.1007/978-1-4613-1221-5.
Mogensen, Preben (1992). 'Towards a Prototyping Approach in Systems Development.' *Scandinavian Journal of Information Systems*, *4*: 31–53. https://doi.org/10.7146/dpb.v21i412.6725.
Muller, Michael (2002). 'Participatory Design: The Third Space in HCI.' In *The Human-Computer Interaction Handbook: Fundamentals, Evolving Technologies, and Emerging Applications*, edited by J. A. Jacko and A. Sears. Hillsdale, NJ: Lawrence Erlbaum Associates.
Pallasmaa, Juhani (2009). *The Thinking Hand: Existential and Embodied Wisdom in Architecture*. London: Wiley.
Perolini, Petra, and Tony Fry (2012). 'Home Eco-Nomy: Dwelling, Destruction, and Design.' *Design Philosophy Papers*.
Praetorius, Ina (2015). 'The Care-Centered Economy: Rediscovering What Has Been Taken for Granted.' *Heinrich Böll Stiftung Publication Series Economy + Social Issues*, *16*.
Pye, David (1968). *The Nature and Art of Workmanship*. London: Cambridge University Press. https://doi.org/http://dx.doi.org/10.1016/B978-0-444-40746-7.50009-2.
Ravetz, Amanda, Alice Kettle, and Helen Felcey, ed. (2013). *Collaboration through Craft*. London: Bloomsbury.
Richards, Laurence (2019). 'Cybernetics and Society Redux: The Necessity of Design.' In *Design Cybernetics: Navigating the New* (Design Res), edited by T. Fischer and C. M. Herr. Cham: Springer.
Ryff, Carol, and Burton Singer (2008). 'Know thyself and become what you are: A eudaimonic approach to psychological well-being.' *Journal of Happiness Studies*, *9*(1): 13–39. https://doi.org/10.1007/s10902-006-9019-0.
Schoel, Jim, Dick Proudly, and Paul Radcliffe, ed. (1988). *Islands of Healing: A Guide to Adventure Based Counseling*. Hamilton, MA: Project Adventure.
Sonne, Mikael, and Jan Tønnesvang (2015). *Integrative Gestalt Practice: Transforming Our Ways of Working with People*. London: Karnac Books.
Von Foerster, Heinz (2003). *Understanding Understanding: Essays on Cybernetics and Cognition*. New York: Springer.
Waltner-Toews, David (2013). *The Origin of Feces: What Excrement Tells Us About Evolution, Ecology, and a Sustainable Society*. Toronto: ECW Press.
Wernli, Markus (2018). 'Adventurous Upcrafting Ventures.' *Cubic Journal: Design Social*, *1*, 210–213. https://doi.org/10.31182/cubic.2018.1.013.
Wolgast, Mats (1993). 'Rena vatten: Om tankar i kretslopp' [Clean water: About tanks in circulations]. *Creanom HB, Uppsala (in Swedish)*: 186–189.
Wood, J. (2010). 'Co-designing Team Synergies within Metadesign.' *'Young Creators for a Better City and a Better Life' CUMULUS Conference:* 1–12.