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Predicting and Shaping or How to Close the Future

Christina Vagt

Numerous apps on my smart phone tell me what to do: drink more water, exercise more, sleep more, spend less money, get your mammogram done. All of these encouragements and reminders are good for me and my physical, mental, or financial health. I chose to use them (and to frequently disobey them) willingly because life is complicated and I tend to forget about these things. Nobody coerces me into it.

My decisions to rely on behavioral technologies is the result of good behavioral design of user-oriented technology, so called »persuasive computer technologies«.[1] Behavioral design works so well because it is human-centered, has a low entry threshold, and promises its user/consumer to achieve »personal« goals in productivity, diet, physical fitness, or personal finance. One of its oldest and most prominent fields of application is education, and as a result the interaction between me and my students in large undergraduate classes takes place mostly via digital technology that aims at producing certain behaviors and preventing others:

I take their attendance by making them use a little handheld device called »iClicker«. iClicker hardware is owned and distributed by a private company, which does not have a contract with my university but nevertheless has a monopoly on »radio frequency classroom respond systems« on our campus. Students have to pay around $ 60 for their device while the teacher's package is free (lowering the threshold to use it). IClicker is fully integrated in our open access online learning platform based on the open source software »moodle«. Moodle allows me to track course-related online activities of my students and iClicker enables me to measure their in-classroom activities: are they paying attention to the lecture, did they do the reading, etc.? The students don't have a choice when it comes to digital learning environments, whereas I still do. And I chose to, because the administration of modern college education is complicated and I am neither a good book keeper nor a good warden by nature.

1 BJ Fogg defines persuasive technology as »any interactive computing system designed to change people's attitudes or behaviors. For example Amazon doesn't just process orders, it attempts to persuade people to purchase more products«. BJ Fogg: Persuasive Technology. Using Computers to Change What We Think and Do, Amsterdam et al. 2003, p. 2.

Whether digital learning platforms as well as health, productivity, and accounting apps are actually useful for the users/consumers is an open question, but I am quite certain that the monetary cost-benefit ratio of their operational economy fails to grasp the full extent of the effects of these technologies, which are not just monetary or educational but also political, social, psychological. I chose »behavioral design« as a generic term to describe this synthesis of corporate, governmental, academic theory and practice incorporated in the development or application of behavioral technologies that have—over the course of only a few years—become a ubiquitous phenomenon that permeates almost every aspect of my professional and private life. »Persuasive technologies« is a euphemism because persuasion can only occur where there is free choice. Behavioral design allows for individual deviation to a certain degree that will not affect the statistical median of the superordinate system.

Historically, behavioral design is the result of a merger between psychology, economics, and computer engineering, a strategic response of military, governmental, and academic players to the general problem that the behavior of complex systems such as humans, societies, or markets is difficult to predict, and that controlling these complex systems means shaping them by designing their technological and social environments. *Predicting* and *shaping* could be called the *ontological operating switch* at the center of this phenomenon, but dating its beginning has its obstacles because of its various story lines and the simultaneity of the non-simultaneous: while behavioral psychology and social engineering emerged as scientific discourses in the 1920s, and cybernetics with its own take on behavior was coined in the 1940s, economics did not experience its behavioral turn until the 1980s and behavioral design only reached its full fletched digital and global dimension in the 21st Century. The term »behavior design« appeared on the course catalogue of US universities like Stanford around 2011, and the first Wikipedia entry on »behavioural design« was written in 2019. The recent institutionalizing of behavioral design indicates that it not only belongs to what Wolfgang Schäffner has called the »design turn«[2] of science but furthermore, that higher academia is in the midst of a significant shift of power structures from natural and social sciences to computer engineering and behavioral economics that it fosters. In its aesthetics and its imaginary, behavioral design is closely related to behaviorist utopias like B.F. Skinner's *Walden Two* that once were discarded as totalitarian,

2 Cf. Wolfgang Schäffner: The Design Turn. Eine wissenschaftliche Revolution im Geiste der Gestaltung, in: Claudia Mareis, Gesche Joost, and Kora Kimpel (eds.): Entwerfen – Wissen – Produzieren. Designforschung im Anwendungskontext, Bielefeld 2010, pp. 33–45.

while its techniques, its ontological operations, are grounded in computer technology and the reprogramming of choice architectures.[34]

1. Operant Behaviorism

Behavioral design of user-oriented technologies is attempting to narrow the gap between future and present behavior by creating environments that are based on positive reinforcement or »nudges«, incentives for desired behavior. It influences the decision making of individuals as well as of very large systems like economic markets and populations. Business models, soft- and hardware design, as well as policy making are based on it. Basically, it is an actualization of B.F. Skinner's »operant behaviorism«, a scientific method that technologically influences environments to generate a desired behavior. Skinner's »operationism«, embodied in the boxes he designed to modify the behavior of rats or pigeons, allows the experimenter to neglect all inner states that might motivate an animal or a person such as affects, desires, feelings, motives, expectations, values, attitudes, or personality traits.[5] At the height of psychological behaviorism during the 1940s and 50s, these inner states were considered to be »hidden factors.« Since they could not be measured with scientific methods, they had to be defined »operationally.« Operant behaviorism allows to completely disregard any qualitative explanation of behavior and to shift the focus towards the shaping of environments—laboratories in this case—that can generate the desired behavior in individuals interacting with these environments.[6] The disregard of any analysis of inner states or hidden factors distinguishes behaviorism from previous attempts to explain human behavior like psychoanalysis, Gestalt psychology, or moral philosophy.[7]

It also distinguishes Skinner's behaviorism from 21st century behavioral design which does not define hidden psychological factors operationally but aims at *eliminating* them by closing the gap between present and future behavior within certain »choice architectures« of consumer decision making.[8] The operationality of be-

3 Burrhus F. Skinner: Walden Two (1948), Indianapolis 2005.

4 Cf. Christina Vagt: Design as Aesthetic Education. On Politics and Aesthetics of Learning Environments, in: History of the Human Sciences, forthcoming.

5 A detailed study on Skinner boxes and teaching machines can be found in: Alexandra Rutherford: Beyond the Box: B.F. Skinner's Technology of Behavior from Laboratory to Life, 1950s–1970s, Toronto 2009.

6 For a historical overview of the concept of environment see Florian Sprenger: Epistemologien des Umgebens, Bielefeld 2019.

7 Cf. John A. Mills: Control: A History of Behavioral Psychology, New York 1998, p. 87.

8 The term »choice architecture« was introduced by Richard H. Thaler and Cass R. Sun-

havioral design has its roots in operant psychology but the technological means to »unhide« hidden factors by forcing the system into a desired behavior belong to a new type of economics that did not exist before the take-off of digital user technologies.

2. The Computational Aspect of Behavioral Economics

Behavioral economics became a focal point of economic theory during the 1980s but its arrival or *event* in the sense of Hannah Arendt who distinguishes between technological events and ideas, were computer simulations.[9] Behavioral economics can be traced back to a new type of economic mathematics or econometrics that John von Neumann and Oskar Morgenstern started with their *Theory of Games and Economic Behavior* (1944). This book is generally recognized as the beginning of modern game theory and in its wake digital market simulations. Von Neumann's and Morgenstern's mathematical take on behavioral axioms played a key role for the merger of psychology and economics which would later be coined »behavioral economics.«[10] While behaviorism made it possible to disregard any hidden factors of the human psyche or mind, mathematical game theory made it possible to disregard any inner rules or laws for economic decision making or behavior, e.g. the idea of a rational *homo oeconomicus* that had dominated classic liberalism and its model of rationality for so long. Instead, it follows the Cold War maxim that modeling and predicting of human behavior works best when the game rules are environmentally shaped. Mathematical ideas according to von Neumann, even if grounded in experiences, have a life of their own, governed by almost entirely aesthetic motivations, before their derivations and proofs have to be related once more to characterizations of the empirical world.[11] Modeled and simulated within the mathematic framework of game theory, economic behavior becomes »empirically« observable. Instead of building economic models on assumed characterizations of rational behavior like classic liberal economics assumed, they now were subjected to experimental verification.

Mathematical game theory and in its wake computer simulations of consumer decision making became the key technique for corporate institutions like the Ford Foundation and the RAND corporation, or military agencies such as the Office

stein: Nudge: Improving Decisions about Health, Wealth, and Happiness, New Haven 2008, pp. 81–93.

9 Cf. Hannah Arendt: The Human Condition (1958), Chicago/London 1998, p. 156.

10 Cf. Floris Heukelom: Behavioral Economics: A History, New York 2014, pp. 20–21.

11 Cf. ibid., p. 24.

of Naval Research.[12] Not only did game theory flourish within the context of Cold War behavioral science, it also survived the downfall of the latter.[13] In 2002, Philip Mirowski famously coined the term »cyborg economics« in his history of economics but only dedicated a footnote to the role of computers for the post-1970 success of experimental decision theories both in economics and psychology.[14] Today, it seems safe to say that not just economics but also policy making irrevocably changed through game theory and computer modeling and in their wake behavioral tech-economics.

3. Open Future, Closed Future

The idea of an open future is rather young: sometimes between the Protestant Reformation and the French Revolution did people actually start talking about the future, either in terms of revolution or reaction.[15] If time is understood as being socially and culturally constructed, ›future‹ is not just a historical but also an ontological concept because it affects all scales of human beings, from the atomic scale of the individual to the macro perspective of entire states. As historic concept, the future itself is subject to change. Medieval Christian societies apparently had no use for the term because the fate of a Christian subject was predetermined by a divine order. It was born into a certain socio-economic role and generally stayed put. Life and death were not considered to be contingent or to be dependent on personal decisions, but predetermined by a higher power. The idea of an open, undetermined future emerged in the 17th and 18th century and in close connection with the ideal of political freedom and economic equality. Not coincidentally did game theory and statistics emerge at the same time and in close correspondence with the concept of future.

Social systems theory is itself heir of the rise of game theory and statistics over the course of the 20th century but Luhmann's distinction between a *present future* and *future present* can still be helpful to understand the dimension of the social effects of today's behavioral design.[16] The concept of an open future implies that future functions in the present as a mere time horizon of many diverse possible

12 Cf. ibid, p. 60.
13 Cf. Paul Erickson: The World the Game Theorists Made, Chicago 2015.
14 Cf. Philip Mirowski: Machine Dreams – Economics Becomes a Cyborg Science, New York 2002, p. 545.
15 Cf. Niklas Luhmann: The Future Cannot Begin: Temporal Structures in Modern Society, in: Social Research 43, no. 1 (Spring 1976), pp. 130–52: 132.
16 Cf. Niklas Luhmann and William Whobrey: Observations of Modernity, Stanford 1998, p. 70.

future presents, all of which will disappear but one. Because of this continuous potentiality, the present future is highly complex and requires social systems to decrease the number of possibilities—to »defuturize« the future.[17] From the standpoint of social systems theory, techniques that are based on statistics and game theory are means to deal with the fact that a social system does not know what the other players will do. In order to make reasonable decisions towards an environment which can only be partially known, social systems develop fictional or simulation strategies, strategies that allow to simulate future presents.[18] Shaping and predicting are operators within literary utopian fiction as well as in game theoretical simulations.

Global capitalism of the 21st century confronts us with new technological means to defuturize the future, fostering higher and higher degrees of calculability and predictability of economic decisions and markets. Social systems are easily manipulated on the affective and aesthetic level through the design of their environments the operative basis for the growing sector of behavioral economics that focuses on ›nudging‹ consumers via chains of incentives. ›Persuasive‹ technology design like digital learning systems or behavioral smart phone apps trigger desired behavior through incentives without evoking the feeling of coercion but whether the user experiences it as compulsion or play does not matter systematically because the bottom line is still the operant behavioral principle of positive reinforcement. The operandum might not look like the lever in a rat dispenser, but the design of online teaching platforms is nevertheless that of a Skinner box.

4. Surveillance Capitalism

Behavioral technology design in coordination with nudging economics creates quasi-closed systems of user/consumer markets in which the possible and probable behavior of each actor is already factored into the product design because they represent de facto social environments for micro-decisions. Informed by the »digital exhaust« of surplus behavioral data that users/consumers leave behind using these technologies, »surveillance capitalism« as Shoshanna Zuboff coined it, is able to not only *predict* but to actively *shape* consumer/user behavior, which means de facto closing up the future. When technologies fold behavioral and cognitive science into corresponding economics, aiming at undermining both senses and sense of individual decision-making processes, the future can no longer be understood

17 Luhmann: The Future Cannot Begin (as note 15), p. 141.

18 For fictional strategies as defuturization, cf. Elena Esposito: Die Fiktion der wahrscheinlichen Realität, Frankfurt am Main 2007.

as an open horizon for individual or democratic decision-making. This behavioral machine affects every inner and outer aspect of life, science, culture, markets, and politics.

The prominent role of a few global actors like Google, Facebook, Amazon, WeChat, etc. in this most recent chapter of global capitalism requires special attention, because it resembles a technological condition of possibility for this shutdown of an open future. Even though psychology, economics, political, and social sciences all have had their behavioral turn, they still employ divergent, even contradictory models of behavior.[19] While the different academic disciplines do not agree on their behavioral axioms, behavioral design creates facts by merging them into the same digital environments, creating behavior that is game theoretically modeled before it occurs. It disregards analytical differences and focuses instead on the production of a certain behavior. In order to understand the implications and effects this behavioral design machine creates and its inner operations, it is important to observe not only the actions of the behemoths in the field but also the underlying behavioral design discourse. Retrospectively, Google's eureka moment was the idea to turn the behavioral surplus data of its search engine, the »digitial exhaust« of its users, into a commodity that can be traded with extremely high profit margin.[20] Only with this new type of data can Skinner's dream of a technology that effectively predicts and shapes human behavior be realized. Skinner's vision of a totalitarian world based on the scientific method and the principles of behaviorism is being reified in the form of user technologies that create their own markets, in which the decision making of user groups can be predicted with a very high certainty, and the system can adapt accordingly, creating markets of total certainty.

Google, Amazon, Facebook, et al. deal in prediction products that are aimed at reducing the risk for customers: »Prediction products are sold into a new kind of market that trades exclusively in future behavior—behavioral future markets in which any player with an interest in purchasing probabilistic information about behavior and/or influencing future behavior can pay to play in markets where the behavioral fortunes of individuals, groups, bodies and things are told and sold.«[21]

Furthermore, as representatives of the field of »computers as persuasive technologies« aka »captology« already predicted in 2003, persuasive technology design operates beyond the Web: »With the emergence of embedded computing, the forms of persuasive technology will likely become more diverse, ›invisible‹, and

19 Herbert Gintis: The Bounds of Reason: Game Theory and the Unification of the Behavioral Sciences, Princeton 2009, p. 221.

20 Cf. Shoshana Zuboff: The Age of Surveillance Capitalism: The Fight for the Future at the New Frontier of Power, London 2018, p. 87.

21 Ibid., p. 96.

better integrated into everyday life. The Web, which is so prominent today, will be just one of many forms of persuasive technology within another 10 years.«[22]

The difference between computer-based behavioral design and older ›persuasive‹ media such as print or television marketing, is interactivity and adjustability: computer systems are feedback systems, they are persistent, they can learn and they can scale. Software-based experiences can easily replicate one successful persuasive experience to millions.[23] In the current summer of AI and machine learning systems, behavioral design promises to reach previously hard to be imagined dimensions. *Capital One,* one of the prominent culprits who not only disrespect their customer's data but also fail to secure them, carries out its own behavioral design research to create methods for applying behavioral economics in products and services and to deploy machine learning. Personality traits in form of big data are no longer hidden factors because within controlled environments that were created by behavioral design in the first place, they form very precise prediction patterns, and machine learning promises to take the predictability of behavior to a new level:

»Practitioners and behavioral scientist have decades of research on how people behave and make decisions, but we're only now figuring out how to practically apply this knowledge on products and services at scale in order to positively influence people. Behavioral practitioners aren't just intervening any more – people are self-selecting to be nudged. With machine learning, we can skirt a debate in psychology about weather personality (fixed, stable traits in people) or situation (context, environments in which people find themselves) best predicts behavior. Nudging at scale with machine learning models helps detect some patterns that are person-specific and some patterns that are situation-specific so that the right balance can be struck.«[24]

There seems to be neither a lack of self-confidence nor relevant scruples in the field of behavioral design, and any critique today seems to come too late. The economic discourse on nudging fully anticipated at its very beginning the coming of critique against this new economic theory and practice. Any risk to nudge theory is being assessed and taken into account for possible future scenarios. This essay probably is already factored in and part of the equation.

22 BJ Fogg: Persuasive Technology (as note 1), p. 3.

23 Ibid., p. 10.

24 Chris Risdon: Scaling Nudges with Machine Learning – Behavioral Scientist, Behavioral Scientist (blog), 2017, under: https://behavioralscientist.org/scaling-nudges-machine-learning/ (1 January 2020).