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Exploring Algorithmic Resistance and Breaching

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Abstract

Advanced algorithmic systems are widely assumed to exercise social power by latently structuring everyday experiences and knowledges via processes of selection, ordering, curating of information, and the automation of decisions. Nevertheless, their entanglement with human practices is never deterministic, as humans do not always comply but enact agency, contest algorithmic truth claims and "resist" automated decisions. Researching such acts of resistance poses great methodological challenges: algorithmic power is mediated by pre-existing forms of domination, enforced by invisible infrastructures, and embedded into the political economies of platforms and applications. Since algorithmic literacies are rare and unequally distributed, most users are unaware of algorithmic influences, limiting empirical inquiries to a few informed "elites". Following an analysis of what algorithmic resistance could encompass, this contribution suggests a methodological inquiry inspired by "breaching experiments." By introducing friction into human-machine relations, this approach enables the research of the subtle, informal, and not politically articulated acts of "everyday resistance" against algorithmic truth claims. Advocating for a broad notion of resistance, "breaching" serves as a heuristic to conceive practices of algorithmic dissidence that would otherwise go unseen. The analysis seeks to inspire future empirical work that understands resistances as tactical bottom-up responses to algorithmic subordination and that allows inquiries into how "ordinary" users can resist algorithmic power.

Advanced algorithmic systems have become an integral part of everyday life, increasingly influencing and shaping human practices, experiences, spaces and culture (Chayka, 2024). Following "sterile" textbook definitions of computer science, algorithms merely transform inputs into outputs along a sequence of defined steps (e.g., Cormen et al., 2009). However, their designs, applications, and outputs are inherently social: as "intricate, dynamic arrangements of people and code" (Seaver, 2019: 419), algorithmic systems are inextricably linked to specific historical conditions and the interests and values of those who design, develop and deploy them. By automating processes of selection, supervision, decision-making, and steering, these technologies

assume key roles within the political economies of digital platforms (e.g., Kassem, 2023; Srnicek, 2019) and are essential assets for the global digital oligopolies that both produce and facilitate them.

Because algorithmic systems "operate as a logic of repetition, ardently reviving and amplifying stereotypes" (Ruckenstein, 2023: 138) and distribute rewards, opportunities, or punishments by mirroring prevailing societal conditions, they computationally and "implicitly rework the process of social class-making" (Burrell and Fourcade, 2021: 223). By reinforcing economic inequalities and societal exclusions (Eubanks, 2017; O'Neil, 2016; Carr, 2014), by "tak[ing] on the historical forces of capitalism, colonialism, patriarchy, and racism and disseminat[ing] and rigidify[ing] these logics in society, asymmetrically influencing social groups" (Yolgörmez, 2020: 145), algorithmic systems are never neutral. Rather, they are technological devices through which power operates and articulates (Airoldi and Rokka, 2022).

However, despite the ubiquity of present-day computation, both the political economy of algorithm utilisation and user engagement with them pose great challenges for empirical research. Addressing questions of algorithmic power in practice means investigating obscure phenomena that are unknown to many people and hidden in plain sight (Burrell, 2016). Ever-tightening webs of algorithmic governance (Just and Latzer, 2017) are encroaching on various societal domains (e.g., labour organisations, the public sector, digital communication) and are becoming ever more sophisticated. Woven into the fabric of everyday life, subtle algorithmic guidance and subliminal manipulation often affect unaware consumers (Gran et al., 2021). In trying to make sense of them, people rely on the industry's carefully crafted "imaginaries" (Bucher, 2017) of algorithmic precision and infallibility (Beer, 2017). However, research into algorithmic influences must not make the mistake of rewriting history "from above". Positioning users as passive subjects of measurement and control overlooks how hegemonic positions are being challenged (Pasquinelli, 2023: 12).

How, then, do people, and especially "ordinary" people, who often lack professional knowledges or literacies around algorithmic systems, resist the power that is computationally exerted over them? How can such resistance be investigated empirically? To answer these questions, I will first outline how modern algorithmic systems are encountered and argue that they are best understood as algorithmic regimes. This will prefigure considerations concerning conceptual frameworks for empirically researching algorithmic practices. After reflecting on understandings of resistance and proposing a perspective that is rooted in the experience of "friction", I will consider the theoretical consequences. Then, a research heuristic based on "algorithmic breaching experiments" will be set out.

Algorithmic regimes

Algorithms, by mediating and selecting information, and by acting as an "invisible structural force that plays through into everyday life in various ways" (Beer, 2013: 69) enable, shape, and limit the possibilities of our "algorithmic lives" (Amoore and Piotukh, 2016). With algorithmic systems enclosing social domains and computational logics increasingly "penetrating the everyday" (Ruckenstein, 2023: VIII), interactions with these technologies increasingly become necessary to achieve certain goals. Algorithms can be seen as governance mechanisms, as "autonomous actors with power to further political and economic interests on the individual but also on the public/collective level" (Just and Latzer, 2017: 245). Originally conceived as techniques for the management of labour, subsequent automation of cultural spheres has "turned all of society into a

'digital factory' through the software of search engines, online maps, messaging apps, social networks, gig-economy platforms, [and] mobility services" (Pasquinelli, 2023: 6).

However, standalone algorithms do not exist and cannot be applied in isolation. As socio-technical systems, they must be conceived as part of techno-institutional "apparatuses" that manifest specific sociocultural effects (Seaver, 2019: 418). Thus, the profound changes yielded by an algorithmic colonisation of daily life cannot be grasped with simple, monistic conceptions of power as a unilateral and direct algorithmic "force". Rather, algorithmic systems reflect and perpetuate far-reaching cybernetic transformations of knowledge (and its production). In this context, "algorithmic thinking" (Beer, 2023) appears as an epistemological practice that affects how people think about and through computation. Shaping "the techniques and procedures which are valorised for obtaining truth" (Foucault, 1980: 93), "algorithmic regimes" manifest as "coherent patterns of thinking and acting in the world" (Jarke et al., 2024: 4). However, algorithmic systems are not "applied" deterministically, but are dynamically enacted (Seaver, 2017), ascribed certain meanings, and "domesticated" (Hirsch and Silverstone, 2003). People are not merely exposed to algorithmic force, but instead actively participate in the negotiations of algorithmic truth claims through their situated enactments of algorithmic practices. Additional to this social contingency, every complex system is characterised by moments of indeterminacy and uncertainty (Parisi, 2015). Unforeseen "novelty" can be introduced into social situations, blurring the often-assumed linear relationship between in- and outputs of computational systems and allowing for the emergence of the unexpected (Yolgörmez, 2020).

Due to this double contingency, users relate to algorithmic systems through recursive "feedback loops" that mutually shape both humans and machines in the process. Or, as Bucher (2018: 117) notes: "algorithms do not just do things to people, people also do things to algorithms". Despite often being applied to human actors "from above", focusing on user agency and the creative ways in which technologies are embedded into social practice makes evident not only their dynamic, reactive, and contingent uses, but also the possibilities of resistance contained therein. While "algorithms of oppression have been around for a long time", they coincide with the "radical projects to dismantle them and build emancipatory alternatives" (Ochigame, 2020). Resistant, antagonistic or deviant acts towards algorithmic subordination are manifest in a wide variety of activities: as public outcries, deliberate manipulation, silent refusal or as Neo-Luddite ambitions of purposeful destruction (Glendinning, 1990). Reflecting both the technological affordances and social conditions under which they are being enacted, such resistances are the "composite of human algorithm relations" (Amoore, 2020: 9).

Researching algorithmic regimes

With their expanding relevance for social life, multiple ways of empirically researching algorithmic practices have emerged. Critical for these efforts is the understanding that "any investigation into how people relate to algorithmic regimes needs to consider how they understand the presence or absence of these technical systems" (Storms and Alvarado, 2024: 66), and thus how they make sense of their everyday algorithmic encounters. However, research shows that knowledge around the presence of algorithms, despite their ubiquity, is often lacking or highly situational (Gruber and Hargittai, 2023). Awareness of their influence is generally low and unequally stratified (Gran et al., 2021; Gruber et al., 2021; Cotter and Reisdorf, 2020). The very term "algorithm" is either unknown to many people (Swart, 2021; Siles et al., 2019) or used inconsistently (Langer et al., 2022). While

users may be "nominally aware of the role that algorithmic processes play in their lives, few understand the basic functions of algorithmic platforms…from a critical and rhetorical perspective" (Koenig, 2020: 1). Against this background, concepts resulting from (and applied in) empirical research are "algorithm awareness" (Eslami et al., 2015), "algorithmic literacy" (Dogruel, 2021), "algorithmic imaginaries" (Bucher, 2017) and "folk theories" (Eslami et al., 2016).

Algorithm awareness

Studies show that being aware of, and knowing how, content is being moderated, information is curated and decisions are automated around algorithms is unevenly distributed, reproducing exclusions and digital divides. For example, Gran et al. (2021) found that 61% of the Norwegian population showed low or no awareness of algorithms, with significant associations between participants' age, gender, and level of education. This was seen to perpetuate and amplify inequalities (Siles et al., 2022; Gran et al., 2021).

Algorithmic literacy

Defined as "being aware of the use of algorithms in online applications, platforms, and services and knowing how algorithms work" (Dogruel et al., 2022: 117), algorithmic literacy is based on cognitive and behavioural dimensions (coping behaviours and abilities for creation) (Dogruel, 2021). Literacy expands beyond basic awareness to include knowledge about inner workings. Thus, "algorithmic skills" are an important asset for the informed use of algorithmic applications but "remain the domain of a select few users" (Klawitter and Hargittai, 2018: 3505).

Algorithmic imaginaries

Examining how algorithms make people feel, the ways in which users know and perceive algorithms, and the subsequent ways of thinking about them have been the subjects of so-called "algorithmic imaginaries" (Bucher, 2017). Going beyond a "mental model" of specific functions, an imaginary entails an affective dimension and is productive in the sense that certain imaginations of algorithmic functioning afford corresponding usage scenarios and perceived possibilities of action. Contrary to public discussion, where algorithms are discursively shaped through newsworthy revelations, the everyday workings of algorithms and their subsequent imaginaries are "mostly observed alone, with associated feelings of astonishment or distress, particularly when their operating principles are not understood" (Ruckenstein and Granroth, 2020: 17).

Folk theories

Closely related to imaginaries, folk theories of and around algorithms are "intuitive, informal theories that individuals develop to explain the outcomes, effects, or consequences of technological systems, which guide reactions to and behaviour towards said systems" (DeVito et al., 2017: 3165). Folk theories are commonly used as rationalisations that make sense of algorithms and their behaviours (Ytre-Arne and Moe, 2021; Siles et al., 2020; Eslami et al., 2016) as speculative, but comprehensible narratives.

In order to gather information around algorithmic practices, researchers might design quantitative survey questions testing people's awareness about an algorithmic presence. They might measure knowledge of, and around, algorithmic systems or test users' literacy by assessing their skills (such as the critical evaluation of results or the ability to employ privacy-related measures against algorithmic surveillance) (Dogruel, 2021). Another option includes assessing people's

affective experiences when enacting algorithms (Bucher, 2017) and analysing the folk theories and related metaphors that they utilise for rationalising algorithmic results (French and Hancock, 2017). Alternatively, one might explore ethnographically how people and algorithms interact (Christin, 2020).

Yet, however helpful these approaches are in understanding certain algorithmic practices, they often seem insufficient for analysing the specific effects and consequences of power operating through algorithmic means. Here, algorithmically imposed influences on action might not be perceived directly. Gentle "nudging" and the exploitation of psychological insights ("dark patterns") might be contained within experiences and imaginaries. Processes of datafication may not be humanly comprehensible, but infused by opacity (Burrell, 2016) and experienced as misrepresentations. Enacting algorithms might lead to unintended, unexpected, and even undesirable results that contradict, challenge and expose users' convictions. This might be perceived as "algorithmic violence" (Bellanova et al., 2021) or as the discontent necessary to participate in digital systems. Such effects would be conceivable as part of everyday experience without individuals having full awareness, understanding, or "imagination" of their algorithmic encounters. However, methodological questions arise about how to research such experiences, when users themselves do not understand them as "algorithmic". As both researchers' access to the intimate situations in which algorithmic encounters occur and participants' vocabularies are limited, suspected dissidences must be investigated in alternative ways.

To conclude, many people—regardless of whether they perceive, comply with or resist algorithmic power—do not qualify for research about their algorithmic encounters. They lack the awareness and literacy to recognise subtle algorithmic influences or the skills to express them within surveys. The ability to deconstruct harms associated with algorithms or even to recognise their presence within daily practice requires specialized knowledge and literacy. As a common understanding of resistance against algorithmic systems "relies on measurement and documentation of harms, often requiring computational science skill sets" (Ganesh and Moss, 2022: 4). Often only acts that are organised, open, observable, and articulated can be captured. Informal, hidden, or unconfrontational actions (Scott, 1985) remain unaccounted for, with the result that research into the powerful aspects of algorithmic regimes is often unintentionally elitist. But while it does not deny ordinary people's agency and critical skills, it practically disregards them.

To design perspectives for researching resistances, it must therefore be determined what resistance encompasses, how it emerges and how it is different to other ways of engaging with algorithms.

Resistance in algorithmic regimes

Manifold algorithmic practices have been labelled as "resistant," and this has led to the creation of diverse terminologies: users "hyperdodge" (Witzenberger, 2018) an algorithmic hunger for data to circumvent systems' "hypernudges" (Darmody and Zwick, 2019). Actions are "obfuscated" (Brunton and Nissenbaum, 2011) to counteract or misguide attempts of datafication, the social power of platforms is "avoided" by disengaging politically (Magalhães, 2022), and "refusal" is mobilised as a resistant "knowledge project" (Ganesh and Moss, 2022). Systems are "gamed" to exploit the imagined functions of algorithms (Cotter, 2019; Bishop, 2018) while the "artificial bosses" of "algorithmic management" (Kellogg et al., 2020) are "ridiculed" (Schaupp, 2023). The "fissures" in algorithmic power that these acts provoke can lead to "moments in which algorithms

do not govern as intended" (Ferrari and Graham, 2021). Subjects of algorithmic control organise publicly to counteract disruptions (DeVito et al., 2017) or tackle the consequences of algorithmic decision making artistically (Weckert, 2020; Bridle, 2017). Other examples include social movements campaigning against the use of specific algorithms (Heemsbergen et al., 2022) or watchdog organisations targeting algorithmic subjection on a discursive level (AlgorithmWatch, nd). Some of these practices "explicitly leverage computational affordances to tactically shift power dynamics" rather than comprehensively "resist[ing] algorithmic ways of life" (Heemsbergen et al., 2022: 2). Others can be seen as "a complicit form of resistance" (Velkova and Kaun, 2021: 535) that, without denying algorithmic power, mobilise it for different ends.

While a broad range of practices can be framed as "resistance", these examples underline that making them visible empirically often depends on user' awareness of algorithmic operations and their vocabulary, their background knowledge about data collection, infrastructures and the inner workings of algorithmic technologies. Furthermore, what is discussed and labelled as practices of resistance often draws from an implicit terminological understanding without providing greater detail on what it means to "resist" and especially who is able to do so. It thus becomes necessary to clarify what resistance is before further elaborating on its algorithmic version.

Understanding resistance

In their widely discussed meta-analysis, Hollander and Einwohner (2004) identify the core elements of resistance. It is an act that operates in opposition to power. But there are also definitional disagreements: must resistance be recognisable as such? If so, by whom? Must actors be aware of their own resistance? Of significance within this discussion is Scott's (1985) concept of "peasant resistance", referring to those "everyday acts of resistance [that] make no headlines" (Scott, 1985: XVII). Scott argues that resistances do not necessarily have to be visible, since in fact they often go unseen to those they resist against. However, following his understanding, those who resist have to act with political consciousness and intent.

Bayat (2000) points out that such an understanding serves to "confuse an awareness about oppression with acts of resistances against it" (543). Focusing on people's intentions would thus exclude a great variety of "everyday" resistances. Instead, he proposes the competing notion of "quiet encroachment": the "silent, protracted but pervasive advancement of the ordinary people on the propertied and powerful in order to survive and improve their lives" (545). Examples of such practices include the (illegal) tapping of electricity or water pipes in poor neighbourhoods or digital file sharing. Evidently, such resistances do not always arise from an outspoken opposition to powerful institutions or an intent to destroy them. They can simply reflect people's needs to fulfil their desires or improve their subjective situation.

However, by focusing on resistance "as a response to power from 'below'; a subaltern practice, which has the possibility to negotiate and/or undermine power" Baaz et al. (2016: 142) propose another analytical distinction. As, in principle, resistance may arise from any social position, they centre their understanding upon actions that "dissolve, undermine, question, or challenge subordination – and which ultimately could produce non-subordinate relations" (141). Such resistances are being performed from a subaltern position or on behalf of a subaltern (as in being of "inferior rank" and subject to a ruling hegemony) (Gramsci, 2011). Yet, one must acknowledge simultaneous interlocking systems of hierarchy, power relations, and resulting degrees of subordination; rigid dichotomies between resisters and dominators elide contextual and situational evaluation (Baz et al., 2018).

Building on these insights, it is evident that resistances are not exclusively found where they are proclaimed via megaphones, strikes, and riots. Consequently, my endeavour seeks to map out theoretical and methodological spaces that allow a deeper understanding of an already multifaceted phenomenon (and its algorithmic amplification). At the same time, however, it is important to notice that there can be no final definition of "resistance", as claiming one could be seen as an expression of hegemonic ambitions (which would likely inspire resistance, Baz et al., 2018: 19). Analytically, and to broaden an understanding of resistances in algorithmic regimes, we need to appreciate the "everydayness" of resistances (Vintage and Johansson, 2013) that might not be politically articulated or formally organised.

For these purposes, algorithmic resistance must be seen as an *act* rather than a quality of an actor or a state of being. Such acts might entail a broad spectrum of practices, ranging from actively challenging algorithmic outputs and the tinkering with inputs, to the refusal, avoidance, and ridiculing of algorithmic systems. However, a mere attitude of mistrust is not in itself enough to qualify as "resistance" (though it could inspire acts of resistance). Such resistance also encompasses acts of critique, which, as discursive practices (Reckitt, 2016) and normative articulations, challenge or dissent from algorithmic systems.

Reflecting upon the notion of *intention* suggests that resistances can address and relate to positions of subordination without consciously intending to do so. For example, contributing to online practices such as "Voldemortian" (van der Nagel, 2018), i.e., altering or avoiding certain keywords to prevent their algorithmic readability can be done out of habit or because of their perceived aesthetic, without understanding the initial purpose of the practice or intending obfuscation.

Furthermore, acts of resistance do not have to be *recognised* as such by resisters or targets of resistance; "various actions or practices—even when the intent is ambiguous, unknown, or nonpolitical—still qualify as resistance" (Baz et al., 2016: 140). This argument goes beyond the view that any definition of resistance is solely derived from the perception of actors. Rather, acts are "resisting" as long as they relate to actors' subordination. The renunciation of both an articulated intention and the need to define one's own action as "resistant" allows one to consider those routinised or affective practices as resistance that challenge relations of subordination (in ways that escape the attention of the actors themselves).

Finally, resistance necessarily arises from a *position of subordination*. While there are countless examples in which subordination appears to be obvious, e.g., as within institutional environments that facilitate algorithmic control (workplace surveillance, automated welfare allocation, job applicant screening), most everyday encounters with algorithms are optional. Algorithmically curated newsfeeds or suggestions about a playlist's next song are not obligatory and do not "force" us to follow or use them. However, political and cultural participation, the cultivation of friendships, the search for love, relationships or professional opportunities are activities that increasingly necessitate the use of algorithmic systems. An apparent voluntarism, therefore, is framed by the possibilities and rules set out by algorithmic regimes. As Burrell and Fourcade (2021) observe, "not participating may guarantee a certain kind freedom, but it may also mean social isolation" (229). Interacting within algorithmic regimes means participating according to the affordances set out by them. Although allowing for choice, contingency is often already algorithmically constrained within the specific political economies in which algorithms operate and the affordances they set out. In practice, algorithmic governance depends on the mechanisms, structures, degrees of institutionalisation, distribution of authority and the respective actors. Thus,

even though many algorithmic practices necessitate at least a certain degree of subordination, different magnitudes of "force" depend on situational features. But, is it legitimate to speak about subordination when interacting with, for example, a highly transparent algorithmic system that seeks to aid (but not determine) human decision making?

In this context, Airoldi and Rokka (2022) suggest approaching algorithmic outputs as "articulations", and therefore as a "techno-social process mediated and actualized by the opaque, authoritative, non-neutral, and recursive actions of automated systems" (418). This understanding suggests that algorithmic systems have inherent normative claims. By building on the intimate imaginings of its designers, "depending on a multitude of *recursive* past iterations of consumer behaviour and human-machine interactions through digital data" (Airoldi and Rokka, 2022: 418–419), algorithmic systems are being iteratively "socialised". Therefore, every algorithmic articulation reflects the normative expressions of the surrounding environment and continually contributes to its reproduction. Despite often being disregarded as "biased", this "culture in the code" is inevitable within complex machine learning algorithms that manifests as "machine habitus" (Airoldi, 2022).

With these considerations in mind, I am suggesting that algorithmic outputs—recursively referring to and reproducing previous practices by opaque and non-neutral means—inherently contain normative truth claims which authoritatively "articulate" themselves into human practice. This does not necessarily mean that human agency is, as often feared, comprehensively undermined. It should, however, sensitise us to the fact that every algorithmic articulation (by constraining and shaping contingencies of action) already necessitates a moment of subordination, a "control through limits" (Beer, 2016: 173). Actions rendered possible and bounded by algorithmic affordances imply and necessitate a submission to algorithmically articulated truth claims (insofar as acting with or through the algorithm continues to be pursued). Such submission is not per se violent, nor does it inevitably produce resistance. But the fact that submission can be voluntary (because enacting a system is accepted as a legitimate means for achieving a goal) or even affirmative (because a result is perceived as superior) should not distract from requiring subordination. Algorithms, in many cases, do not exercise their power in a Weberian sense as "the probability that one actor within a social relationship will be in a position to carry out his own will despite resistance" (Weber, 1978: 53). However, algorithmic governance establishes a link between goals and means: in order to participate, users have to play along by the rules [1]. There are plentiful examples in which algorithms improve participation, foster decentralised bottom-up coordination, and offer new opportunities for inclusiveness, diversity and democratic involvement (König 2020; Scrape, 2019). Yet, even "benign" applications require subordination to their calculative authority. Algorithmic results may be presented in a transparent and understandable way, grant users agency in decision-making, and strictly adhere to inclusive, democratic, or even non-hierarchical principles. But, they can still be observed as an authoritative expression of superior computational power and as an attempt to maintain the normative order that is inevitably embedded into them [2].

Resistance as rooted in friction

While this rather expansive notion of resistance results from an emphasising a permanent subordination under algorithmic articulations, the theoretical omnipresence of technological domination is accompanied by a dilution of its explanatory power. Furthermore, it favours the labelling of actions as "resistant" from the privileged epistemological position of researchers and

their implicit (and possibly romanticized) ideas of what resistance should look like. As hierarchies may contain subordinates that are "not only willing to but also enthusiastic in their obedience to the power with which they identify and live" (Baz et al., 2016: 141), those engaging in such practices may at the same act as "parasitic on power and/or nourish as well as undermine it" (Baz et al., 2016: 142). Any classification without knowledge of a user's "intention" would solely depend on a researcher's verdict. Although conceptual openness can be fruitful to allow for broader examination of various forms of resistant practices (articulated and silent, intentional and unconscious, calculated and affective), it carries the inherent problem of arbitrarily labelling resistances.

In order to counteract these tendencies and to focus on the experiences of users assumed to be capable of criticising and resisting their subordination (rather than a researcher framing their actions as such), one must aim for a causal criterion from which resistance emerges. Here, I suggest the concept of situational "friction". Tsing (2011) proposed that the universal claims of global phenomena (capitalism, science, and politics) lead to frictional reconfigurations of local practices. Highlighting how algorithms articulate powerful claims within human-machine relations, Rosenstein (2023) observes that this "notion of friction aids in addressing tensions and contradictions involved in processes of datafication and related to informational asymmetries" (8–9). Frictions within algorithmic relations manifest as "ambivalences and contradictions" caused by and rooted within normative algorithmic articulations and experienced through actors' situated knowledge and expectations. As an affective dimension, this emphasizes the importance of "how algorithms are felt and accommodated" (Rosenstein, 2023: 10) within people's practices. Notions of "friction" highlight that within users' mundane experiences and practices, they are capable of recognizing and counteracting algorithmic domination. However, the mere perception of friction does not necessarily imply resistance against hegemony (Tsing, 2011). On the contrary, accepting friction as inevitable might even inspire the very practices that stabilise and uphold domination. It is therefore important to highlight that rooting resistances within experiences of friction does not offer a clear criterion for distinguishing the quality of actions that they inspire. However, it can inspire further questioning concerning people's motives and intentions (in which such demarcations are made by the actors themselves). By making tangible what often lies beyond actors' own grasp, discussing frictions seeks to encourage reflection upon the intentions and goals that their actions contain. It further allows the investigation of the very modalities and conditions that sometimes spark resistance (and sometimes do not).

Rooting resistances in "friction" seeks to broaden the perspective while avoiding arbitrary judgements from researchers. Instead, emphasis is given to users' experiences of ambiguities, ambivalences and contradictions that somehow "do not feel right". Resistance in and against algorithmic regimes is defined here as practices performed from a subordinated position (or in solidarity with one) within or against an algorithmically structured environment (when algorithms are used or have to be used to achieve a certain goal). Resistant practices are rooted in affective encounters and experiences of "friction". As outlined, mobilising this understanding of resistance is not definitive, nor does it provide unambiguous criteria as to what actions oppose power and what reaffirm it. However, it seeks to include such practices within notions of resistance that challenge a prevailing hegemony yet escape the gaze of common operationalisations.

Frictional algorithmic resistance

To accommodate this notion of "friction" within practices of resistance, its emergence and entanglement within powerful algorithmic articulations must be specified. As some resistances

occur routinely, a temporal dimension must be considered. Frictions perceived in the past can inspire resistant practices, which over time become entangled within other layers of meaning to a point where the original experience of friction is no longer recognised.

These processes can be understood by drawing from theories of practice (Reckitt, 2002) and more specifically from the concept of "practical knowledge" to describe people's abilities to "to accomplish X, Y, or Z within algorithmically mediated spaces as guided by the discursive features of one's social world" (Cotter, 2022: 1). If "we can know more than we can tell" (Polanyi, 2009: 4), then "knowledge may not necessarily be that which can be verbalised"; it should instead be understood as "tacitly expressed via action" (Cotter, 2022: 7). Knowledge is part of routinised bodily activities and manifests "in the form of understanding, know-how, states of emotion and motivational knowledge" (Reckitt, 2002: 249). Embedded in circulating and socially incorporated knowledge orders, actors "know-how" to enact algorithmic applications within practices, without having to "know-what" these applications actually do. The specific skills that surround algorithmic practices are closely related to their meanings (as to why a certain practice is being performed) and the materials (algorithmic systems, infrastructures, interfaces) with which they are being combined. Such elements are already "linked" in practices and are being performed by practitioners who don't necessarily understand every aspect of them (Shove et al., 2012: 14). In this sense, we practically know, and implicitly understand, how to start a computer without requiring detailed knowledge about the processes that happen in the background. We experience algorithmic encounters affectively, based on expectations towards their functioning that are mediated within practices, and perceive whether or not they "feel right". However, no situational context is alike and both human and algorithmic articulations are contingent. Thus, every performance of a practice may produce "novelty" and such "awkward, unequal, unstable, and creative qualities of interconnection across difference" (Tsing, 2011, 4) that are perceived as friction.

Practices and their discursive shaping are not isolated instances but always relate to the spatial, temporal and social contexts of their performances. One can then consider the social conditions under which (resistant) algorithmic practices are being shaped and locate the emergence of frictions at the point where normative algorithmic articulations intersect with the contexts that they are being enacted within. Specific articulations open trajectories for action that enable, exclude and particularise depending on situational affordances. Consequently, "encounters across difference can be compromising or empowering" (Tsing, 2011: 6) and can cause both "everyday malfunctions as well as unexpected cataclysms".

However, not every resisting act has to be initiated in situ: frictions may have been perceived in the past and inscribed into practices. Being continuously reiterated within practice, frictions can appear as detached from the irritations they initially resulted from. As habitual repetition, such routinised acts of resistance can manifest as quiet deviances, as unquestioned certainties, or as rituals of opposition detached from their original meaning [3].

Algorithmic breaching experiments

This understanding of "resistance," informed by theories of practice, doesn't just allow the consideration of direct, outspoken, and open acts of opposition to algorithmic articulations, which necessarily depend on users' knowledge, literacy, awareness and skills. Resistance also includes the subtle, silent, routine, not politically articulated or formally organised acts that would otherwise remain unseen. For empirical investigation, established tools of social research (in particular, qualitative interviews, participant observation and ethnographic work) along with related concepts

("imaginaries", "folk theories") remain important. However, the proposed understanding also enables a novel approach, one that is inspired by a famous, but seemingly antiquated social science heuristic: the breaching experiment.

Originating from Garfinkel's (1964, 1967) ethnomethodology, breaching experiments represent an attempt to make implicit norms recognisable through the conscious disregard of social conventions. By disrupting everyday, routinised processes of action, breaching experiments aim at forcing actors to de-familiarise themselves from immediate social surroundings. Classical examples of such experiments include researchers initiating a conversation with someone and "bring[ing] their faces up to the subject's until their noses were almost touching" (Garfinkel, 1967: 72), requesting people to give up their seat in public transport (Milgram and Sabini, 1978), and asking students to act as if they were subtenants in their parents' house (Garfinkel, 1967).

Due to algorithms' hidden nature and subtle blending into everyday life as invisible infrastructures, an intended or non-intended malfunctioning created by breaching experiments could be facilitated to violate internalised practical assumptions around algorithmic applications. Drawing from an understanding that locates resistance in frictions, breaching experiments thus offer potentials not only for researching algorithmic practices in general (Zenkl, 2025), but in particular for the investigation of resistant practices. By intentionally generating "friction" within a research setting, normative claims of a (faulty) system may interrupt usually undisputed practices and urge participants to "surface" the expectations they associate with an intended functioning. Since both algorithmic articulations and users' expectations reflect respective normative positions, such breaching allows an analysis of how users perceive friction and of what "tactics" (Certeau, 2002) they employ to tackle it. It was acknowledged earlier that not every perception of irritation and ambivalence causally determines resistance. On the contrary, friction may also inspire new ways of upholding power and validate submission. Nevertheless, in some cases, breaching might incite those acts that are considered "resistant" and allow for their empirical study. Moreover, reviewing the analytical framework provided by Johansson and Vinthagen (2014), analysis could infer repertoires of action, configurations of power between humans and algorithms, and relations of time and space. The attempt to provoke resistant action by introducing friction into an experimental setting and to make resistant practices into the object of analysis thus leads to a second-order sociological observation concerned about the contexts and effects of such resistance (Vobruba, 2013).

In regard to algorithmic breaching experiments, multiple approaches for researching resistances within this framework can be considered. For example, participants could use commonly known algorithmic applications that, being modified for the research setting, deviate from their "normal" form of operation and violate practical expectations. Users would be presented with flawed outputs and confronted with dysfunctional algorithmic assessments. Introducing friction would seek to disorganise user's practices, discredit habitualised background expectations and therefore disrupt tacit know-how (Patzelt, 1987). This would create situations under which normative algorithmic claims and users' everyday understandings collide. Such breaching experiments seek to observe affective reactions (the "feeling" that something is not right), the tactics applied to confront dysfunctional algorithms, the discursive accounts of critique and the performances of resistance that they inspire. The purpose is to manufacture the very "experiences of irritation [that] offer concrete examples of how algorithms are seen to operate in the world" (Ruckenstein, 2023: 136).

Most importantly, by intentionally producing errors and studying breakdowns, accidents, and anomalies, breaching experiments seek to surface algorithms in a way that actors can describe them

from practical experience. Algorithmic breaching experiments therefore share similarities with what Storms and Alvarado (2024) describe as "sensitising activities". These are preparatory exercises for research participants that, without even naming "the algorithm", are meant to foreground algorithmic experiences, raise awareness or bridge gaps in vocabulary [4]. However, instead of trying to develop a shared understanding among participants around algorithms as a basis for questioning, breaching experiments may be conducted without invoking such an initial awareness or vocabulary.

Furthermore, and by acknowledging that actors are not only capable of conducting "breaching experiments" themselves, but in fact widely and often facilitate practices of "breaching" in their daily lives (Celikates, 2009, 130), experimentally created confrontations with friction could leverage further questioning about such experiences. Algorithmic breaching experiments to investigate resistances may, for example, include the:

- Cloning and manipulation of commonly known interfaces (e.g., Search Engines, Social Media Platforms) producing outputs that could be perceived as unpredictable, useless or wrong.
- Tampering with results or ridiculing algorithmic assessments of relevance to intentionally create mismatches between algorithmic outputs and everyday experience (e.g., navigation apps suggesting detours).
- Deliberate misclassification of users' actions or attributes that lead to a datafication of the self that is perceived as incorrect. As Burrell and Fourcade (2021: 229) note, algorithmic processes can be experienced as particularly oppressive when "algorithms are disturbingly wrong in their assessments (rather than spookily accurate)". Such operationalisations, in order to inspire resistances, will, however, require a careful consideration of research ethics.
- Violation of expectations within domains where algorithmic articulations collide with "expert" knowledge, e.g., support systems in professional everyday life. This may generate results which do not correspond to the usual routines of action or one's own convictions about how work "should be done".
- Exposure of algorithmic practices that are often perceived as "harmful" by making them visible and confronting users with this experience. For example, clearly warning about surveillance by presenting data that has been collected from a user within a certain situation/environment or by communicating the automatically assigned identity/behaviour categories that have resulted from certain actions.

Breaching algorithms follows a methodological "broken tool approach" (Adams and Thompson, 2016) in which a technology and its usage is observed in its most taken-for-granted, ready-to-hand moments. Disrupting the everyday knowledge and routinised practices surrounding algorithms confronts users with an "outright breakdown" in order to initiate their "puzzling over incongruencies in everyday actions" (Adams and Thompson, 2016: 56). This, in turn, seeks to "produce reflections through which the strangeness of an obstinately familiar world can be detected" (Garfinkel, 1967: 38). By manufacturing perceptions of friction, by surfacing "fissures in algorithmic power" (Ferrari and Graham, 2021), researchers seek to study infrastructures when they cease to work as they normally do. This, Graham (2010: 3) finds, is "the most powerful way of really penetrating and problematising those very normalities of flow and circulation to an extent where they can be subjected to critical scrutiny".

By not only observing users' direct reactions but also employing the research setting as a referential lever to further examine previous experiences of frictions, algorithmic non-functioning,

and non-conforming, breaching experiments are expected to "sensitise" participants to recognise and articulate further subtle acts of resistance without relying upon expert knowledge or vocabulary.

Despite the opportunities that algorithmic breaching experiments offer, their limitations must not be overlooked. Most obviously, sterile research environments are detached from the algorithmic messiness of layered, intersecting systems and the hierarchies of everyday life. Introducing friction into human-machine relations still relies on researchers' preconceptions about what such friction could consist of and what an "error" might encompass. To mitigate these potential biases, participants would need to be actively involved in the research design so that their own practical understandings of friction are recognised. Furthermore, implementing these experiments depends on their convincing practical realisation, which requires an imitation of "practically known" applications as close to everyday experience as possible. In addition to the skills required for this, the very "opacity" of platforms and applications are key barriers to be taken into account.

Conclusion

Algorithmic regimes closely follow Tsing's (2011: 6) imaginative comparison of "roads". They "create pathways that make motion easier and more efficient, but in doing so they limit where we go. The ease of travel they facilitate is also a structure of confinement". Normative algorithmic claims are, in many cases, not experienced directly as something that is forcefully asserted. Rather, they are manifest as friction: in fissures of users' expectations, the breaking of accountabilities, disruptions of routines, or as algorithmic violence. People resist such articulations not only by politically outspoken activism, but by rooting subtle acts of resistance in perceived and affectively experienced friction within everyday practices. Their "tactics" applied to counteract algorithmic subordination are manifold: from avoidance, contamination and exploitation of algorithmic flaws to disengagement and strategies for gaming and beating the system.

This article has sought to critically acknowledge common conceptualisations of algorithmic power and resistance and their operationalisation for empirical research while identifying their shortcomings. Notions of resistance are inherently controversial, multifaced, ambiguous and contested. I have sought to provide a perspective that sheds light on those acts of resistance that often go unseen, happen silently, and are not politically articulated. As one possible point of departure for empirical research, a methodological heuristic based on algorithmic breaching experiments has been proposed in which intentional algorithmic error is meant to collide with users' expectations. Such experiments could "start with familiar scenes and ask what can be done to make trouble" (Garfinkel, 1967: 37). Then, interviewees would be invited to observe those "'whoa' moments—events in which the intimate power of algorithms reveals itself in strange sensations" (Bucher, 2017: 35), while making visible the implicit knowledge that "ordinary" users facilitate within their everyday algorithmic practices. This approach could help sensitise both researchers and users to the everydayness of small, invisible, and petty acts of resistance and their part in the shaping of digital technologies.

Resistances occur as neo-luddite disruptions, strikes, and protest, but are not restricted to these practices; hegemonic power is contradicted in silent encroachment as well as in open confrontation. Thus, understanding "how power and resistance interact, and how they factor in the struggle for social change" (Vinthagen and Holloway, 2015: 5) cannot restrict the ambition to investigate revolutionary uprisings, but must always consider everyday acts of opposition. Even though "challenging algorithms takes effort" (Swart, 2021: 7) and platforms and applications often create

environments in which passive usage is made attractive, it can be assumed that everyday acts of resistance are common, that code might indeed be law, but that law can be (and often is) broken.

Author Bio

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Endnotes

[1] In this understanding, the willingness to continue interaction can be differentiated from practices of "refusal".

[2] This argument could be extended through the following consideration: superior access to the world through mass datafication, categorisation of the world within metrics that exceed or enhance human perception, and the epistemological consequences that arise from this can be seen as another source of subordination that leads to a hierarchisation in human-machine relations. So-called "neutral" algorithms, as proposed by efforts of "platform neutrality" (Pasquale, 2016), could not counteract this momentum, as any algorithmic system that relies on the datafication of social practices and extrapolates them to arrive at predictive results implies (voluntary) subordination.

[3] While this temporal dimension of resistant practices, whose meanings are propagated or dissipated through repetition and lead to what theories of practice describe as the "sedimentation of knowledge" (Reckwitz, 2016) offer interesting starting points for future research, they must be neglected here. However, special attention must be given to the circumstance whereby "rituals of rebellion" may, in the trajectory of practice, invert their initial opposition to power and serve to reinforce its practical acceptance by merely disputing it symbolically (Gutmann, 1993).

[4] Examples for such activities include applying "walk-through interview" techniques (Swart, 2021), asking participants to find a movie they wanted to watch on a streaming platform followed up by questions about what they knew about the recommendations that came with that choice, or sensitising participants to algorithmic rankings of platforms via diaries documenting their experiences (Storms and Alvarado, 2024).

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