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Sonifying the Quantified Self:

Rhythmanalysis and Performance Research In and Against the Reduction of Life-Time to Labour-Time

Forthcoming in *Capital & Class*

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Abstract
Today there is a proliferation of wearable and app-based technologies for self-quantification and self-tracking. This paper explores the potential of an Open Marxist reading of Henri Lefebvre's rhythmanalysis to understand data as an appearance assumed by the quantitative abstraction of everyday life, which negates a qualitative disjuncture between different natural and social rhythms - specifically those between embodied circadian and biological rhythms and the rhythms of work and organisations. It takes as a case study a piece of performance research investigating the methodological and practical potential of quantified-self technologies to tell us about the world of work and how it sits within life as a whole. The prototype performance research method developed in the case study reconnects the body to its forms of abstraction in a digital age by means of the collection, interpretation and sonification of data using wearable tech, mobile apps, synthesised music and modes of visual communication. Quantitative data was selectively 'sonified' with synthesisers and drum machines to produce a forty-minute electronic symphony performed to a public audience. The paper theorises the project as a 'negative dialectical' intervention reconnecting quantitative data with the qualitative experience it abstracts from, exploring the potential for these technologies to be used as tools to recover the embodied social subject from its abstraction in data. Specifically, we explore how the rhythmanalytical method works in and against the reduction of life-time to labour-time by situating labour within the embodied time of life as a whole. We close by considering the capacity of wearable technologies to be repurposed by workers in constructing new forms of measurement around which to organise and bargain.

1. Introduction

There is a rapidly-expanding critical literature on the proliferation of technologies of self-quantification and self-tracking (Moore 2018; Moore and Pivek 2017; Moore and Robinson 2016). The most familiar guises assumed by these new technologies include wearables like Fitbits, chest-strap heartrate monitors, Bluetooth glucose monitors, and mood- and stress-measuring or productivity-enhancing apps. Their marketing to sports and wellbeing communities emphasises personal empowerment, individual

performance and increased productivity. Meanwhile, in the critical literature self-tracking is commonly thought of as either a means of control – in the workplace, for instance – or commodification, as everyday life produces lucrative chunks of personal data that can be repackaged and resold to advertisers (Charitsis et al 2018, Till 2014).

Exploring the possibility for quantified-self and self-tracking wearable devices and apps to be repurposed for individual and collective struggle and self-understanding in the workplace and beyond, the case study presented in this paper centres on a sonic exploration of the methodological and practical potential of quantified-self technologies to tell us about the rhythms of contemporary work and how they sit within life as a whole. The study collected data from a range of wearable devices over the course of a week, centring on 'biosignals', or 'data based on activity of an organic body, which may be registered by means of sensors' (Ploeger 2011). Situating quantitative representations of the bodily aspects of the working week with the qualitative lived experience of those periods, biosignal data was then selectively 'sonified' with synthesisers and drum machines to produce a forty-minute electronic symphony performed to a public audience. Whilst this was a very specific and limited use of the technology, this paper considers what it can tell us about its further development for critical ends oppositional to capitalist control and commodification and 'the reduction of life-time to labour-time' (Bonefeld 2010).

The use of creative and arts-based methods in critical management and organisational research is represented in a growing literature (e.g. Rippin 2012; Gaya Wicks and Rippin 2010). To a large extent, however, the existing literature employing creative methods in organisation studies has largely centred on material practices like drawing, painting and quiltmaking. Fewer examples abound of where researchers have employed sound performance to analyse and share findings. The use of sonification to explore and interpret the objectivity of the self in its quantified form marks an innovation not only in the analysis of data in studies of work, employment and organisation but also an innovation in how findings are disseminated and made communicable to a wider audience in an age where 'critical performativity'- or, in other words, the relationship between critical scholars to communities of practice and public interest outside the academy- is a major concern of critical management and organisational scholarship (King 2015; Learmonth et al 2016). Staging research as a performance directly addresses contemporary debates around critical performativity, bridging the gap between practice, data analysis and their relationship with audiences.

The case study draws inspiration from Henri Lefebvre's theory and methodology of 'rhythmanalysis' (2004). Lefebvre holds an increasing profile in studies of work and organisation (Dale et al 2018), his theories of space and everyday life receiving enthusiastic uptake among scholars of organisation studies (Taylor and Spicer 2007) and beyond – his *Production of Space* (1991) is the British Library's most requested book.[1] However, with some exceptions (Nash 2018; Lyon 2016; Borch et al 2015), his work on time and rhythmanalysis receives a more muted reception.

Answering the recent call in this journal for further engagement between form-analytical approaches to critical social theory and the work of Henri Lefebvre on everyday life (O'Kane 2018), the case study is guided by an Open Marxist reading (Charnock 2010, 2014) of Lefebvre's rhythmanalysis. Whereas previous work in the tradition has productively explored Lefebvre's work on space (op. cit., Kerr 1994; Wilson 2013), Lefebvre's work on time has received less consideration through the lens of what might broadly be called the 'critique of political economy as a critical social

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[1] https://twitter.com/britishlibrary/status/984356115382226944

theory' which, best exhibited in the work of Werner Bonefeld (2016a, 2016b), is informed in equal measure by Marx (1976) and Adorno (1990). Specifically, Lefebvre's work on time, read through the critique of political economy as a critical social theory, provides a window into how living, or subjective, concrete labour, is negated as dead, objective, abstract labour through its quantitative measurement. The performance research presented here seeks to render audible the vanishing subject sublated in this process by reinstating labour time within the time of life itself.

The first section - Section 2 – sets out the Open Marxist reading of Lefebvre in which the case study is rooted conceptually. Section 3 looks in more detail at Lefebvre's thinking around 'concrete abstraction' as an extension of critical Marxian theories of alienation and fetishism, specifically as it relates to insights drawn about the body and data. Section 4 establishes the methodological underpinnings of the case study in Lefebvre's theorisation of 'rhythmanalysis', relating the concept of 'abstract time' to his work on 'abstract space'. Section 5 presents the case study of a performance-research project sonifying self-quantification data as a means of rhythmanalysing work in and with everyday life along the lines set out by Lefebvre read through an Open Marxism lens. Section 6 deploys an Open Marxist interpretation of Marx's value theory to explore the implications of the case study for the critical exploration of the relationship between the time of life and the time of labour intrinsic to Lefebvre's rhythmanalysis. We close by reflecting on some of the implications of the research for the possible remediation and repurposing of self-tracking technology as a tool for critical social science in the name of individual and collective resistance and self-knowledge, with specific application to the context of the workplace.

2. The negative dialectics of economic objectivity

The foundations of the case study presented in the second part of this paper sit at the synthesis between an Open Marxism and the work of Henri Lefebvre struck in recent contributions, including to this journal and elsewhere in the annals of the Conference of Socialist Economists (op. cit.). The most immediate resemblance between Lefebvre and Open Marxism (Bonefeld et al 1992) is their common commitment to a 'anti-dogmatic', anti-totalitarian Marxism (Charnock 2014). From this starting point, existing contributions have staked out their affinities around issues of fetishism, alienation and abstraction, particularly with reference to Lefebvre's work on space (1991). This paper builds on this engagement with reference to his work on time (2004) to inform a concrete application of it in the case study in the second part of the paper.

In common with other strands of critical Marxism like the *Neue Marx-Lekture*, Open Marxism centres on a reading of Marx's critique of political economy (1976) as a critical social theory (Bonefeld 2014, Bellofiore and Riva 2015, Pitts 2015) rather than an alternative economics. The essence of the 'form analysis' at the heart of this approach (O'Kane 2018:267) is the key question posed by Marx: why this content assumes that particular form (1976:173-4). As such it 'seeks to reveal the human content of formal economic categories' (Charnock 2010:1284). It does so by drawing on Adorno's negative dialectics (1990) to expose the social and material constitution of categories of economic objectivity. Negative dialectics demystifies a reality in which the results of human practice pose themselves above and against its performers, exploding the economic abstractions through which humans subsist in capitalist society. The 'incomprehensible economic forces' that rule over subjects in capitalist society by means of the assertion of their quantitative objectivity, Bonefeld suggests (2016a:65-66), rest in human practice and can be explained through human practice.

Thus, the 'conceptuality' of the supersensible movement of economic categories conceals within it a 'non-conceptual premise' rooted in the sensuous 'actual relations of life' (Bonefeld 2016a:72fn11). The 'relations of economic objectivity' abstract from lived experience. But they are also a mode of existence of the latter and a means by which it is facilitated. In this way, they represent an 'inverted and perverted world of definite social relations' rooted in everyday life, but one we can only access by moving through the forms in which they are concealed and denied.

Thus focus falls, on one hand, on the continuing abstract forms of social mediation and domination in capitalist society that take on a 'thing-like', fetishistic form (Bonefeld et al 1992:xii). On the other, what appears as conceptually abstract and immaterial is rooted in a concrete 'non-conceptuality' in continuing modes of practice and coercion. In highlighting 'how human content is suspended in economic forms and categories' both as a 'determining force' and something negated (Charnock 2010:1284), Open Marxism brings our attention to the antagonism of that content 'in and against' its negation as capital, through which it subsists 'in the mode of being denied' (Gunn 1992). It thus places struggle and contradiction front and centre of its analyses, but its grounding in negative dialectics makes no promise of their resolution or rational development toward a synthetic outcome as posited in conventional dialectics. This means that, in begging the question of alternatives, it does not fall in line behind 'resistance for the sake of resistance' (Bonefeld 2012:132, cited in Charnock 2014).

However, in decoding the qualitative 'non-conceptuality' that lurks in the quantitative conceptual, negative dialectics opens out upon political questions about the delineation of the possibility or impossibility of the right life in a wrong world. Far from mere theory, it constitutes a 'conceptualised praxis'. It thereby provides not the 'impoverished praxis' popularly associated with critical theory, but poses precisely the key 'question' of praxis: 'what really does it mean to say 'no' in a society that is governed by the movement of economic abstractions?' (Bonefeld 2016b:237). This praxis consists in a method that critiques and negates what is by opening up, and not seeking to contain or close off, the grounds for struggle over the apparent objectivity of quantitative representations of what are, in effect, qualitative relationships between people and things.

In this sense, the mediation of capitalist social relations in quantitative forms of objectivity always retains the antagonistic concrete core of capitalist society by mediating, and thus sublating, its contradictions (Gunn 1987:63). As Marx writes, the infrastructure of capitalist measurement and valuation of time and productive activity 'does not abolish these contradictions, but rather provides the form within which they have room to move' (1976:198). As such 'the "play" of mediation is the play […] of struggle itself' (Gunn 1987:64). The proximity of mediation and struggle creates the possibility of moments of demediation, a possibility contained within mediation itself (Dinerstein 2015:21-22). This is not the same as pure immediacy, impossible in a world determined by abstract objective forms of economic action and calculation (Gunn 1987:64). Forms of mediation like value, money and the state contain the possibility of demediation because they mediate, at their core, the capital-labour relation (Bonefeld 1987:68) which is by its very nature contingent upon and characterised by struggle and thus unstable. As Gunn writes, 'the unfixity of form signals its openness to a future' (1992:32), and it is part of the focus of the case study to explore whether such an unfixity can be found in the form of data.

3. Alienation, fetishism and concrete abstraction

Lefebvre's position within Marxist and critical theory is typically defined by his signal contributions on the study of space (1991, 1996) and everyday life (2008). But for the majority of his career he was also concerned with the delineation of a Marxism, open in character, by means of a sustained 'metaphilosophical' engagement with form analysis and dialectical method (2009). Against the Althusserian orthodoxy of the day, which posited an 'epistemological break' between Marx's juvenile 'humanism' and his later 'political economy' (Althusser 2005), Lefebvre's undertaking was characterised by the presentation of a seamless continuity between how Marx young and old deployed concepts of alienation, fetishism and abstraction (Charnock 2010:1281; O'Kane 2018:257). For Lefebvre (2008:79), the theory of alienation in the early Marx 'becomes transformed into the theory of fetishism' in Marx's *Capital*, his humanism made 'richer and [more] explicit' (Lefebvre 2008:89). The reason that this transformation was so important to Lefebvre was that he 'came to Marx via Hegel', reading the former with and not against the grain of the 'continuities running through German Idealism' from Kant through Hegel to Marx (Charnock 2010:1279, 1285), centring on the role of knowledge in 'abstract[ing] from concrete lived experience' (Charnock 2014:314).

An intractable alienation stems from 'the 'dominance over man of his own products' (Lefebvre 2009:81), knowledge included. For Lefebvre this fetishism consists not only in the commodity, which marks the contemporary incarnation of a more general condition, but in the way that humankind itself is 'dominated by a world that is 'other' even though [it] gave birth to it' (2009:51-52). In this, Lefebvre displays clear affinities with Open Marxism's negative dialectics of the 'nonconceptual within the conceptual' (Charnock 2010:1286). For Lefebvre, the practical content of the human intercourse with nature constitutes itself in certain social forms that then impose themselves upon humans in their domination (O'Kane 2018:257). But, as in Open Marxism, there is room for struggle 'in and against' these forms. Lefebvre, too, theorises the negation and suspension of the determining subject within its reduction as object (Charnock 2010:1286). But, similarly, he also sees how the 'logical and practical negation which restrains' the subject 'does not succeed in destroying' it, and the subject can 'assert themselves within the reduction' (Lefebvre 1976, cited in Charnock 2010:1286). Accordingly, the way that Lefebvre sees alternatives resiles, like Open Marxism, from resistance for the sake of resistance against 'particular varieties of alienation' or 'liberal (humanist) ideology' (1996:371), emphasising instead reappropriation (of space) or remediation (in the workplace), as well as an 'espousal of difference over homogeneity' and 'politicization of desire' (O'Kane 2018:265-6).

All this rests on a conceptualisation of 'concrete abstraction' (O'Kane 2018), which plays a role akin to concepts of 'real abstraction' (Sohn-Rethel 1978). Human praxis assumes the mode of appearance of abstract social forms like money and state that are 'more and else than mere illusions' along the lines of the old Marxist canard of 'false consciousness' (Lefebvre 2009:77). These abstractions are 'concrete' and not simply 'in the mind' because 'constituted by social praxis' (O'Kane 2018:259). Hence the Kantian schema is appropriated in the same way as in Frankfurt School critical theory (Lotz 2014), with the abstract categories through which 'sense-perception' is filtered relating not solely to thought, but stemming from practical activities of production and exchange (Lefebvre 2009:109). Far from 'epistemological deceptions' (O'Kane 2018:259), this grants these abstractions a 'practical power' and a 'concrete objective reality' (Lefebvre 2009:76-77) that attains the same fetishistic 'thing-like' autonomy the forms of social domination assume for Open Marxism and other cognate strands of critical theory.

As O'Kane asserts (2018:259), form analysis resounds in Lefebvre's writing, with fetishism understood as a 'mode of existence' of social reality' both 'real and unreal' (Lefebvre 2009:81). Where Lefebvre adds to this analysis is by using concrete abstraction to relate social domination to a broadly-conceived notion of production encapsulating the everyday production and reproduction of the human being and its social relations (Lefebvre 2008). As Charnock (2010:1292) contends, in this way Lefebvre surpasses the narrow concern with labour and labour-time present in some strands of the critique of political economy and opens up the study of capitalist social forms to life itself and the contextualisation of labour within it. This opens up to scrutiny a concept as 'betrayed, abandoned and denied' as the body, which for Lefebvre becomes the 'point of departure and destination […] upon which the space of particular society is built' (Lefebvre 1991; Kerr 1994:25), space 'transforming 'lived experience' and 'bodies' into 'lived abstractions'' (O'Kane 2018:265). The body, too, also plays a vital role in Lefebvre's writings on time and the delineation of the rhythmanalytical method, which we will consider in the next section.

By opening up form analysis to the body, Lefebvre connects with what Bonefeld calls the 'ad hominem critique of political economy' present in Open Marxism, so-called because it deals with what Marx calls the 'muck of ages' (Bonefeld 2016a:65), the 'non-conceptual' violence and material coercion concealed within the conceptuality of capitalist abstraction. The latter rest in our relationship with 'sensuous things', but our material existence is mediated by 'supersensible' social forms we both subsist through and struggle against. This materiality, rooted in social reproduction and the struggle to subsist, means that real (or concrete) abstraction, as Lukacs noted, 'has the same ontological facticity as a car that runs you over' (quoted in Lotz 2014:xiv). Lefebvre, too, records this when he suggests that, rather than something entirely uprooted from the concrete, '*there is a violence intrinsic to abstraction*, and to abstraction's practical (social) use' (Lefebvre, 1991:289, cited in Wilson 2013:370). As Wilson (2013:370) notes, 'the intrinsic violence of abstract space is therefore only fully realized through the concretization of abstract representations within the materiality of everyday life', playing out in part upon the terrain of the body. This spatial element of social domination and the position of the body with it will be relevant to the discussion of the rhythmanalytical performance research in Sections 5 and 6.

Within the literature on 'concrete abstraction' in Lefebvre's oeuvre, there is some dispute over the extent to which Lefebvre's interpretation of the concept implies a transhistorical understanding of human domination. One reading might suggest that alienation and fetishism work from some transhistorical human essence to effect 'the devastating conquest of the lived by the conceived, by abstraction' (Lefebvre 2006:10). That much one might infer from Lefebvre when he suggests that 'fetishism properly so called only appeared when abstractions escaped the control of the thought and will of man' (Lefebvre quoted in Wilson 2013:366), the origin of which one could well place in human rationality itself (Wilson 2013:366). Lefebvre certainly appears to favour this interpretation when he classes alienation as 'the form taken by dialectical necessity in human becoming' over some 'thirty centuries' (Lefebvre 2008:169-184, cited in O'Kane 2018:257). On the other hand, as O'Kane contends, Lefebvre can be conceived not as 'the 'reigning prophet of alienation' with an expansive transhistorical notion of alienation, romantic domination and humane resistance founded on a problematic opposition between quantity and quality' that transcends capitalist society, but rather as also having a 'theory of abstract domination' historically specific to the latter (2018:266-7).

It is entirely possible to hold to a conceptualisation of alienation as intrinsic to the human capacity to grasp and encounter the world in thought and practice, and to see the particular social forms that characterise a historically specific kind of society as temporary appearances taken by this general condition. In this way 'value and money', in our own time, constitute 'quantitative abstractions, abstract expressions of social, human relations' (Lefebvre cited in Wilson 2013:366), but may be joined or replaced by others, arriving in the name of either liberation or domination. Lefebvre implies this when he writes that the 'world of commodities' *belongs* to the process of abstraction, and not the reverse (2008:5). This leads Lefebvre to open out form analysis to apprehend not only the 'characteristic dominating forms of capitalist society', but 'an array of complementary dominating forms which suffuse the content of everyday life in capitalist society' (O'Kane 2018:260), outside the spheres of labour and exchange and the production and reproduction of human life and social relations as a whole. As we shall see, data may well constitute one such form.

4. Trial by time: Space, time and the rhythmanalytical method

The current commentary on Lefebvre's Open Marxism has tended to focus on Lefebvre's empirical concern with everyday life and specifically the role of *space* within it. In one of the earliest contributions to this literature, Kerr (1994:23) notes how Lefebvre rejects the Marxist focus on time for a conceptualisation of space as the key contemporary problematic. The Marxist focus on time carries over into the Open Marxist tendency, with Charnock observing that Open Marxists like Bonefeld 'cling to time as the locus of critique', where for Lefebvre 'the critical labor of the negative should necessarily be aimed at space' (Charnock 2014). However, Charnock notes that Lefebvre did eventually go on to 'focus largely upon questions of time in his late works'. He does so by beginning to 'develop a *method* which is able to apprehend social space […] with its own specific time or times' or, in other words, 'the rhythm of daily life' (Kerr 1994:25). This is *rhythmanalysis.*

This account constructs a continuity between the Lefebvre's conceptualisation of 'abstract space' (1991) and a theorisation of 'abstract time' of a piece with Lefebvre's understanding of the development of human rationality elsewhere in his work on dialectical method and everyday life, whereby 'Cartesian notions of time and space as homogeneous and infinitely divisible' produce quantitative abstractions that dominate and alienate praxis (Wilson 2013:366). Abstract space is a specific conceptuality of capitalist modernity that negates its non-conceptual constitution in human practice and the differences that attend its material basis in bodily lived experience (Charnock 2010:1293). Abstract space is emptied of 'lived' time because with Cartesian modernity the latter exists only abstractly itself, mediated through 'measuring instruments' (Kerr 1994:30, Lefebvre 1991:95). But a 'trial by time' is still made possible (Kerr 1994:30) because abstract space 'carries within it a certain determination' in a 'differential space-time' that it negates (Charnock 2010:1293; Lefebvre 1991:50). Here Lefebvre echoes a vital Open Marxist insight to suggest the continuing possibility of struggle and critique within these conditions. Where Gunn suggests that 'totality' is better thought of as the unresolved process of 'totalisation', Lefebvre suggests that the abstract homogeneity of abstract space is similarly only an end goal never reached (Gunn 1992:16; Lefebvre 1991:50). Time sits behind it, negated.

It is the aim of rhythmanalysis to uncover what is concealed by exploring the relative coincidence and conflict between different natural and social rhythms-

specifically those between our embodied circadian and biological rhythms and the rhythms of work and organisations. Rhythmanalysis thus builds upon the theorisation of the 'concrete abstraction' of capitalist time present in Lefebvre's earlier work on everyday life (2008:11). As Wilson (2013:375fn3) puts it, this concrete abstraction comes about with the 'advent of capitalism' when, with 'the measurement of value by labor time, time came to be represented—like money—as abstract, homogenous, quantifiable, and divisible into identical units'. The crucial aspect is how this linear time leaves the workplace to 'establish itself as a concrete abstraction in everyday life'. Everyday life for Lefebvre consists of work time, leisure time and other 'constrained' times of travel, bureaucratic tasks, grocery shopping and so on. For Lefebvre, the sphere of work has a specific temporality. It is 'abstract, quantitative', 'homogeneous and desacralised'. Its instruments of measure are watches and clocks. For Lefebvre, this temporality reduces life itself to its logic, decontextualising labour-time from its situation in the embodied time of life as a whole. Translated into labour-time, the time of work has become 'the time of everydayness'. It affects 'sleep and waking, meal-times and the hours of private life, the relations of adults with their children, entertainment and hobbies, [and] relations to the place of dwelling'. These all become governed by the same rationalisation and routinisation that was once restricted only to the formal process of production (2004:73), and the 'organic relationship between nature and lived experience' is sublated within 'the subordination of society to an abstract, conceived order' (Wilson 2013:375fn3).

Lefebvre suggests that the usurpation of everyday life by the temporal practices and patterns of work is by no means complete. Whilst they are negated, traces of the earlier rhythms remain 'in and against' abstract time, specifically those relating to the cyclical sensual rhythms of the body. But these rhythms appear in a reconfigured form. '[G]reat cosmic and vital rhythms', of 'day and night, the months and seasons', and of biology, both underpin and exist alongside these new rhythms (2004:73). As the negated material condition concealed within abstract linear time, cyclic time lives on 'in and against' its abstraction, 'exerting a disruptive influence on linear time's rigid structures' and, crucially, keeping open the possibility of different temporal mediations of lived experience (Wilson 2013:375fn3). This is something that 'requires detailed research' amounting to nothing less than 'a science, a new field of knowledge' (Lefebvre 2004:3, 74): rhythmanalysis.

In line with Lefebvre's understanding of 'concrete abstraction' which extends the critique of political economy to include within form analysis the 'non-conceptual' presence of bodies in space, this rhythmanalysis is concerned with the lived and bodily experience of concrete time negated within its abstraction as linear time. The key participant in rhythmanalysis is the researcher themselves, whose body and own experience acts as the measuring instrument. For Lefebvre, Reality 'rich in meaning' can be 'grasp[ed] directly' only by the senses (2004:15). Lefebvre suggests that the sensible is the medium by which one collects and renders for analysis empirical data. The jarring sensory experience of difference in contrast to repetition is a key moment in rhythmanalysis. The possibility of recognising rhythm relies upon some aspect of everyday life dropping a beat. The repetitions that constitute rhythm appear only with the deviation of phenomena from its usual pattern. Difference makes rhythm sensible to the rhythmanalytical researcher (2004:8), via 'the psychological, social, organic unity of the 'perceiver' who is oriented towards the perceived', because 'we are only conscious of most of our rhythms when we begin to suffer from some irregularity' (2004:77). However, rhythm being the sum of 'multiple strands of the social, temporal and the spatial', myriad 'materials, actions, texts and other data', situated in a

relationship of 'simultaneity' with one another, are necessary to analyse it. The identification of rhythms is thus a 'prospective and retrospective' affair dependent on the volition of the researcher in delineating where rhythm consists (Pigrum 2008). In the case study that follows, the positionality of the researchers as both participants and performers of the data plays upon this relationship of data, rhythmanalyst and rhythm.

5. Case study: Sonification and the quantification of the self

Current discourse in performance research emphasises experience over accurate representation, and quality over quantity (Lamontagne 2012). Inspired by the Open Marxism outlined above, and its project of exploding the quantitative abstraction to which qualitative human practice both contributes and is subject in capitalist society, the performance research utilised in the case study confronted the veneer of equivalence the data of self-quantification grants to human processes and what we will go on to discuss in the next section as 'living labour', exposing the elision of embodied rhythms. Appearing on stage to actively perform data collected about the physical and emotional rhythms of our working and home lives aimed to destabilise this equivalence and expose the lack of equivalence the data dialectically conceals within itself as its negated material and social foundation. As such, one aim of the project was to make visible and tangible the flux between the material specificity of our labouring bodies and the immaterial world of data which represents their concrete abstraction.

Labour in the digital age is sometimes conceptualised as 'immaterial production' (Lazzarato 1996), a play of signs and signifiers producing services and experiential goods divorced from the materiality and physicality of traditional capitalist work. The resultant expansion of working time to occupy the time of life itself, and the immaterial immeasurability of contemporary digital, cognitive and communicative work, this argues, shatters the abstract mode of domination represented in a 'crisis of measurability' (Pitts 2018). The case study that follows builds upon existing critical work interrogating the continuingly material and embodied physicality underpinning digital labour by scholars of both organisation (Sandoval 2015) and performance.[2]

The performance research method on which the case study centres used data gathered from off-the-shelf self-quantification devices and apps widely available to the buying public: a FitBit counting steps, sleep stages and heart rate; a continuous blood glucose monitor running from a Bluetooth-enabled arm implant; a heart rate variability (HRV) monitor used to measure 'readiness' for athletic training; an app-based survey which prompted us to tell it when we ate, drank, exercised or went to the toilet; and a mood rating scale. The technology was used to record our own data over the course of a week. The data collection and analysis took Lefebvre's concept of 'rhythmanalysis' as a methodological anchor point. This guided the project's search for a way to reveal the internal rhythms of the body in relation to those of the work environment. The data we each collected across a working week was used to create a composition incorporating both synthesised sounds and audio recordings of our bodies and work environments. We each completed a week's recording and exported our data into .csv (spreadsheet) files, which needed to be formatted. From the raw data the sound artist wrote instructions in Max MSP (software) to allow different parameters of our data to affect different aspects of the sound, which was running in Ableton (sound software).

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[2] http://arthackday.tumblr.com/post/80993595877/dani-ploeger-jelili-atiku-back-to-sender-in

We experimented with using different 'modes'. In each mode some variables were controlled by the data. The heartbeat determined the tempo of the beat, and some were controlled by us live in response to the data score, e.g. changing the pitch of a synth part in relation to our current stress rating which we followed on screen. We performed the composition live onstage, placing our bodies back into relation with the data they created. The prototype was performed at the Cube Microplex, a community-owned cinema and music venue in Bristol.

The process of composing the soundtrack and concept for the performance mimicked the process of data analysis and representation in conventional academic research, and hence the 'new science' set out by Lefebvre in his work on rhythmanalysis. Despite the apparent 'objectivity' of our data, many of the biggest decisions made during the process of analysis and performance of the data were over which sounds to assign to which data parameters, based on subjective associations of our own qualitative feelings with the experiential time negated in the quantitative data. This had the overarching goal of sharing the affect of the data through, for instance, changes in intensity over time.

The first building block of the affective relationship with the audience was placing our bodies on stage and bringing attention to the material infrastructures through which the data was produced and performed. In recognition of the importance of the interpretation and working through of affect for the study of work and organisation (Fotaki et al 2017), the performance aimed for a radical demediation of quality in quantity through the production of an 'affective atmosphere' (Michels and Steyaert 2017) generating felt impact upon the audience of the piece's combination of sound, visuals and movement through time and space. 'Performing' the research is an action that gives it duration and physicality and renders it perceptible. Depending on the format, different degrees of participation and spectatorship are possible for the audience, and the boundaries the between these modes can be blurred by the affective nature of audio-visual elements. In terms of affect, sound has a forceful and physical impact of its own (Michels and Steyaert 2017), achieved by means of waves and vibrations which communicate the data in different ways than the apparently objective veneer of number with which we are most familiar in our everyday lives. It was by means of the creation of an affective environment that the 'meaning' of the data we had accumulated could be performed and shared with the audience.

We each performed our own subset of the three overlaid datasets to progress through the seven days of the study simultaneously on stage. During the performance we could each switch our sounds on and off with controls, allowing us to focus on only one person's data or build a combination- for instance, of three heartbeats. A key feature of the sound composition was that we could change its overall speed - slowing down to 'zoom in' on the detail of a few seconds, or speeding up to power through the last 3 days in 10 minutes, observing longer-term patterns by condensing time. We created different 'modes' to reflect this, which had a different sound quality. At 1:1 speed, actual recordings of each of our heartbeats played at a speed determined by our heart rate data. We assigned a high, whining sound to blood glucose which 'felt' like the feeling of having eaten too much sugar. In the slowest mode, 'Microsound', self-captured audio recordings of our work environments slowed down until they became 'microscopic-sounding' data artefacts. In the fastest mode, a driving techno beat carried on regardless of our data states. We each had a synth line and a drum part - hi-hat, snare or kick - to bring in and out of the mix, the qualities of which were controlled by parameters in our data, resulting in a semi-improvised composition between our individual parts which played with the tropes of techno music. These

spaces in the performance for improvisation through 'solos' and 'jams' allowed for in-the-moment sonifications, expressing our present individual interpretations of the real, past events the data captured.

This awareness of the reflexive nature of interpretation was compounded by mistakes and technological glitches that highlighted the absurdity and subjective undertow of any claim to total objectivity in the data or its digital representation. For instance, the visual of this first performance, like these ways of processing the sound, was an experiment in the limits and possibilities of communicating the qualitative meaning of the quantitative data to a non-specialist audience. To make clear the relationship between life-time and labour-time which we explore in more detail in Section 6, we sat in a row at desks, facing the audience, each with a laptop, a sound controller and a desk lamp. The latter's illumination controlled automatically via MIDI by each of our respective volume levels, to give a visual cue as to whose data/sounds were active in the composition. The large cinema screen behind us showed a visual where our heart rate, glucose and steps were represented by coloured line graphs. A marker ticked through the week, showing the day, time and speed. But the more we attempted to transmit and communicate to the audience the specific meaning with which we endowed incidents and time periods captured in the data, the more it eluded our capacity to do so, as the screen behind became overloaded with information, eventually crashing.

By placing our bodies onstage and foregrounding the physical devices we used to perform the data, we disrupted the apparent immateriality of the medium and reconnected our physical forms to the data they created. Moreover, the sound itself had a materiality, travelling and vibrating through space and destabilising the notion of the immaterial unpinning the world of data by establishing an affective relationship between performer and audience. The data was once generated by a body, using a device made by a body. The sonic form it assumes in performance is mediated by bits of information moving through a physical computer system, and the audience and participants can hear it because the speakers translate information into vibrations picked up by our bodies. Sound, in this way, is affective.

In this way, the performance research presented the physicality and temporality of contemporary labour in its relationship with self-tracking wearable tech and apps. Specifically, it centred on the respects in which we can capture the way that they both rely upon and reshape in turn the bodily and circadian rhythms and affective experiences of the humans who labour in the digital workplace. The lived experience of collecting and formatting the data and designing the sound allowed us a new tactile, affective and temporal understanding of 'data'. Moreover, the performance actively sought to reconnect our bodies to the data they produced, reappropriating the means of quantification to communicate through affect. Practice and research are conceived in performance as one and the same action, not different aspects of the same project, insofar as performance actively reveals new knowledge. The use of sound showed that data *moves*, that it is not a more accurate concretisation of reality but an abstraction from it; it is not scientific and objective but changeable and up for grabs, and over which, as we shall see, political contestation and human intervention is possible in the name of other kinds of life and labour.

6. Room to move: remediating the reduction of life-time to labour

By placing the body in everyday life, what does the performance research reported above tell us about labour itself? The infrastructures of software and hardware we

used onstage are a product of the capitalist workplace, the 'corporate programme of efficiency and (rational) masculine affinities around production' that Moore (2018:10) identifies. Self-quantification technologies create a distance from the specific feeling body of the user, rationalising input into numerical goals and graphic lines. Moore (2018:8) points out 'the dangers in reading data in the workplace where each user has different life circumstances and desires' elided and abstracted from in that data. But, by working within the measurement of the movement of the body in motion, the project rescued a lived subjective experience of human activity abstracted from in its quantitative mediation as data, whilst posing the possibility of an alternative that works through this formal infrastructure for transformative social change.

The rhythmanalytical method underpinning the performance research presented in this paper seeks to uncover the conflict of circadian and bodily rhythms with counterposing rhythms set in place by clock time. Fleshing out Lefebvre's unfinished methodological endeavour of rhythmanalysis, here we might think of the contradictory unity Marx poses between living, subjective, concrete labour and dead, objectified, abstract labour. These three representations of what Lefebvre calls the 'conquest of the lived by the conceived' (Wilson 2013) – living and dead, subjective and objectified, concrete and abstract – all centre in some way on the role time plays in social domination (Postone 1993). Each contradictory unity sees 'the life-time of the worker' – the time of bodily lived experience – 'reduced to labour-time' (Bonefeld 2010:269), a process out of which the worker is cast as 'time's carcase', personified labour-time. In the case study above, the reduction of life-time to labour-time effected in the contradictory unity of living, subjective, concrete labour with dead, objectified, abstract labour was challenged principally by situating labour as an embodied practical activity within the expanse of life itself. This was done through the exposure of the physical and affective rhythms of the living subjective concrete labour concealed within the dead, objectified, abstract form it

Living, subjective, concrete labour 'is the expenditure of […] life's energy, the realization of […] productive faculties; it is […] movement' (Marx 1976:982). Taking place in lived time and space (Bonefeld 2010:262), it assumes an embodied form 'as process and as action' (Marx 1973:298), involving the 'expenditure of muscles, brains and nerves' (Bonefeld 2014:127-8; 2010:262). The results of living, subjective, concrete labour are transformed into dead, objectified, abstract labour, taking the form of infrastructures of value and its measure that exert the dominion over the dead over the living (Marx 1976:342), the past over the present, and the 'done' over 'doing' (Dinerstein 2012:532). Subjective concrete labour, embodied and 'present in time' (Marx 1973:298), is, simultaneously, continuously 'objectifying itself' as objectified abstract labour, undifferentiated labour equated and expressed in money upon the exchange of the useful goods and services produced.

This has a temporal aspect to which a rhythmanalytical method is well attuned. Whilst the commensuration of concrete labour as abstract is effected in exchange, an 'ideal precommensuration' (Arthur 2001:22) of labour proceeds by means of a 'real-time' abstraction in the labour process itself that posits labour-time in 'abstract units that add to themselves' (Bonefeld 2014:133). Being waged labour, labour power sold by the worker to the capitalist, concrete labour is already posited as carrying a determination as abstract labour expressed in a monetary value denominated in hours. Owing to its 'participation in the capitalist process of valorisation', concrete labour is posited as practically abstract in the course of its being 'counted' (Arthur 2001:22-3). This counting recodes the labour as 'abstract movement in time', an 'abstract activity,

pure motion in time' rendered quantitative, undifferentiated, equivalent – and thus manageable (Harvie and Milburn 2010).

Time, of all things, represents the guise in which this abstraction proceeds because the prevailing standard of 'socially necessary labour time' determines the 'value-validity' of the goods and services in which labour results when they reach the market in competition with those of other enterprises (Bonefeld 2010:262). Labour time is posited as the 'sole measure and source of wealth' (Marx 1973:706) because of the imperative to compete on the intensification and extensification of the translation of lived time into labour time in pursuit of the faster and more efficient production, circulation and consumption of goods and services. This criterion of value productiveness is realised in exchange, but concrete labour must conform to it in the labour process by assuming the 'form of its opposite', undifferentiated abstract labour (Bonefeld 2010:266).

This time, for Adorno (1990), is the 'ontologized' time of capitalist society, the time of value and, therefore, of abstract labour, dead and objectified (Bonefeld 2014:133). As Bonefeld writes, '[j]ust as motion is measured by time, so is labour by *labour time*' – and this latter time becomes in turn 'the living quantitative reality' through which labour is practiced and experienced, comprising 'abstract, constant and equal time units, measured by clock time'. This real-time abstraction has direct impact upon the body, a feature key to Lefebvre's rhythmanalytical recoding of Marx's critical method. What Marx calls the 'bodiliness of the worker' is negated in the course of this real-time abstraction. A focus on the human body such as that at the heart of the performance research method profiled here shows that the clock time of the capitalist labour process abstracts from the 'actual human affairs' at the heart of the 'human activity' it measures, 'regardless of [the] specific contents' of that activity insofar as it is synonymous with the bodily expenditure and reproduction of 'the individuals who meet their needs in time' (Bonefeld 2014:133-4).

The difficulty in overcoming the reduction of the life-time of the human body to the labour-time of real abstraction is that the living, subjective, concrete aspect of labour constitutes a contradictory unity with the dead, objectified, abstract aspect from which no one side can be separated. The reason why relates to Lefebvre's own insights about the continuing relevance of alienation in Marx's 'mature' work as an expression of something essential about the character of human thought and intercourse with nature that transcends capitalism alone. Object and subject cannot be simply prised apart, for the former - capital - is the condition for the realization of the latter - living labour, 'the worker who works' (Marx 1976:982-3), and vice versa. Without an object, the 'vitality' of subjective labour remains unrealised, pure capacity and potentiality (Marx 1973:514-5). Similarly, concrete labour only attains its social validity in the monetary form assumed by abstract labour, on which its reproduction depends. This 'alienation' of labour, its 'measurement' by labour time, is as such also its objective condition.

Whilst the contradictory unity of living and dead, subjective and objectified and concrete and abstract cannot be overcome simply by advocating one side of what is a dialectical unity (Postone 1993), there is an antagonistic 'opposition' (Marx 1976:982-3) at its centre that produces the 'room to move' of which Marx writes (1976:198). Within this contradictory unity is contained the antagonism 'between capital in an established form on the one hand and living labour as an immediate life task of the work on the other' (Marx 1976:993). This is expressed in the situation whereby labour 'alive […] can be present only as the *living subject* […] as *worker*' (Marx 1973:273). Sublated in the object, the subject is never entirely negated, but

retains a presence that poses a risk to the smooth continuum of quantification. As Veca (1971) notes, it is upon this subjectivity that opposition to capital, the 'opposition of objectified and living labour', and 'between past and present labour', may be anchored. The point of resistance, here, consists in the impossibility of closure in the struggle to commensurate the incommensurability of embodied existence under quantity. Whilst reality cannot be grasped or lived in a wholly unmediated way, the concrete can never fully yield to its abstraction in time and number. In this unyielding quality, what Sergio Tischler (2005:131-3) calls the 'time of insubordination' can play out, against the 'time of reification'. The latter is the 'uniform and continuous time' of capitalist valorisation, consisting of equivalent temporal units emptied of specific content and divorced from its context as a precondition and outcome of the process of its measurement. Within this abstract time, however, there persists a latent time of 'struggle over the reduction of human creativity' that at once 'can be realised only within the framework of a form of power [...] alien to it', whilst also simultaneously resisting its wholesale 'negation' in that power. As Marx writes (1976:342), '[i]f the worker consumes his disposable time for himself, he robs the capitalist' (ibid.), and releases the time of life from its determination as time of labour.

Facing up to the impossibility of overcoming of the contradictory unity through one or other of its terms, the rhythmanalytical performance research project detailed above was exercise in finding means and forms for the remediation of the embodied 'time of insubordination' Tischler describes. The performance research reported above moved through the abstractly dead and objectified quantitative form assumed by reified time of new modes of data capture and commodification in order to render more audible and affective the embodied rhythms of the insubordinate time concealed within it. Working through the risk that 'quantifying ourselves actually start[s] to shut down possibilities for spontaneity and undefined vitalities' (Moore 2018:10), the alternative mediations prototyped by the performance research repurposed self-tracking data for critical self-knowledge by making visible our own internal bodies in their negation as data. The bodily process of producing and formatting the data allowed us to see the material constitution mediated by data in practice. This rests upon the idea, inspired by Lefebvre, that the quantification of the self is not a neutral process of measurement but an active intervention into the world that *produces* data, and that there is a potential openness in this state of affairs that allows antagonism the 'room to move' Marx perceived in the measurement of labour-time. Within the 'room to move' afforded by measure the prototype performance method profiled above harbours the possibility for fleeting 'moments of excess' (Free Association 2011, Dinerstein 2015) in which reality busts through the capacity of forms of mediation to commensurate and reconcile its chaos with pre-existing categories and conceptual apparatuses. In this respect, the 'performance' and sonic manipulation in our project open out upon the exposure and politicisation of the qualitative core concealed in the quantitative, aiming at the production of moments of demediation and excess that in turn potentiate new formal (re)mediations of praxis in abstract data and sound.

This has practical implications for workers themselves, who in traditional forms of labour organisation have found within the mediations of their labour 'room to move' sufficient to struggle in, through and against capital and its forms of waged reproduction. The insights generated by wearables into the reality of the lived relationship with work suggest that tools of self-quantification could become tools of resistance in much the same way as the managerial clipboard wielded in the Taylorist factory (see Sohn-Rethel 1978) established forms of measure that were both used to dominate workers and by those same workers to organise around and strike bargains

over time, productivity and wages (Ferrari Bravo 2014; Tomasetti and Veersma 2017). Wearables could be repurposed in a similar way as instruments for politically recoding the measurement of work from the perspective of workers themselves, as a means for the 'shared curation' of evidence demonstrating the bodily impacts of work. This may facilitate opportunities to create new measures around which to organise collectively struck standards and agreements, making claims on value and the improvement of work conditions in support of mental and physical health and wellbeing. Permitting workers to both better understand their own labour and others, and make representations of it to employers, this technology may open new paths for collective worker resistance in an age of the fragmentation of organised labour. In so doing it would run against the grain of claims made over the 'immeasurability' of contemporary work and the purported crisis the unquantifiability of 'immaterial' labour poses to traditional forms of worker organisation and class struggle (Pitts 2018).

This is particularly the case with kinds of work where measures are less easily established, either because of the content or the form of the labour. The prototype performance research method presented here may, therefore, have the effect of 'rematerialising' (Doogan 2009) what appears as immaterial labour by providing evidence of the physical effects of work associated with an immaterial or intellectual character, demonstrating the time and space in which it takes place and the impact of it on the person who performs it- whether in terms of heart rate, stress, mood, mobility and so on. Workers such as the journalists Nicole Cohen surveys (2016), who in the face of technological change struggle to place claims on the value their creative labour produces, may especially benefit from other ways of evidencing and making plain the lived reality of the work they do through its quantitative mediation as data. They struggle to maintain and enforce existing forms of measure in the wake of the precarisation of labour. The quantitative reduction of life-time to labour-time is, in this respect, a comparatively favourable basis on which to barter for better pay and conditions. This bears a formal similarity with the Wages for Housework campaign (see Weeks 2011) which, sustaining critiques for its apparent willingness to comply with the exploited status of wage labour, recognised that to be exploited as wage labour was the precondition for the reproduction of human life as labour power to begin with, and a basis to bargain for better. Marxist-feminist advocates desired it for the reason that it brought women's work in the home under similar forms of measure that allowed male workers elsewhere in the economy to evidence their work and negotiate and strike in pursuit of higher wages and better working conditions. The case study presented here suggests that wearables may potentiate a platform on which to stake some of the same claims.

7. Conclusion

Through the lens of Lefebvre and Open Marxism, the developing research agenda presented here foregrounds how we can move through quantity to explore the *quality* of 'good' (Bales, Bogg and Novitz 2018) or 'decent' (Moore et al 2015; Thomas and Turnbull 2018) work by using self-quantification devices and wearable tech to represent experiences and impacts of work upon the body and the self. Further work is needed as to the optimum forms of ownership and shared curation of data that can best accommodate these outcomes. The key issue is how to collectivise what is currently an individualised and individualising process of commodification and control. Confronting attempts to repurpose and remediate the interface between individuals, data and society is the circumstance that the wearables themselves are devices

servicing the commodification of our data. The use of cloud computing means that in the context of personal or workplace use, wearables and whoever buys their data always already hold info about the consumer, and at work the boss likewise holds info about the employee.

One solution would be to make the technology available without the compulsion to automatically upload, empowering the individual with the option to share or not share their own data and harness it to gain rather than commodify knowledge about themselves and others. In this last respect, awareness of and literacy in those data-based forms of mediation could facilitate individual and collective resistance to social domination where it assumes quantified or tracked forms of workplace surveillance, performance monitoring, or workplace conditions that are detrimental to health and productivity. The decentralised quality of the apps, handsets and wearables on which this data is collected could be opened up to make clear to workers themselves temporal, bodily and productive aspects of the work they are doing and collectivised in such a way as to establish shared measures and standards around which they can understand their work and its impacts and results, organise around common issues and make representations of them to employers.

This makes possible what might take the form of a critical social science modelled on the rise of 'citizen science' (Smart et al 2019) as a means of open and accessible knowledge production and analysis applied to the workplace. Specifically, the technologies of self-quantification may, in the right hands, have the capacity to remediate a world of work that runs a constant risk of breaking the capacity of workers to make claims on value based on shared measures of the work they do, its results and its impacts. Whilst we intend to broaden the project to include a wider array of working lives and experiences, the first forays demonstrate the capacity for modes of creative exposition, communication and interpretation of data to call into question and render open to debate the rapidly proliferating infrastructures of control and commodification objectified in wearables and their measures.

Acknowledgements

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