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Citation: Bell, E. & Willmott, H. (2020). Ethics, politics and embodied imagination in crafting scientific knowledge. Human Relations, 73(10), pp. 1366-1387. doi: 10.1177/0018726719876687

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Link to published version: https://doi.org/10.1177/0018726719876687

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Abstract

This paper explores ‘research-as-craft’ as a sensitising concept that can elucidate the practice and representation of scientific activity by disclosing the presence of ethics and politics, as well as embodiment and imagination, which are generally unnoticed, denied or suppressed. Craftiness is demanded when grappling with indeterminacy that is endemic to the production of scientific knowledge but is rarely acknowledged, let alone thematised. Research-as-craft speaks to, and supports, a sense of scientific inquiry as an activity where the crafted ‘object’ and the researcher come together in a movement that articulates the ethics and politics of scientific knowledge production.

'Craft' is widely used in a rather casual way, figuratively and as a synonym, to characterise aspects of the process of generating and disseminating social and natural scientific knowledge (Booth, Colomb and Williams, 2016; Vagle, 2016; Beuving and de Vries, 2015; Kvale and Brinkmann, 2009; Bernard, 2006; Prasad, 2005). Here, we follow Bernard (2006) who declares that '[r]esearch is a craft. I'm not talking *analogy* here. Research isn't *like* a craft. It *is* a craft' (Bernard, 2006: 1, emphasis in original). Frequent but rarely elaborated reference is made to 'craft' when characterizing aspects of scientific knowledge production and dissemination, especially in the domain of qualitative inquiry (Atkinson, 2013; Liberman, 1999; O'Connor, 2017), and in the field of management and organization studies more specifically (c.f. Baer and Shaw, 2017; Patriotta, 2017). Yet there has been little sustained reflection on the significance these invocations as a means of advancing the self-understanding of scientific work and thereby informing scientific practice. To address this anomaly, we commend the notion of research-as-craft as a way of thematising what is opaque, yet signified by 'craft' in accounts of research. We thereby seek to facilitate scientific practices governed by a more purposive enactment of research-as-craft.

Etymologically, craft is polysemic[i]: it speaks to the embodied, imaginative, ethical and political. Accordingly, attentiveness to craft supports 'calls for continued deliberation and innovation – in particular, deliberation over the ontological relation between self (as researcher) and Other (as researched)' (Rhodes, 2009: 665). Reference to craft typically evokes a sense of dedication to the perfection of practice based on the acquisition of embodied skill over time (Sennett, 2008) – a dedication that is rendered intrinsically problematical by the presumption of perfection (Clarke and Knights, 2018). No less significant, we suggest, is the invocation of 'craft' to signal scientists' grappling with *indeterminacy* in the research process (Pinch, 1981; Latour and Woolgar, 1986; Collins and Pinch, 1993) that defies the certainties to which 'idealized notions of expertise' aspire but

'axiomatically are impossible to achieve' (Clarke and Knights, 2008: 1396). It is the 'indeterminacy inherent in social action' (Knorr-Cetina, 1983: 134) including the production and dissemination of scientific knowledge – more specifically, the underdetermination of action by antecedent constraints and the overdetermination of interpreted constraints – that frustrates the prospect of substituting the omniscience and discipline of epistemic reflexivity for the openness of judgment. At the extreme, craft gestures to what, in the context of social science, Klag and Langley (2013: 163) have termed 'the mysterious dimension of qualitative methodology', a feature they describe as 'magical' but which we characterize as 'crafted' and 'crafty'. More mundanely, it has been observed that '[c]raft practices…enable the scientist to get on with the everyday business of *doing* science', even though scientists, natural and social, may be only dimly aware of the presence and significance of these practices since 'they rest on tacit knowledge, they are frequently messy, and they cannot be easily generalized outside the local situation' (Pinch, 1981: 151). That is why craft is important for understanding and informing our practices as (social) scientists: it is central to getting science done, yet is merely glimpsed, rather than registered or appreciated, in accounts of research practice.

In the field of management and organization studies, recognition of craft as central to processes of knowledge production is valuably signalled but not elaborated by Prasad (2005) when she characterizes 'science in practice' as 'an inventive form of *craftsmanship* that is constantly engaged in adjusting and reconfiguring scientific protocols to meet the vagaries of each unique empirical situation' (p.7, emphasis added). Acknowledgement of the 'vagaries of context' is critical but should not be regarded as given or self-evident. Instead, we conjecture, through the concept of craft, that each 'empirical situation' is interpreted imaginatively, or craftily, by embodied researchers working within communities of practice (Lave and Wenger; 1991; Bourdieu, Chamboredon, Passeron and Krais, 1991). Since this indexicality[ii] of

research practice is generally unnoticed or suppressed, and so is undeclared, researchers wishing to learn about it are 'largely left in the dark' (Van Maanen, Sørensen and Mitchell, 2007: 1149). To remedy this shortcoming, we propose 'research-as-craft' as a sensitizing concept[iii] that, in addition to registering and developing awareness of the embodied (Sudnow and Dreyfus, 2001) and imaginative (Weick, 1969) nature of scientific knowledge production, informs and strengthens an appreciation of its political and ethical formation and effects (Haraway, 1988).

By *ethics* we do not mean a set of 'rules, virtues or formulas [or protocols] that might be used to ensure or judge righteousness' (Rhodes and Carlsen, 2018: 3). Rather, we commend a conception of ethics-in-practice that involves struggles with challenges in the conduct of research that resist the mechanical application of rules (Guillemin and Gillam, 2004; Derrida, 2002). Such struggles are marked by vulnerability and are conditioned by events that escape prediction and control, as 'one's own knowledge and self-understanding are themselves [rendered] open to question through the research encounter' (Rhodes and Carlsen, 2018: 3). Research-as-craft conceives of knowledge producers as embodied beings who grapple imaginatively with 'the radical contingency [of social objectivity] that mark[s] our inquiries, our lives' (Bernstein, 1991: 336). The requirements of codes or virtues may inform struggles with indeterminacy but, ultimately, an ethical leap is required. Understood in this way, research, as a craft, 'is always and inextricably fused with the ethics of our relations with the people we study' (Liberman, 1999: 55). By *politics*, we mean the mobilization of material and symbolic resources to produce and disseminate particular forms of knowledge. The production of scientific knowledge is understood to be embedded in politically (re)constructed institutional contexts that it actively reproduces and, potentially, transforms. When developing or performing (temporary) resolutions of issues faced as

generators or reporters of scientific knowledge, researchers are apprehended as inescapably engaged in ethical and political work.

We begin by thematising the role of craft in knowledge production in relation to three forms of reflexivity – constitutive, epistemic and disruptive. We then argue that the invocation of craft in accounts of research practice points to the significance of indeterminacy and disruptive reflexivity. Next, we address two key aspects that characterise research-as-craft, imagination and embodied knowing, before showing how invocations of craft in accounts of research practice signal the importance of politics and ethics in processes of generating, evaluating and reporting knowledge. In conclusion, we consider the implications of research-as-craft for the self-understanding and practice of social scientific inquiry.

Mobilizing reflexivities

In addition to being imaginative and embodied, etymologically, 'craft' connects the application of skill to the ethics of self-formation and the politics of performativity (see note 1). It encompasses 'the power to control one's own pattern of life, its shape and speed, to resist through the process of making and designing' (Greenhalgh, 2002: 8). This capability, and the responsibility arising from researchers' involvement in representing and changing their objects of study, invites consideration of the role of reflexivity in processes of knowledge production. Exemplified by a capacity to become aware of 'how knowledge changes its own object' (Smith, 2005: 12; Bourdieu, 2004; Alvesson, Hardy and Harley, 2008), the significance of reflexivity for research resides in the provision of

> a guard against… the assumption that there is an unproblematic relationship between us and the world, including social scientific practices and its products, which results in a valid and reliable representation of the world (May and Perry, 2017: 4).

In the absence of reflexivity, research findings, and the assumptions on which they are based, can be treated as quasi-autonomous, fetishised nuggets of knowledge, acquired without regard to their sensuous and socially organized production and application. Such an approach to the production of knowledge (re)produces an objectivistic sense of being '*in* the world, not *with* the world' (Freire, 2005: 75). Cartesian separation, or dualism, between subject (researcher) and object (researched) contrives to bestow credibility on knowledge that, as a consequence of the ostensible split, is declared to be devoid of subjectivity, and therefore neutral and objective (Sandberg and Tsoukas, 2011). Conversely, when this dualism is placed in question by a dialectical understanding of the subject-object relationship, claims to neutrality are reframed as expressions of ideology, not least because as they are seen to dissemble or mystify the political and ethical conditions and consequences of scientific knowledge production.

To explicate the relation of subject and object, we distinguish three kinds of reflexivity – constitutive, epistemic and disruptive. Following March (1996), we conceive of scientific knowledge production as comprising elements of 'openness' and 'discipline' that are fully engaged only when the former's unruly, creative aspect is valued as much as the orderliness provided by 'discipline' (Hirsch and Levin, 1999). The first *constitutive* form of reflexivity is endemic to suspension of doubts about the reality of social objectivity – it enables actors to maintain what Giddens (1979: 128) terms 'the basic security system' that underpins the (re)production of social realities, including everyday and scientific life-worlds. *Epistemic* reflexivity is mobilised when testing and thereby warranting or falsifying the validity of knowledge claims. Finally, *disruptive* reflexivity amplifies doubt by breaching convention and challenging the basis of gaining security and testing knowledge claims. It attends to what knowledge produced within the restrictions of epistemic reflexivity 'is not capable of saying' (Alvesson and Skoldberg, 2000: 246); it thereby challenges one-sided

applications of discipline, supported by epistemic reflexivity, in which craft(iness) is engaged but, being placed in the service of refining technique, is unacknowledged.

Constitutive reflexivity is articulated as 'knowledgeability' which, following Giddens (1984: 375), comprises everything known by actors – tacitly and discursively – about how to 'carry on' their activity – as makers, or as researchers, for example. It is a ubiquitous condition of the on-going production of social/material order(ing) in its diverse forms. So endemic that it is 'seen but unnoticed' (Garfinkel, 1967), constitutive reflexivity ensures a sense of self-evidence or taken-for-grantedness. The 'knowledgeability' accomplished by constitutive reflexivity provides an accountable (sense of) lay and scientific orderliness that is, nonetheless, inherently vulnerable to disjuncture. Its fragility is demonstrated when lay or scientific routine is breached resulting, *in extremis*, in the collapse or breakdown of the 'basic security system' (Giddens, 1979) as manifest, in the scientific realm, in a paradigm shift (Kuhn, 1969).

Epistemic reflexivity interrogates the plausibility, and ultimately the truth, of lay and/or scientific manifestations of knowledgeability. Centrally, it warrants claims to objectivity. Epistemic reflexivity is distinguished by its adoption of a God-like position from which 'a methodological basis for enhancing objectivity' (Lynch, 2000: 26) is established. Epistemic reflexivity assumes and promotes a sense of sovereignty capable of revealing and removing extra-scientific influences (e.g. biases) in knowledge production (Rouse, 1996). In the context of a pre-modern, medieval worldview, the application of epistemic reflexivity challenged established practices which were regarded as an impediment to innovation and progress promised by science. In the modern context, the target of epistemic reflexivity is indeterminacy, manifest as uncertainty or equivocation. It advocates the refinement of 'technique' as the means of removing sources of indeterminacy (e.g. bias), thereby warranting objectivity (Bell, Kothiyal and Willmott, 2017). Mastery of technique – whether

quantitative or qualitative is presumed 'to display a discovered order with a high degree of fidelity and verisimilitude' (Deetz, 1996: 197). Epistemic reflexivity is engaged by diverse producers of knowledge – from scientific Marxists to evidence-based positivists – when striving to validate their knowledge claims. In the field of management and organization studies, it is most apparent in what Cornelissen (2017) characterizes as "factor analytic" approaches but is pervasive through the prevalence of neopositivism (Prasad and Prasad 2002; Johnson, Buehring, Cassell and Symon 2006).

To give an example from the domain of culinary science, molecular gastronomy aspires to escape the contingencies of culinary craft. Working within 'the regimes of experimental deduction' (Roosth, 2013: 8), exponents pursue a decontextualized science of food preparation that disregards 'interactions of people with national, familial, and ethnic identities, senses of nostalgia, taste and historicity' (p.12). Reflection on the craft(iness) involved in establishing and maintaining such 'regimes of experimental deduction' (Roosth, 2013: 8) is restricted to the methodological identification and removal of sources of bias associated with specific contexts of food preparation. '[T]he unity of science, craftsmanship and artistic quality' (Gustavsson, 2004: 11) thereby becomes fragmented – with the consequence that faith in the unity and superiority of an idealized, monist conception of science drives out 'every other possibility of revealing' (Heidegger, 1977: 14, emphasis added; see also Collins, 1999) in a manner that parallels 'abstracted empiricism' in the social sciences (Mills, 1959).

Finally, *disruptive reflexivity* points to contingencies, paradoxes and uncertainties in every (social) scientific endeavour, and so attends to how claims to objectivity may obfuscate or mask their contingency. Disruptive reflexivity amplifies a central lesson concerning the pervasiveness of constitutive reflexivity: namely, that 'a necessary feature of action is its partial indeterminacy' (Nicolini, 2013: 48). Indeterminacy may be obscured but it cannot be

removed. As Law (2004: 2) puts it: not only is everyone a participant in the 'reflexive and self-reflexive project of monitoring, sense-making and control' but we are also 'caught up in its uncertainty, its incompleteness, its plurality'. Disruptive reflexivity recalls the limits of order generated by constitutive and epistemic reflexivity as it reclaim[s] conflicts suppressed in everyday life realities, meaning systems and self conceptions' (Deetz, 1996: 203) that include those of science and scientists **(Author XXXX)**. Disruptive reflexivity is attentive to how every remedy for dis-order, as sought out by constitutive and epistemic reflexivity, is irredeemably vulnerable to unintended (circumstantial) or deliberate (reflexive) disruption.

Accordingly, disruptive reflexivity deconstructs the orderly, reductionist objectification of craft(y) practices to 'mere' skill. Disruptive reflexivity discloses the contingency of the boundaries that define the meaning of constructs, such as craft, as it debunks their apprehension as something external which comprises distinctive, observable and measurable elements, rather than the unstable outcome of processes of co-production within asymmetrical relations of power. Disruptive reflexivity valorises openness by revealing how, for example, procedures of concept clarification, the specification of variables, and the testing of propositions, are enacted through normative (ethical and political) practices. Disruptive reflexivity recalls how, in practice, clarity, specificity and testing are products of (normalized) convention, not unforced consensus. Hence a one-sided, undialectical approach can be maintained only by excluding or suppressing what does not comply with, and thereby affirm, the approved procedures of what Hirsch and Levin (1999) instructively term 'validity policing'[iv].

To be clear, disruptive reflexivity does not, and cannot, 'debunk' other forms of knowledge in the sense of invalidating their claims, as Anderson and Sharrock (2015: 6) contend when suggesting that such reflexivity also succumbs, self-deceptively, to a 'god trick' (Lynch, 2000: 26). Nor does disruptive reflexivity deny or dismiss the pursuit of

epistemic reflexivity. Rather, it draws attention to the inherently problematic nature and incompleteness of its quest. The temptation of omniscience to which Anderson and Sharrock (2015) refer is perennial, but the consistent application of disruptive reflexivity heightens, rather than diminishes, sensitivity to the ethico-political conditions and consequences of producing knowledge. This sensitivity is exemplified by Marks (2008) in a social scientific study of the ethics and political effects of how stems cells are defined and classified. She attends to the restrictiveness and limits of scientists' reflection on these effects (see p.243), while acknowledging that her analysis is itself perspectival:

> Although I am committed to helping scientists be more reflexive by giving them a sociologically informed understanding of their knowledge, I do not argue that my knowledge claims are more *truthful* than theirs. They are instead offered as ways to open-up for examination and change the already-existing, often crystallised, and sometimes problematic forms of public engagement. Thus, the interpretative reflexivity I am advocating is different to Bourdieu's reflexivity thesis, and social scientific understandings are not seen as *truer* than natural scientific or commonsensical ones. (p.236, emphasis in original)

Marks's stance distances the knowledge claims generated by disruptive reflexivity, or what she terms 'interpretive reflexivity', from those produced by epistemic reflexivity which, as noted above, assumes the possibility of transcending contingency to attain objectively 'truer' understandings. This disruptively reflexive stance is, however, easily mis-read, especially by those steeped in epistemic reflexivity, as advocating a position that aspires to *displace*, rather than one that seeks to *debate*, existing ways of making sense of the effects of how, in Marks' research, stem cells are defined and classified. Marks' attentiveness to contingency is resonant with an understanding of craft as 'the workmanship of risk' (Pye,

1995) where, in contrast to variants of 'the workmanship of certainty', there is an awareness of how 'the quality of the result is continuously at risk during the process of making' (p.20). Contingency is recognized through the situatedness of practice, the particularity of materials, and above all, the limitations and frailties of knowledge producers who are not 'all-seeing gods' but rather, are 'very much part of what we survey' (Chia, 1996: 54). As illustrated by Marks, the contribution of disruptive reflexivity is not to advance, refine or falsify claims to objectivity found in 'the workmanship of certainty' but, rather, like 'the workmanship of risk' (Pye, 1995), to value and maintain openness, thereby permitting new possibilities.

The significance of craftiness: Working with indeterminacy

The widespread invocation of craft in the social sciences arises, we suggest, from the provocation of indeterminacy that mobilizes forms of reflexivity – constitutive, epistemic and disruptive. Indeterminacy is evident in the 'insecurity regarding the basic assumptions, discourse and practice used in describing reality' (Pollner, 1991: 370). As an ontological quality of natural and social realities, indeterminacy defies everyday as well as scientific accomplishments of closure produced by engagements of constitutive and epistemic reflexivity.

The significance of indeterminacy is highlighted by Amis and Silk (2008; see also Sandberg, 2005) who contrast a postfoundationalist orientation to the production of social scientific knowledge, where the inescapability of indeterminacy is presumed, with approaches that aspire to minimize sources of indeterminacy by requiring compliance with such criteria as internal and external validity, reliability, objectivity and generalizability. Research-as-craft attends to how transient forms of closure, taking the form of scientifically warranted knowledge claims, are contingent upon conventions that produce closure, and thereby points to the fragility of the solidity attributed to the foundations of social scientific

inquiry. For example, instead of striving to establish the adequacy of categories, research-as-craft attends to the crafty construction, as well as the 'moral, social and political consequences, of constructing categories' (Amis and Silk, 2008: 467) but without any presumption that (crafty and crafted) accounts of construction practices can overcome or indeterminacy eliminated.

Research-as-craft is exemplified by Kondo's (1990: 24) conception of knowledge production as 'a complex negotiation, taking place within specific, but shifting, contexts where power and meaning, "personal" and "political" are inseparable… [Acts of crafting] are the complicated outcomes of power-fraught negotiations between "Self" and "Other"' (Kondo, 1990: 24). Knowledge production is seen to be a work-in-progress as the scientist experiences and responds to moments when, as indeterminacy becomes tangible, 'it is no longer clear how the subject is to "go on"' (Glynos and Howarth, 2007: 129). At such moments, constitutive reflexivity stalls as a heightened awareness of 'the mess of relations not yet organized into terms such as "subject" and "object"' (Manning, 2016: 29) intrudes. In what Manning terms the 'relational field of emergent experience', the seemingly 'pre-constituted subject-position external to the event' has yet to be constructed and (impermanently) fixed. Craftiness accomplishes (precarious) closures by temporarily resolving the undecidability of contingency – for example, by appearing to overcome the under-determination of theories by experimental facts (Pickering, 1986). Research-as-craft recognizes this craftiness and recalls the inescapable contingency of its claims to objectivity.

To provide greater concreteness to this discussion, we now turn to Delamont and Atkinson's (2001) study of the socialization of doctoral students in laboratory and field studies where research-as-craft is powerfully demonstrated. Delamont and Atkinson (2001) report that, as undergraduates, the doctoral students had acquired a sense of science as comparatively settled, comprising '[d]emonstrations of classic phenomena [and]

recapitulations of predictable laboratory procedures' (p.87). This taken-for-grantedness is established and maintained by what we have termed constitutive reflexivity. Then, when undertaking their own research, the doctoral students came to 'discover that "real" science is more complex' (p.88), and that it lacks the predictability that had previously been presupposed. When engaging in the (laboratory and field) practices of science, they encountered breaches in constitutive reflexivity; and 'in order to produce useable results' the neophyte researchers were required to 'master *indeterminate* skills and knowledge' (p.88, emphasis added). This process is also noted by Latour (1987) when he observes that scientists' research practices 'bear little resemblance to the models of scientific procedure' (p.6).

In Delamont and Atkinson's study, the doctoral students came to understand that the achievement of closure is contingent upon developing the (crafty) capacity to work with, and through, indeterminacy in order to 'master' it (p.88) by engaging what we have called epistemic reflexivity. Only then was it possible to generate scientifically recognizable forms of closure in the guise of 'usable results'. The students' efforts to address the discovery that '"real" science is more complex' potentially drew them towards an awareness of another – disruptive – form of reflexivity. But this pull was (craftily) neutralized by acquiring skills and tactics that confined their work within the boundaries of epistemic reflexivity. When seeking to publish their research, moreover, the apprentice scientists found that recognition of, or reference to, their acquisition and deployment of 'crafty' capacities had to be excluded. No mention of indeterminacy and/or the intrusiveness of disruptive reflexivity was permitted in their scientific work as they 'learn[ed] to write public accounts of their investigations which omit the uncertainties, contingencies and personal craft skills' (Delamont and Atkinson, 2001: 88). In other words, priority was given to affirming the authority of epistemic reflexivity, and there was an associated disregard and/or suppression of disruptive reflexivity.

As noted earlier, there are direct parallels in the social sciences – as when, for example, processes of abduction are obscured by the scientistic separation of theory and method as researchers 'wishing to learn the craft of research' are 'left in the dark' about the role of influences such as 'imagination' in processes of scientific knowledge production (Van Maanen, et al., 2007: 1149-50).

The craft(iness) of research is cast into shadow whenever a preoccupation with demonstrating the epistemic purity of scientific knowledge prevails. The resulting positioning of disruptive reflexivity as 'dark', and ostensibly dangerous, is thus an epiphenomenon of equating reflexivity with the refinement of epistemes, as illustrated by Delamont and Atkinson's (2001) study. From the perspective of research-as-craft advanced here, this suppression exemplifies the application of craft(iness) to maintain and protect a valued sense of closure. We now elaborate on the imaginative and embodied characteristics of research-as-craft (Dant, 2010), conceived as a flexible, accomplished working on, and with, physical or symbolic materials (Becker, 1978), before we turn to consider how it research-as-craft incorporates an appreciation of the ethical and political dimensions of scientific knowledge production.

Beyond craft as skill: Imaginative and embodied knowledge

Craft includes 'skill' but, etymologically, is not reducible to it. Research-as-craft speaks to aspects of inquiry that, in exemplifying a 'turn to experience' (Evered and Louis, 1981), disclose knowledge production as an imaginative and embodied process which is routinely learned or absorbed through processes of inter-subjective transmission (Lave and Wenger, 1991). When practiced actively this involves building embodied, responsive and affective relationships that put the self at risk by opening oneself up to the other, and letting go of 'presumed certainties' (Rhodes and Carlsen, 2018: 12).

The imagination that Mills (1959) terms 'intellectual craftsmanship' is fuelled by suspending belief in the adequacy and exhaustiveness of accounts of knowledge production framed in terms of an impersonal, asocial process of devising and testing propositions by diligently applying theory and following methodological protocols. In such unimaginative research, the operation of craftiness in the generation and representation of data is routinely ignored or suppressed. The outcome is a devaluing, or dulling, of imagination, especially where scholarship is designed or retrofitted to comply with the restrictive, self-referential norms of many 'top-tier' international, generally US-based, journals (Alvesson and Sandberg, 2013). Imagination is disciplined (Weick, 1969) to the point at which it is harnessed exclusively to epistemic reflexivity.

When the openness of craft(iness) is not entirely limited to, or suppressed by, epistemic discipline, there are crafty ways of subverting its creeping impoverishment of imagination. Mills (1959) commends analogical reasoning, taking inspiration from surprising and unconventional sources, and borrowing analytic frameworks and language from other disciplines to break out of standardized models that are conventionally used to account for, or explain, phenomena. And so-called 'postmodern' literary theory is championed by Deetz (1996) for disclosing how 'the indeterminacy of the text is reclaimed against any fixity of determination' (p. 391). With regard to embodiment, craft implies a closeness and intimacy of engagement, a process of bringing objects into being (Heidegger, 1971), as form is constituted through physical, phenomenological interactions with materials of making (Atkinson, 2013; O'Connor, 2017). Invoking embodiment, Abbott similarly urges openness and undecidability as enabling researchers to 'come at an issue with only a gut feeling that there is something interesting about it…Indeed, figuring out what the puzzle really is and what the answer ought to look like often happens in parallel with finding the answer itself' (Abbott, 2004: 83). In this formulation, research-as-craft is, we suggest, conceived as a more

or less purposive ‘act of extending our person into the subsidiary awareness of particulars which compose a whole’ (Polanyi, 1958: 65). Embodied curiosity fires the imagination. For example, Kvale and Brinkmann’s (2009) commentary on the conduct of interviews commends an approach that relies primarily upon repeated imaginative responses to indeterminacy and contingencies that are learned through experience and absorbed through practice. Trust in ‘gut feeling’ and a willingness to inhabit indeterminacy is also illustrated by Barley’s (2004) notion of ‘puddle jumping’ – a physical metaphor that conveys a degree of imaginative craftiness in pilfering from other fields, recommends improvisation, and involves an act of faith in the collection of ‘disparate ideas with the hope that they may prove relevant for future innovation’ (Abbott, 2004: 77).

The corporeality of craft acts as a ‘tool of human feeling’ (Yanagi, 1972: 108; see also O’Connor, 1997) that can serve to problematize, and thereby assist in re-uniting, the dualisms of subject and object, mind and body. Craftiness has the capacity to engender an embodied receptiveness to how media ‘develop, and change throughout a process, requiring minute, subtle reactions and decisions’ (Hardy, 2004: 181). When commenting on her orientation to studying Japanese artisans, Kondo (1992) notes how ‘the aim is to go beyond a purely cognitive level of learning, and to learn with the body’ (p.47). This aspiration foreshadows Abbott’s reference to ‘gut feeling’ (Abbott, 2004: 83) in gesturing to how scientists participate with matter in movement, entering the flow, and surrendering to the material, following where it leads (Deleuze and Guattari, 2004; Rhodes, 2009) – a capacity that may be valorised in scientific practice, and not simply recorded by researchers. It can be facilitated by actively switching off, or at least dimming, the dominant, cognitive orientation to processes of knowledge production, as alluded to by Allay (1998) when he characterises ‘scientific writing’ as ‘a craft that requires preparation… Running, walking, and bicycling… give you a chance to think about the structure of a document, play a strategy in your mind,

and see if it makes sense... long enough that I begin daydreaming' (p.234). A further illustration of the embodied quality of research practice is provided by Turner[v] who explains that he was 'deeply influenced' by Mills' (1959) concept of 'craftsmanship' which he takes seriously as a practical, embodied project that relies on physical preparedness. This recognition of the embodied nature of research activity has the effect of problematizing and eroding the mind-body separation, thereby enabling creative energies to flow in undirected and unanticipated ways (Ingold, 2007).

By unleashing imagination and feeling, a research sensibility can emerge and develop that counteracts the reduction of 'the world to a spectacle and our own bodies to mere mechanisms', and that leads to a loss of 'vitality, that mysterious richness' which characterises 'our common experience' (Langer, 1989: 15). When everyday Cartesianism, which reflexively constitutes consciousness as disembodied, is unsettled by disruptive reflexivity, the production of knowledge is no longer apprehended as the outcome of an inner dematerialized cerebral self that gathers and processes information to know and master the outer world of matter (Lewin, 1985). Instead, practices of scientific knowledge production are apprehended as inextricably situated, fostering an awareness of how materials are in process, always on their way to becoming something else (Ingold, 2013; Barad, 2007).

Craft as politics and ethics

Craft has a lengthy historical, as well as etymological, connection with politics and ethics. In the eighteenth century, craft characterized a way of doing things that encompassed 'political acumen and shrewdness' (Dormer, 1997: 5). Before that, practices of witchcraft were associated with the exercise of occult power and the use of secret knowledge that presented a troublesome challenge to conventional, religious wisdom. Politics, ethics and craft came together in the formation and development of the Arts and Crafts Movement

(Krugh, 2014; Ullrich, 2004; Coomaraswamy, 1909). Its members presented an ethical and political challenge to Modernist orthodoxy which presumes that advances in engineering and technical expertise necessarily deliver promised social, moral and spiritual improvements, in addition to material benefits (Naylor, 1971; Krugh, 2014). Beyond the UK, the Movement inspired the notion of a 'pan-Indian craft heritage' that served to recognize and mobilize 'marginalized artisans' in India (Venkatesan, 2006: 66-69). Globally, members of the Movement developed 'a particular amalgam of social, political and artistic ideals…capable of 'recover[ing] unity in a world perceived to be artificially differentiated and morally and aesthetically corrupt' (Crook, 2009: 29). The values of the Movement have been denigrated as backward-looking and nostalgic for an idealized golden era. But this assessment does not take adequate account of its members' ethical and political mission to create a different and better, less brutalising modern society: the Movement was 'emphatically future-oriented, seeking to re-enchant and re-embed "Life" in a new kind of society' (Crook, 2009: 29).

The association of craft with politics and ethics, and its 'subversive potential' (Cooke, 2007: 6) to question and offer an alternative to the spread of a 'bureaucratic ethos' (e.g. automation and audit) across all spheres of society, continues today in the contemporary Craftivist Movement (e.g.; Greer, 2008; Moore and Prain, 2009; Parker, 1996). Craftivism comprises participatory, community-based projects where artefacts are created to address contemporary social, environmental and political issues, such as global poverty, human rights injustices and the degradation(s) of corporate and institutional culture (Black and Burisch, 2014; Bratich and Brush, 2011), as well as critiquing established, depersonalized means of addressing such issues (Vachhani, 2013). Its members celebrate the continuity with, and renewal of, elements of the values and vision of the Arts and Crafts Movement.

When Mills (1959) invokes the notion of intellectual craftsmanship, he insists that researchers inescapably engage with politics as well as ethics grappling with problems. To better appreciate this engagement, and pursue it more self-consciously and purposefully, Mills (Ch 5) invites researchers, as intellectual craftspersons, to abandon a 'bureaucratic ethos' of inquiry where standardization and rationalization is prioritized, and where politics and ethics are ostensibly removed by demonstrating compliance with methodological procedures and codes of conduct. He urges us to acknowledge and take personal existential responsibility for the form and consequences of our scientific work – a responsibility that, ethically, involves 'a choice of how to live as well as a choice of career' (p.216)[vi]. The politics of research are evident in how researchers struggle to establish, protect and expand the space in which such choices are possible, and become enacted; the ethics of research are articulated in the practices of (re)making of choices.

Amongst contemporary commentators on methodology, Law (2004) notes that accounts of research practice are contingent constructions that can be 'otherwise' (p. 143), and he foregrounds ethical and political moments in the production, reporting and reception of social scientific knowledge. The presence of politics and ethics is well articulated by Rouse (2001: 197) when he states that '[a] modest and self-critical attentiveness to our own partiality and situatedness, and accountability for what we say and do, are the political responsibility incurred by our own contingent positionings within the cultures of science'. Within the framing of research-as-craft, knowledge of what we do, and of what we say we do, is not regarded as procedural, comprising compliance with techniques or protocols. Rather, actions and articulations express a commitment that is responsive to questions about the kind of people we want to be, the world we hope to make, the knowledge we want to produce. This responsiveness incorporates an appreciation of how ways of framing and fulfilling ethical commitments are contingent on participation in, and influence by, a broader

structure of social relations, including engagement in research communities that support particular research practices.

Social science is intelligible as a complex of practices enacted as political responses to ethical demands: 'the ethical subject is always as well the political subject; the one who takes action in response to the call of the ethical demand' (McMurray, Pullen and Rhodes, 2011: 557). Analysis informed by this understanding is attentive to the 'contingency, historicity and precariousness' of practices in a way that appreciates 'the *constructed* and *political* character of social objectivity' (p.557, emphasis in original). The political character of social objectivity is evident when, for example, institutionalized expectations surrounding the adoption of protocols of knowledge production are enforced by the 'validity police' (Hirsch and Levin, 1999) whose code of best practice becomes widely internalized and self-policing, as illustrated in Delamont and Atkinson's (2001) study of doctoral students discussed earlier.

A crafty spirit also exists at the margins of scientific activity where the subversive potential of research-as-craft results in 'transgressive academic practice' that 'exposes the relations between truth and power' in politically important ways (Schubert, 1995: 1005) or actively supports alternative organizations (e.g. Esper, Cabantous, Barin-Cruz and Gond, 2017). Notably, this spirit inspires the possibility, as Marks (2008) has noted, of social scientists contributing to a parallel, expansive transformation of scientific practice, and can thereby amplify and apply political and ethical critiques of much of what is normalized and 'industrialized' in a modernist framing of social science (Mills, 1959; Pollner, 1991; Law, 2004; Symon, Cassell and Johnson, 2016; Bell et al., 2017).

Discussion: Crafty capabilities

Craft is routinely assigned a liminal position between art and science (Carmel, 2013), where it is widely conceived to be inferior, and not just different. Conventionally, craft is distanced from art by the latter's association with aesthetic originality, as contrasted with a crafty preoccupation with practical utility and style (Becker, 1978). This inferior positioning of craft is questionable, however, as it disregards artists' intimate connection to their materials, such as the painter's (crafty) experiential working with pigments and canvas. Craft knowledge is similarly distanced from science by an alleged deficit of rationality and rigor (Fariello, 2004; Rowley, 1997). This positioning is no less problematical as it is forgetful of how historically, 'local ways of knowing, such as embodied workshop practices, were critical for the pursuit of ostensibly 'transcendent, universal knowledge of science' (Smith, 2004: 241). We have therefore conceived of craft as integral to, rather than as the 'other' of, science as well as art. It is not, however, simply an amalgam of science and art as its etymology incorporates elements – notably politics and ethics – that are largely absent from the etymologies of art and science.

Our conjecture has been that craft(iness) is more or less consciously and purposefully exercised, developed and valued by members of research communities (Lave and Wenger, 1991) as they wrestle with indeterminacies that repeatedly destabilize their practices. However, while some measure of craftiness, in the form of ethics and politics, is endemic to research activity, it is routinely unacknowledged or actively suppressed; instead it is dissembled and/or disowned. The presence and significance of craftiness is signalled, and tacitly acknowledged, when 'craft' is attributed to some aspect of the research process. Scientists – natural and social – continuously undertake the ethically and politically significant creative/repair work of frame maintenance because they must: indeterminacy demands (crafty) initiative and improvisation in order to sustain established scientific practices but also, potentially, to transform them. Irreducible to a formula, or to a set of

protocols, craft(iness) involves 'a preparedness to confront the unknown. It is tied inextricably to the freedom to think freshly, to see propositions of every kind in an ever-changing light' (Boyer, 1990: 17, cited in Alvesson and Sandberg, 2013: 143).

A preparedness to confront the unknown and to think freshly is consistent with a conception of research-as-craft in which disruptive reflexivity is incorporated, rather than domesticated by epistemic reflexivity. It makes no presumption that a remedy can be found for the 'messy and problematic' (Lynch, 2000: 4) nature of scientific practice. In scientific, as in everyday, practice, ontological openness is understood to have primacy; forms of ontic closure, which are simultaneously compelling and precarious, are accomplished through practices of constitutive and epistemic reflexivity, and are unsettled by disruptive reflexivity. Research-as-craft recollects the contingencies that produce the *sense* of closure, but without claiming that its attentiveness transcends contingency. Indeed, research-as-craft recognizes itself as another manifestation of ontic closure. Insofar as it intentionally destabilizes the foundationalism, as exemplified by epistemic reflexivity, its orientation is less prone to reductionism and/or formulaic practices. Acknowledging, rather than concealing, its contingent articulation, research-as-craft is, arguably, more open and inclusive in its representations of scientific knowledge production.

By incorporating disruptive reflexivity, the characterization of research-as-craft pushes back against, and thereby destabilises, ostensibly disembodied, value-free, apolitical conceptions of scientific activity. In contrast to research-as-technique (Hammersley, 2011; Bell et al., 2017), research-as-craft accounts for and fosters awareness of the positioned or situated nature of knowledge where 'location is about vulnerability; location resists the politics of closure' (Haraway, 1988: 590). Resistance to closure, enabled by the unsettling effects of disruptive reflexivity, and supported by other 'multi-perspectival' and 'positioning' modes of reflexivity (Alvesson et al., 2008: 482-6)[vii], is incorporated into the comparatively

open framing of research-as-craft. The characterization of research-as-craft is, we contend, consistent with an etymology of craft(iness) that includes ingenuity as well as slyness, and implies deviation from and disruption of conventions – a sensibility characteristic of receptivity to openness rather than compliance with discipline. Such openness facilitates disclosure of how, in Haraway's words, '[r]ational knowledge is power-sensitive conversation', such that science '*becomes the paradigmatic model, not of closure, but of that which is contestable and contested*' (p.590, emphasis added). The sensitizing concept of research-as-craft signals the contingent boundary conditions of generating and evaluating knowledge claims in ways that make apparent their precarious, ethico-political basis.

Research-as-craft fosters and conveys the subtlety and ineffability of the interplay between researcher and researched. In place of the figure of the researcher as a transcendent subject, 'ultimate arbiter', or falsifier of the validity of theoretical propositions (Alvesson and Sandberg, 2013: 145), s/he is portrayed as engaged in an open, critical dialogue in which 'there are not self-certifying epistemic foundations immune from criticism' (Rouse, 2001: 197). Accordingly, apprehending and articulating 'the set of contingencies that play on others' (Van Maanen, 2011: 219) – the subjects of research – to disclose their world 'in a "different light"' (Dey and Nentwich, 2006: 13) requires an exercise of craftiness that comprises practical, embodied ethics in the form of 'subtle reactions and decisions' (Hardy, 2004: 181), as well as political acumen and shrewdness in communicating and institutionalizing knowledge claims (Dormer, 1997).

Researchers are invited to examine and potentially shift their self-understandings and associated practices from that of 'the neutral expert observer to engaged interpreter and facilitator' (Cunliffe and Scaratti, 2017: 41). When actively practicing research-as-craft, the researcher's experiential being-in-the-world (Sudnow and Dreyfus, 2001) problematizes the reduction of knowledge production to a cognitive activity; and it resists pressures to shoe-

horn, or reverse engineer, research in order to make it compliant, at least dramaturgically, with notions of validity and reliability associated with one-sided demands for discipline (Cornelissen, Gajewska-De Mattos, Piekkari and Welch, 2012). When actively or self-consciously pursued, research-as-craft expands 'the reach of our thinking, of seeing what else we could be thinking and asking, of increasing the ability of our ideas to deal with the diversity of what goes on in the world' (Becker, 1998: 7).

By pursuing the 'workmanship of risk' (Pye, 1995), the researcher-as-craftivist negotiates a path through 'the irrationality, complexity, and paradoxicality of organizational worlds' (Prasad, 2005: 292). Instead of striving to eliminate or domesticate indeterminacy through formulaic representations, a recognition of craft(iness) in research practice respects the 'radical contingency of materiality' (Glynos and Howarth, 2007: 129). By attending to this contingency, and thereby drawing out the performative significance of the marginalization of openness in processes of knowledge production, research-as-craft points to 'the end of political innocence' that Law (2004: 149) associates with the ostensible separation of truth and politics. Disruptive reflexivity interrogates this separation as it dis-closes how '[t]ruth and politics go together one way or another', and that 'once the performativity of method is recognised this implies responsibilities to both [truth and politics]' (Law, 2004: 149). Conceived in this way, research-as-craft attends to knowledge production as an ethical and political process wherein craftship is conceived to articulate experiential, pre-codified understandings of the potential and limitations of our embodiment, our relatedness to, and dependence upon materialities (Collins, 2004).

Finally, in self-reflective mood, it is relevant to acknowledge that our conception and explication of research-as-craft may itself be interpreted as a crafty application of two forms of reflexivity outlined earlier. Constitutive reflexivity has been mobilised as our conjectures on research-as-craft depend upon a (crafty) suspension of doubt in their credibility and, more

specifically, scientists' invocations of 'craft' to characterize aspects of their practice, which we have engaged when commending the sensitizing concept of 'research-as-craft. Our thematising of craft in research exemplifies an application of disruptive reflexivity inasmuch that it challenges accounts of scientific activity which disregard or suppress the presence of craft(iness) in knowledge production. By incorporating 'disruptive reflexivity' within our conception of research-as-craft, we have sought to appreciate how 'scientific practices do not reveal what is already there as its reality-in-itself defies our reach; rather, what is "disclosed" is the effect of the intra-active engagements of our participation with/in and as part of the world's differential becoming' (Barad, 2007: 361; see also Rhodes, 2009; Diprose, 2012).

Conclusion

The presence of craft in research is often signalled but seldom thematized. This omission is regarded as anomalous when the practice of science is considered to involve the crafty work of wrestling with indeterminacy in order to establish and maintain shared frames of reference (e.g. paradigms of inquiry) within which knowledge is produced.

Thematising the presence of craft in research can, we contend, facilitate a re-visioning of the theory and practice of scientific knowledge production. Invocations of elements of craft in processes of scientific knowledge production, we have suggested, signal a core quality of scientific activity that is intuitively resonant, yet rendered opaque through a failure to thematise it. Addressing and reducing this opacity has prompted our coining and consideration of 'research-as-craft' as a way of fostering awareness of (social) scientific practice as an ethical and political, as well as skilful, embodied and imaginative activity. Etymologically, craft encompasses power (politics) and virtue (ethics) as well as science, and thereby presents an alternative to Cartesian conceptions of science that presume, or aspire to attain, neutrality and objectivity. Within a post-Cartesian conception of scientific knowledge

production, the researcher-as-craftist is enjoined with the artifact in the process of its formation (Cooke, 2007), even if this enjoinment is widely represented and experienced through variants of the dominant, estranging frame of Cartesianism.

When conceived and executed as a craft(y) practice, scientific knowledge production is apprehended as an activity that is more embodied, less certain, less cognitive and more emotionally demanding (Broussine, Clarke and Watts, 2014) than is acknowledged in accounts of scientific activity developed in the philosophy and sociology of (social) science as well as in the field of management and organization studies. By connecting scientific practice to the ethics and politics of craft (and craftiness), and especially to 'its genesis as a social critique', we have surfaced how central elements of craft 'always had a subversive potential', while underscoring how the significance of these attributes have 'rarely received any sustained critical attention' (Cooke, 2007: 6), despite being repeatedly invoked in accounts of scientific knowledge production.

Research-as-craft apprehends and fosters a subversive sensibility, but it does not directly advocate any particular means of social scientific knowledge production. It takes seriously the indeterminacy associated with the understanding that the meaning of terms like 'quality' and 'rigor' is contingent upon their development within intellectual traditions and application in specific contexts. As Ketoviki and Mantere (2010: 310 cited by Cornelissen and Harley, in press) put it, '[t]here is no consensus on universally applicable [epistemic] virtues', so that the 'choice' of subscribing to 'research-as-craft' as a practice, or as a characterization of scientific practice, is 'ultimately arbitrary in a logical sense'. It requires the exercise of ethics-in-practice to make the required leap of faith.

This position does not exclude or suppress established forms of knowledge production based upon epistemic reflexivity. Instead, it invites openness about, and acknowledgment of, how engaging any methodology involves research-as-craft as researchers struggle, in diverse

ways and with varied outcomes, to become, in Mills' (1959: 135) formulation, their 'own methodologist[s]'. Research-as-craft does not deny the distinctive contribution and application of 'discipline' – with respect, for example, to 'learn[ing] something from overall attempts to codify methods' (ibid: 136) – but crucially it attends to, and valorises, an 'openness' that allows and enables 'theory and method [to] become part of the practice of a craft' (ibid: 246). In doing so, it challenges the consistency of advocating seemingly universal epistemic values – such as those of coherence and inference to the best explanation (Harley and Cornelissen, in press) – when accepting that [scholars] go about reasoning *within and as part of* their chosen approach' (emphasis added). To give an obvious example, dialectical reasoning has a distinctive, critical conception of the virtues ascribed to non-dialectical understandings of coherence and inference (Benson, 1977; Mumby, 2005). To ignore such differences is to impose a (non-dialectical) standard of reasoning about coherence and inference by attempting to pass it off as universal, claiming that it is applicable 'regardless of the tradition in which the research is conducted and the specific methodology adopted' (Harley and Cornelissen, in press).

Most importantly, craft-as-research directs attention to how the struggles with indeterminacy required to produce scientific knowledge are animated by (contingent) ethical commitments and political forces that establish and secure transient forms of determination, or closure. The sensibility of research-as-craft provides a reminder of how ethical and political work, embodied and imaginative, is required not only to establish closure and protect it from disruption, but also to challenge and disrupt the basis of such protection.

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Notes

[i] **craft (n.)** Old English *cræft* (West Saxon, Northumbrian), *-creft* (Kentish), originally "power, physical strength, might," from Proto-Germanic **krab-/*kraf-* (source also of Old Frisian *kreft*, Old High German *chraft*, German *Kraft* "strength, skill;" Old Norse *kraptr* "strength, virtue"). Sense expanded in Old English to include "skill, dexterity; art, science, talent" (via a notion of "mental power"), which led by late Old English to the meaning "trade, handicraft, calling," also "something built or made." The word still was used for "might, power" in Middle English.
crafty (adj.) mid-12c., *crafti*, from Old English *cræftig* "strong, powerful," later "skillful, ingenious," degenerating by c. 1200 to "cunning, sly" (but through 15c. also "skillfully done or made; intelligent, learned; artful, scientific") from craft (n.) + -y (2). Related: Craftily; craftiness.

Source: https://www.etymonline.com/word/crafty [accessed 12 June 2018]

[ii] 'Indexicality' is a manifestation of indeterminacy: 'All meanings are constantly subject to negotiation and renegotiation as expressions are used and concepts are applied. We may say, in the unsatisfactory philosophical idiom, that both the sense and reference of expressions is continually problematic, and that neither the intension nor extension of concepts can be delineated clearly, fully, and "objectively" in advance of use' (Barnes and Law, 1976: 226).

[iii] Sensitizing concept are usually derived from the research participants' perspective – in this case, the 'participant' is the researcher who characterizes some aspect of his or her practice as 'craft' – that suggests a certain line of inquiry. See Van den Hoonard (2008).

[iv] Validity policing is used to establish and maintain closure around a given worldview, as doubts are suspended in in the interest of (re)producing authoritative representations.

[v] Turner, B. 'How to write practically', *Writing Across Boundaries* https://www.dur.ac.uk/writingacrossboundaries/writingonwriting/bryanturner [accessed 7 June 2018]

[vi] This injunction is echoed by Gouldner (1971: 489) when he contends that the 'question [reflexive social scientists] must confront is not merely how to work but how to live'.

[vii] On this point, we differ from Alvesson, Hardy & Harley (2008) who align 'multi-perspective practices' with what they term R-reflexivity whereas we identify its potential to contribute to D-reflexivity.