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Distance runners as thermal objects: temperature work, somatic learning and thermal attunement

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Abstract

The senses of heat have to date been under-examined, including in the sociology of sport and physical cultures. Drawing on theorizations of the senses and 'sensory work', the purpose of this article is to investigate via phenomenological sociology the under-researched lived sense of temperature. Based on ethnographic and autoethnographic data emanating from our physical culture of distance running in the United Kingdom, here we examine the lived experiences of thermoception, thermoregulation and the ways in which 'temperature work' constitutes an axiomatic part of the craft practice of this particular sporting subculture. Key findings are structured into three thermal themes: (1) the salience of temperature work and temperature learning for runners as thermal objects; (2) thermal attunement and intercorporeality between runners; (3) thermoceptive 'collective resonance' (Ingold, 1993) of running groups. We highlight the insights available to sociologists of sport and physical cultures in engaging with these three mutually influencing levels of analysis, which enable the development of the social-scientific study of temperature.

Introduction

In this article, we draw on conceptualizations and theorizations from phenomenological sociology, and a developing field of 'sensory work' within the sociology of the body, in order to consider the lived experience of temperature (thermoception) in running-bodies as thermal objects. Thermoception has to date remained under-researched within sociology (Vannini and Taggart, 2014) despite its importance in everyday lives and in our physical-cultural embodiment. Employing data from ethnographic and autoethnographic research projects on distance running, we explore and analyse some of the 'intense embodiment' experiences (Allen-Collinson and Owton, 2015) of thermoception. One of the reasons for our interest in this domain is that the sense of thermoception, by which humans and other organisms detect and 'feel' temperature, and the ability to thermoregulate, are crucial to life. For humans, even a tiny divergence from our core body-temperature results in death.

Drawing on anthropological theorizations of the senses (Howes and Classen, 2014) and sociological concerns with 'sensory work' (Hockey, 2009), the purpose of this article is to investigate via a phenomenologically-inspired sociology (Allen-Collinson, 2009) the lived sense of temperature in our physical-cultural world of distance running in the United Kingdom (UK). Here we examine the lived experiences of thermoception and thermoregulation, and the ways in which temperature work (Allen-Collinson *et al.*, 2018), constitutes a central component of the craft practices in this particular athletic lifeworld. We focus upon three key thermal areas that emerged as highly salient in our data: first, how temperature work requires thermoceptive somatic, sensory learning, as runners learn what their bodies can and cannot do under conditions of varying heat and cold, and how to cope with temperature oscillations. Second, not only are specific bodily ways of knowing and sense-making developed by runners in relation to their own bodies as thermal objects, but also vis-à-vis their habitual running partner(s). We consider how thermal attunement is a key element in the production of 'running-together'. Third, distance running for many is undertaken as a group activity, and we examine the temperature of running groups, not just physiologically but also socially in terms of ongoing 'collective resonance' (Ingold, 1993). Before proceeding to portray the autoethnographic research from which our data are drawn, we first provide a brief overview of our theoretical perspective.

Phenomenological sociology and thermoception

For the purposes of this article, we employ a form of sociology informed by social phenomenology, which we have described in some detail in earlier work (e.g., Allen-Collinson and Hockey, 2015). Here, we highlight just two key elements in the phenomenological 'method' (Overgaard, 2010): the *epochē*, which requires phenomenological researchers to make all best efforts to suspend or bracket the 'natural attitude' of everyday thinking (where people do not think critically or reflexively about the 'flow' of the everyday) in order to identify and subject to questioning taken-for-granted assumptions and presuppositions about a phenomenon. A further stage in the method is the phenomenological *reduction*: the researcher's efforts to reduce the

phenomenon to its essence, or *eidos*; its haecceity or 'thisness', the essential core characteristics that make it the 'thing' it is. For phenomenologists, it is the essences of the phenomenon that we seek, stripped of the taken-for-granted, everyday assumptions of the natural attitude – at least as far as possible. Phenomenologically-inspired sociology also addresses the cultural and social 'situatedness' of our being-in-the-world, emphasizing the powerful influence of social-structural and socio-cultural forces upon our mind-body experiences (Allen-Collinson and Hockey, 2011). In this article, we explore sensory experiences and somatic ways of knowing in relation to temperature, as culturally constituted, framed and lived, in relation to our own physical culture of distance running. We also use the term 'intense embodiment' (Allen-Collinson and Owton, 2015) to describe periods of heightened awareness of somatic experience, including thermoceptive experience. Thermoception (and thermoregulation) may draw our intentionality or attention to feelings of heat and cold both inside and outside the running body, generating a sense of corporeal 'aliveness' - of the senses working at an intense level.

The notion of a 'sense' of heat points to cross-cultural variations in conceptualizations of the sensorium. Senses beyond the 'classic five' Greco-Romano sensorium include, for example, kinaesthesia, balance, and proprioception, as 'inner senses' (Paterson, 2007). The conceptualization of thermoception as a distinctive sense is perhaps less familiar (Vannini and Taggart, 2014), despite the sense of heat arguably being the most important sense of all (Ong, 2012), helping to ensure homeostasis and thus allowing humans and other animals to stay alive. There is a small sociological/anthropological literature theorising thermoception (or sometimes heat) as a distinctive sense (e.g. Potter, 2008; Ong, 2012; Allen-Collinson *et al.*, 2018). Furthermore, we note that it is often difficult to 'select out' specific senses during a particular experience, as the senses usually work in concert to generate an overall sensory 'feel', or inter-sensory perception of a phenomenon (Merleau-Ponty, 2001). For example, as runners, we might visually appraise the terrain of our running routes as we run, but we also both anticipate and feel the tactile elements of that ground, so as to

make bodily adjustments to allow for slippery mud, or hard, sun-baked clay, for instance.

Having introduced the background to our research, we now briefly portray the auto/ethnographic projects from which our data emerged.

The research

The findings derive from three linked research projects, one a collaborative autoethnographic study undertaken by both of us when injured and rehabilitating from specific injuries; the second an autophenomenographic project by Jacquelyn as a distance-running woman. The third project was a more traditional ethnographic study by John. As 'veteran' distance runners, our running biographies span many decades: John for 49 years and Jacquelyn (a 'late starter' runner) for 31 years, with racing experience ranging from five miles to marathons. Whilst never elite runners, we are nevertheless committed, 'serious' runners, whose running coheres with Bale's (2004) notion of running as *work* that requires regular, disciplined, demanding and routinized body-training.

Running Study 1 (RS1) was a two-year collaborative autoethnographic project spanning the incidence of knee injuries during winter-training, through our rehabilitative efforts, to a return to running fitness. Data were collected via individual training/injury/research logs, together with a joint 'analytic log'. In Running Study 2 (RS2), Jacquelyn similarly maintained a training/research log for 3 years, also incorporating a strong autophenomenographic element, focusing upon lived experiences of being a running-woman training in public places. Whilst autoethnography is now well-known as a research approach within the social sciences, autophenomenography may be less familiar. This is an automethodology analogous to autoethnography but where the researcher draws upon phenomenological principles such as *epochē* in order to explore the structures of her/his own experiences of a *phenomenon* (Allen-Collinson, 2009). Running study three (RS3) involved John completing three months participant-observation with groups of distance runners in the north-west of England and south Wales, with the aim of gaining insight into key social processes within the UK distance

running subculture. We interrogated the data sets for emerging themes using a form of the constant comparative method (Charmaz, 2006).

From all the research studies, the importance of thermoception (and thermoregulation) was salient in our encounters with distance running. We have structured our findings into three key thermal themes: (1) the salience of temperature work and temperature learning for runners as thermal objects; (2) thermal attunement and intercorporeality between habitual training partners; and (3) the thermoceptive 'collective resonance' (Ingold, 1993) of running groups.

Temperature work and temperature learning

As distance runners we have become highly attuned to the 'weather-world' (Ingold, 2010), and to changes, sometimes very subtle and nuanced, in atmospheric and environmental conditions, including temperature and temperature shifts at the body-world interface. Here, the 'touch' of heat/cold and the tactility of thermal objects emerge as salient, when our running-bodies are literally touched by the environment – ground and air; for example, gently caressed by swirling warm breezes, or, in contrast, pelted by cold rain and sleet:

Cold wet run tonight as heavy sleet, snow and rain made for a drenching cocktail. A week's snow has been washed into slurry by the heavy rain, making for that strange double-layered surface when newly thawed snow mixes with mud and shifts and slides atop of still frozen ground... Sleet pelts my frozen cheeks so I pull my ski mask higher, but it's already drenched with wet flakes of sodden snow. I seem to be breathing in slushy snow particles... Picking my way carefully around potholes and puddles, I leap straight into an unseen one - cursing, then a moment's anticipation before the near freezing water seeps into my trainers and through two layers of socks and then begins slowly, slowly to warm as I squelch my way home through the pinging sleet.

Also, our British weather is notoriously mercurial, so sudden changes from bright skies and warm sunshine to the arrival of thick cloud and heavy, cold rain are not unusual, even in summer, and particularly in upland areas, where we both used to run:

Glorious, golden-sun, pale blue-skied autumn day up on the Howgills¹ with clouds scudding across the moorland. Sweat glistens on my arms and tickles my neck, as I labour up the slopes. Touching the summit cairn of Winder, I turn slightly to look towards the Lakeland fells... a dark, lowering, brooding bank of cloud is heading swiftly across the vale, and I can already detect the chill edge of a shower cloud swirling in the rapidly cooling wind. To maintain rapidly vanishing warmth, I head off along the ridge whilst untying my Gore-tex jacket from my waist as I run, shrugging myself into what had seemed an overly heavy top when I set off, but now feels somewhat flimsy as the wind whips around my slight body. (RS2)

Such temperature fluctuations require of runners a certain kind of 'weather endurance' (Allen-Collinson, 2018). An active, reflexive, and at times deliberative and mindful engagement with weather, is all part of 'weather work' (Allen-Collinson, 2018). This highlights how weather does not just 'happen' to us, but is also actively constructed, interpreted/re-interpreted, made sense of, and in some circumstances communicated to and with others via social interaction. Temperature work (Allen-Collinson *et al.*, 2016) similarly involves active engagement with temperature, and interpretations, meanings and understandings surrounding the sense of thermoception, experienced as lived heat/cold (Allen-Collinson and Hockey, 2011; Allen-Collinson and Owton, 2015). Such thermal work is often a key element in engaging with weather and is strongly contoured by our particular physical-cultural world of distance running, where weather 'endurance' is not only required but also valorised by runners (Hockey and Allen-Collinson, 2016).

¹ a range of mountains in the North of England

As illustrated in the above field note, as runners, we are involved in a process of ongoing 'situational adjustment' (Becker, 1977) in the face of the thermal environment. Labouring up the hillside in autumnal sunshine generated heat and sweat, but only seconds later, clouds descended, plunging Jacquelyn into chill wind-driven rain showers, requiring specialist clothing to be donned. Later in the same run, when the clouds parted and the sun re-emerged, she began to overheat and so again removed the rain jacket. This constant adaptation and re-adaptation to weather and temperature is the means by which runners strive to achieve what Dewey has conceptualised as an 'equilibrium' (1980:12) with their environment, including the thermal environment.

Temperature work also highlights the importance of somatic learning and socialization into particular bodily ways of knowing, interpreting and sense-making with regard to the thermal, which may have to be developed gradually over time and with experience. This requires *learning* the skills of thermoception and thermoregulation, learning to live with and sometimes to endure levels of thermal discomfort and 'dys-ease' (Leder, 1990), to perceive and identify changes in temperature, and to make situational and bodily adjustments, including – as a last resort – being obliged to cut short a training session to cope with the thermal environment and avoid further deleterious corporeal consequences:

...The workday left my quads heavy, lethargic and dead, no 'whack' at all, and it's that awful, heavy, hot-humid weather. I know by now, after all these years, that this *might* mean cutting short the run (as absolute last resort). I'm rubbish in this kind of weather, and I'm furious at having to sacrifice hard-won running-time to waste-of-time work. The fury assists the first 20 mins of the run, but after that, as my body-core starts to heat up relentlessly, I'm beginning to sink. Not even the energy to seek out the slightly cooler air under the trees. The heat bounces up at me mercilessly - off the tarmac and even off the torpid grass. Angrily had to stagger home after just 40 mins today, the heat and humidity compounded by hotness of hayfever. (RS1)

Learning how to adjust individually to the surrounding thermal conditions has its own complexities. Distance running is arduous, particularly over long distances, and runners develop craft practices aimed at minimising physical irritations that compound that arduousness. Such irritations include the over-heating of bodily parts, which can lead to blistering on the feet, and chafing the insides of thighs and nipples. So, the runner's best friends become tubes of Vaseline™, dual layers of socks, and occasionally bathing feet in surgical spirit in an attempt to toughen the skin! Irritation also occurs when items of running clothing are carried and found then to be superfluous in relation to the surrounding temperature, thus leading to the corporeal accumulation of unwanted heat. The tactical decision-making over what clothing to wear prior to starting a run is often quite nuanced:

Today it's a do I wear gloves or not day? I can tell it's coldish and there is a bit of a wind, but I don't feel it's really gloves weather. If my hands heat up too much it's uncomfortable and I end up taking them off and carrying them in one hand which peeves me! I decide to wear my blue rain top. It has longer sleeves than my other two rain tops. That means if I go without gloves and my hands do get cold, I can pull the sleeves over my hands and be warm.
(RS1)

[Here: Figure 1]

Having examined the individual temperature work in which runners engage, we now consider thermal and thermoceptive insights in relation to habitual training partners and how those insights help achieve running-together.

Thermal attunement and intercorporeality

Doing serious distance running in preparation for races demands running with some intensity, and completing a considerable volume of training. In subcultural argot, one is systematically 'sticking the miles in'. Training all year round, with much of it in the dark

winter after work, the physical and psychological stressors are often ameliorated by running with regular training-partners. The interaction between runners who habitually train together (the authors did so for nearly twenty years) produces a specific corporeal comprehension of each other, forming part of what Schütz (1967) termed the 'stock of knowledge at hand'. This knowledge is used to construct *typifications*: common sense constructs that ordered daily training-together in terms of its local organization on a moment-by-moment basis (cf. Benson and Hughes, 1983: 53). Such typifications about partner strengths and weaknesses as runners include those relating to temperature. Knowledge of one's training partner's physical and psychological responses to climatic or temperature variation is an important feature of ensuring safety on the run, and also the regulation of effort - linked both to safety and effective training. The evaluation of the other's capacity to deal with temperature was primarily done via audio (Vannini *et al.* 2010) and visual work:

I have long realised to be alert to how Jaqui is running when temperatures or humidity rises a lot. However fit she is, she still struggles with those kind of conditions. Primarily as we run I am glancing at her and judging her face and its skin tone. When she over-heats she can flush dramatically and when that occurs her breathing becomes deeper, which is also something I monitor. I have also learnt to look at her face, arms, shoulders, for the presence of sweat. If she is sweating I figure that is ok. When she has stopped sweating, that is a danger sign and I have sometimes intervened and attempted to cut the training session short. On occasion that has led to a full-blown argument, as she has a tendency to 'head-bang' (be very stubborn) and train on regardless. (RS1)

Whilst John was largely able to train effectively in a range of temperatures, there was a propensity for him to be impacted upon negatively by cold and wet conditions. This tended to occur if insufficient training kit had been donned initially and the weather

had changed considerably on a long run. The indicators that a problem had arisen again demanded visual work by the other training partner:

If John has a problem it tends to be when he gets cold internally, when he gets heavily soaked by winter rain, or sleet. What happens is I notice his face becomes... what I can only describe as 'withdrawn', and if he's not wearing gloves there is a marked absence of blood from his hands; they go quite white despite the blood pumping around his system. When all that happens his balance starts to go a bit 'wobbly' if we are moving over rough terrain. He's a strong runner, but not the most balanced, even at the best of times, so when I see these signals, they prompt me to ask how he's feeling.

(RS1)

Above, we have considered the visual and aural indicators we both used as part of our attunement to each other's 'going' and temperature work. Examination of the ethnographic data also revealed other verbal signals made up of 'ritual utterances' (Goffman, 1967) some of them very small, such as 'whew' or 'brrrrrrr' between us when temperatures were respectively hot or cold to a discomforting degree. There were, of course, times when such audio-visual work and small verbal signalling were not so effective at identifying each other's state of running-being, and we had to engage in more elaborate verbal interaction to supplement or enhance our intercorporeal 'somatic empathy' (Allen-Collinson *et al.*, 2016) as indicated in the above extract. This happens particularly when heat is felt interoceptively and 'lived' as a distinctive sense (Potter, 2008; Ong, 2012; Allen-Collinson *et al.*, 2018), and we need to communicate via explicit utterances to each other regarding internal thermal indicators; for example, when internal core heat has built up to generate a high degree of discomfort. This tends to occur for Jacquelyn in particular:

Horrible run this evening. Body drained and dehydrated from having to sit through interminable meetings in airless, cramped rooms. No time to hydrate

properly before setting off, and the heat hit like opening an oven door. Like running into a wall of heat, stagnant, suffocating, pollen-heavy. Just 10 mins in and I'm struggling for breath, legs swollen, aching, heavy, bloated, no 'whack' in them whatsoever... I head for every precious hint of shade I glimpse, but am too work-weary to make sudden detours in search of tree-shaded terrain. 'I'm gonna have to cut this one short, Bud, I'm just so overheated,' I tell J. 'Bloody meetings drive me to distraction – no drinks provided either. Rubbish.' (RS2)

Furthermore, the shared stock of thermal knowledge about our respective temperature-work capacities was put into practice in decision-making about the organization of training runs, such as: the kind of athletic clothing worn, the distance, intensity of pace and terrain selected. For example, when temperatures and humidity were both very high, clothing would be minimal, pace and distance reduced, and terrain selected to maximise shade: forest paths, sheltered canal tow paths, or urban routes featuring high buildings. Given the particularly variable nature of UK temperatures, such decision-making was requisite and commonplace.

Thermoception as 'collective resonance'

At this point, our analytic gaze turns to a third form of thermoceptive activity evident within the distance-running subculture, the production of certain kinds of 'collective resonance', which Ingold (1993:160) categorises as follows:

By watching, listening, perhaps even touching, we continually feel each other's presence in the social environment, at every moment adjusting our movements in response to this ongoing perceptual monitoring... Indeed it could be argued that in resonance of movement and feeling stemming from people's mutually attentive engagement, in shared contexts of practical activity, lies the very foundations of sociality.

More recently Miller (2015:7) has reinforced this conception of collective resonance as a fundamentally embodied phenomenon, 'felt and performed in and through the body' and 'con-constructed through the interaction of bodies', in particular contexts. As authors He and Ravn (2017) also note, drawing on Zahavi (2015), reciprocity can be deliberately shaped through mutual coordination and affective dynamics of movement so that moving together is a practical way of understanding and feeling one another. Some time ago, Goffman (1963) perceptively pointed out there are informal rules of conduct in public places, which constitute forms of diffuse social organization. There is in our direct experience of four formal athletic club running groups, and many more informal groupings, a normative order that regulates conduct within training runs and races. How that normative order is complied with or not, on specific occasions, produces particular forms of collective resonance. This itself is constructed and displayed by a combination of particular kinds of participants' talk and gesture, including facial gestures (see Goodwin (2003) for an elaboration of these processes). Interactional processes that Laurier and Philo (2006:3) have illustrated in the case of UK café society, can convey conviviality, animosity, indifference or familiarity. Resonance then can be experienced by participants as *warm* and welcoming or *cold* and exclusionary, communicated, as Laurier and Philo indicate, by open or closed faces, bodies turned away or towards, restricted or extended discourse. Such states are not just experienced metaphorically but involve thermoceptive feelings and consequent understandings (see Zhong and Leonardelli, 2008, on this point).

The following ethnographic data illustrate the thermal nature of collective resonance and its relationship to informal rules of conduct in a particular running context: what has traditionally been called (in the UK) the 'long Sunday run'. These are runs carried out in preparation for marathons, ultra-marathons or long hill races. To run these distances often tests endurance to its limits. The prime rule of conduct for these long runs - rarely directly articulated but often tacitly intimated - is that the group stays together; the pace being that of the slowest member. The advantages of staying together include the collective verbal and gestural encouragement as members go into and come out of difficult periods of physical suffering, normal over this length of run.

Togetherness is also important in case of emergencies: strained tendons, pulled muscles, dehydration, hypothermia, heat exhaustion, glycogen depletion, etc. Such runs can generate a collective resonance of interaction that is accomplished in synchrony as 'We' (Schütz, 1974 [1951]):

We were out on the Lakeland fells (upland northern hills) this Sunday morning for 18 miles, me as experienced road runner and complete fell novice, and 4 very experienced 'fell rats'. Every descent they all got away from me, because I do not yet know how to descend quickly over such steep, rough terrain. Going uphill fine, stronger than some of them, but down, nope. So they would slow the pace directly after each descent for me, so I could catch them up. I was alternatively encouraged 'keep going mate', or the subject of amused banter of the following kind: 'We can't leave you to die out here as your Missus (wife/girlfriend) would give us earache for ever'. And: 'no point in leaving you out here, even the birds won't get a decent meal out of your corpse lad'; a comment about my slowness of frame. (RS3)

In the above example, in the midst of all the considerable physical effort, the group constantly interacted with John-as-novice's performance, via much eye contact, smiles, verbal encouragement and jocularly (see Trevarthan, 1993, for more detail regarding the development of collective resonance generally). By all these means, in addition to slowing the pace after descents, the novice was incorporated into the group, reciprocating with similar smiles and banter as the run progressed. The collective resonance was then experienced as inclusive and felt *warm*.

In contrast to such warmth, the following example depicts a process and temperature of interaction of a very different order:

This morning a hilly 20-mile on the road scheduled, up over Jubilee Tower, with Al who I have run this distance with before, and Rich, who normally does not train or race much over 10 miles, but he's a good athlete. Around

two miles Rich starts moaning that the pace is too slow. This irritatingly goes on and on until finally he sprints ahead, to our bemusement, climbs on to a farm gate and pretends to read a newspaper. On we go, and more moaning, which irritates increasingly. Suddenly Al looks hard at me and says, 'You coming?' And then he accelerates FAST and I go with him and we are immediately at racing pace. We keep this up and accelerate hard up each climb and then again off each top, making it even harder. Glancing at Rich and judging his face and breathing, mile after mile. Finally, at about 15, he cannot maintain the pace and 'blows up', dropping off the back, and we go charging on and on until we can no longer hear or see him. (RS3)

In the above example, the violation of the normative order of the run is an attempt to force the pace up, beyond what had been established and known by more experienced athletes (at long distances) to be acceptable, vis-à-vis distance, kind of terrain and stage of race preparation. The run after all was supposed to be a training run and not a race. Compounding that violation was Rich's insult: sitting on a fence and pretending to read a newspaper, communicating 'you are too slow', 'you are not tough enough'. It also indicated disruption of the collective, no longer a 'We', as gesturally it constituted a direct challenge. Al and John's response was initially glances of puzzlement, then of increasing irritation, and finally those of direct hostility. So, demeanours moved from being open and relaxed to being closed, hard and aggressive. From the point of pace acceleration, the interactional resonance was experienced as *ice-cold*, as ruthlessness was applied to 'break' Rich, so as to cast him out of the collective; he never came on a long Sunday-run again.

Whilst the above constitutes a somewhat dramatic example, the data also illustrated more mundane instances where the normal warm conviviality of groups was occasionally diluted by more minor transgressions of distance-running norms. These included clipping the heels of the runner directly in front, elbowing runners directly to the side, and 'cutting up' or moving sharply across the direct line of momentum. These offences were pointed out to offenders and if they were habitually repeated, the

collective resonance of the group inexorably changed, moving from warmth to cold as irritation and hostility developed, communicated via expressions, gestures and terse performative utterances (Turner, 1975) such as 'get out of the way!'. This inexorable cooling towards offenders resulting in their not turning up for the next training session; in effect they 'disappeared'.

Concluding thermal thoughts

As noted earlier, there is currently a dearth of sociological research and analytic attention to the lived experience of temperature. Vannini and Taggart (2014) point out the surprising lack of ethnographic investigation into lived heat/cold, despite the centrality of temperature perception and control across all cultures. Drawing upon data from our three research projects, above we have sought to contribute to a very small corpus in this domain, by considering the ways in which running-bodies constitute thermal objects – and subjects. The findings revealed some of our somatic learning and ways of knowing, interpreting and sense-making with regard to the thermal environment – both external and internal - in short, our temperature work (Allen-Collinson and Owton, 2015; Allen-Collinson *et al.*, 2018).

In our everyday embodied lives, including our physical-cultural lives, we are often called upon to engage in temperature work, in interpreting and making sense of temperature, constantly seeking to achieve a thermal balance; one that is social context dependent. For example, whilst it may be deemed socially acceptable, indeed commendable, to be 'hot' and sweating profusely in certain contexts such as the ashtanga yoga classes vividly described by Atkinson (2017), in other social contexts such corporeal evidence of raised thermal levels would be considered abhorrent and morally reprehensible. Furthermore, as we learn through socialization into running and other physical-cultural practices, we feel, interpret, make sense of and sometimes communicate thermal learning and temperature work. Immersion in these training practices can, over time, shift and shape how temperature is actually experienced in the body. As distance runners, we gradually developed a sometimes nuanced and refined attunement to the thermal environment, including other body-subjects as thermal

objects. We frequently drew upon this attunement in our decision-making, for example, in relation to which running-routes to take (shady, sheltered, high-level), and what running-kit to wear, sometimes in contrast to the meteorological conditions prevailing at the time we actually set off for the run. Thus, temperature work can be closely allied to 'weather work' (Allen-Collinson, 2018).

The salience of temperature work and somatic, thermal learning for distance runners, both individually and collectively, emerged clearly from our projects. Not only do runners undertake their own individual temperature work in order to engage in effective training and racing, and to protect themselves as much as possible from injury, they also engage in thermal attunement to, and thermal intercorporeality with other runners. This has theoretical, 'analytic generalizability' (Smith, 2018) implications, including for the theorization of thermal experience, in at least two key ways relating to the lived experience of temperature. First, whilst the *tactility* of thermal objects did emerge from our findings (for example, when running-bodies were literally *touched* by the elements, environment and other runners), other forms of thermoception were not amenable to the conceptualization of temperature as a particular form of touch, as it has sometimes been theorised (see also, Allen-Collinson and Hockey, 2011; Allen-Collinson *et al.*, 2018). Temperature was also experienced as a distinct sense, including interoceptively, as an intense form of inner-heat or energy (Ong, 2012), as Potter (2008) similarly found in her ethnographic study of dancers. Second, temperature was found to relate to a form of 'collective resonance' (Ingold, 1993) in terms of a *social* and *interactional* thermal environment. Our data highlight how collective resonance can be experienced by interactants as *warm* and welcoming within a running-group, or conversely, as *cold* and exclusionary. Importantly too, as Zhong and Leonardelli (2008) highlight, these thermal feeling states are experienced not just metaphorically but also involve corporeal thermoceptive sensations.

Here, we have described and analysed certain forms of temperature work, but there are likely to be myriad others, contoured by the different cultures and physical cultures in which we live. These in turn may be highly context-dependent, evolving and transforming as we ourselves develop new somatic ways of knowing, shaped by these

cultures and physical cultures. If we extend the case to generalise to, for example, occupational groups, we can pose the following kinds of questions: how do workers who toil in cold-stores, or welders who use thermic tools, engage with temperature? What situational adjustments and meanings do they make in the face of extreme cold or heat? At present, we know very little about those kinds of occupational temperature work (Vannini and Taggart, 2014). In addition, there are other intriguing questions to be addressed. Thus, what are the sociological nuances of situations in which social metaphors used (hot, cold, warm, cool, etc) and actual physical temperatures coincide or not? For example, in the former case, when on operations (combat) military helicopter pilots fly into landing zones that are declared 'hot' and meet enemy fire and explosions, the temperature rises literally. Or, in the latter case, when groups of tourists take Christmas sleigh rides in the frozen European north, accompanied by much alcohol and collective 'good cheer' and warmth of spirit.

Certainly, in the case at hand, we have only just begun to uncover and explore some of the thermal experiences involved in our distance-running lifeworld. Detailed ethnographic, auto/ethnographic and/or autophenomenographic investigation into the under-researched sense of thermoception and into temperature work is needed across a range of cultures and physical cultures. Such work is of considerable sociological interest, for without ongoing engagement with thermoception and thermoregulation via our temperature work, our physical cultures would not be possible, and – ultimately - we would of course die.

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Figure 1: John engaged in winter temperature work