Understanding and Information Constellations in Ultrarunning

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Abstract

There have been many conceptualizations of knowledge in information studies. Though presently disparate, they can be brought together under a common framework with the concept of understanding. As such, understanding can provide an account for how bodily experience, recorded information, and other forms of information can contribute together epistemically. This paper provides a way for researchers to analyze understanding informationally: It defines *information* as form-and-activity and suggests that multiple pieces of information can be bundled together as information constellations with narrative as a cohering structure. The concept of information constellation is illustrated in a hermeneutic-phenomenological study of the information experience of ultrarunners. The resulting anecdotes and information constellation mappings show how multiple forms and activities of information are integrated as understanding even in the "simple" act of running. This discussion puts embodied, experiential, corporeal information on equal footing with the external, recorded forms of information that have been the traditional focus of information studies.

Introduction

> *And this long-distance running lark is the best of all, because it makes me think so good that I learn things even better than when I'm on my bed at night.*
>
> —Alan Sillitoe, "The Loneliness of the Long-Distance Runner," 1959

Distance running is a fundamental human activity. It's something we've done for at least two million years. In large part, it's the reason our bodies

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look the way they do (Bramble and Lieberman 2004). For something so central to humanity, it's interesting that running is often viewed as something purely physical—just a mechanical affair.

In this paper, I seek to problematize that account of running, characterizing running instead as an information-rich and multimodal activity. I present a study that, first, documents some of the key information sources, needs, and activities of ultrarunning (i.e, very long-distance running). More deeply, I plumb the structure of these information forms and activities to explore how they contribute to human understanding. I introduce the concept of information constellations, which is meant to showcase how the so-called "physical" and "mental" are always intertwined.

In so doing, I build upon the theoretical work of Marcia Bates (2006) and Anders Hektor (2001) to demonstrate that even a pursuit as seemingly divorced from documentary information as ultrarunning is enmeshed in a heterogeneous information world. I put embodied, experiential, corporeal information on equal footing with the exosomatic forms of information that have been the traditional focus of information studies—and which are privileged in modern society generally. As Haruki Murakami illustrates in his novel *Kafka on the Shore*, the ubiquity of literacy has reshaped our very being—and narrowed our sense of the possible. It is my hope that this paper may serve as a sort of course correction.

Metatheoretically, this paper is rooted in hermeneutic phenomenology. This is an interpretive way of coming to the world that attempts to understand the world as it is already understood before we try to understand it. Hermeneutic phenomenology takes human experience as its point of departure. It plays with the tension between social constructionism and constructivism (see Talja, Tuominen, and Savolainen 2005). It seeks to cultivate wonder and questioning rather than provide once-and-for-all answers. At heart, hermeneutic phenomenology recognizes that conceptual thinking necessarily eviscerates the quality of experience, and it attempts to recoup as much of the wholeness of experience as possible. A fool's errand, perhaps, but it seems to me that there is some wonder in foolishness.

I begin by discussing the merits of understanding as an epistemic aim for information (and information studies). I then argue that understanding can be conceptualized as the diversity or multiplicity of perspective. This, in turn, can be conceptualized by considering information always as form-and-activity and by taking information in bundles, which I call information constellations. With this groundwork in place, I then present and discuss an open-ended survey study I conducted to explore how ultrarunners build understanding.

Background: Understanding and Information Constellations

Understanding as a Unifying Concept

Information is often assumed to be an epistemic good. How this is the case is not self-evident, but is rarely investigated. When scholars do consider information epistemologically, they generally appeal to knowledge as an epistemic aim (Fallis 2006; Furner 2010). However, conceptualizations of knowledge in information studies have been diverse and disconnected (Rowley 2007). For instance, accounts variously consider knowledge to be a coherent web of information (Bates 2006; Floridi 2011), pure meaning (Yu 2015), and situated action (Lloyd 2011).

As these accounts are paradigmatically entrenched, there seems to be little opportunity for synthesis. However, recent efforts in information studies and epistemology have begun to explore *understanding* as a higher-order epistemic aim. I suggest that understanding could provide unification to these diverse approaches to knowledge.

Understanding refers to the grasping of inferential and explanatory relationships among a body of information (or, perhaps, of knowledge or meaning, depending on how these terms are defined) (for a recent review, see Baumberger, Beisbart, and Brun 2017). Understanding is posited to be truer-to-life than knowledge because it realizes the innate human drive for sense-making; whereas knowledge can seemingly be given, understanding must be grasped (Kvanvig 2011; Pritchard 2014). It admits of degrees of gradation, rather than the binary of known/unknown (Kelp 2015). It is transparent, meaning a person always knows when they understand something, whereas they may not always know that they know something (Zagzebski 2001). It accommodates subjectivity, allowing for two people's understandings of a phenomenon to be different but for both to be possibly valid (Grimm 2012). Concomitantly, understanding accounts for how outdated and false information can contribute epistemically, as well as that which cannot be evaluated as either true or false. Thus, for instance, pictorial and literary art (and, indeed, bodily action) may not contribute to knowledge as they are not "true" in a positivist sense; however, they may contribute to understanding (Briesen 2014; Elgin 2002). Catherine Elgin (2002) argues that evidence for this is seen in how art challenges assumptions and furthers inquiry in other fields. Mark Johnson (2007) has also argued that art can be regarded as epistemic on the grounds that all meaning, including intellectual abstraction, ultimately has a biological basis in the environmentally situated processes of the human body.

An example may be in order. Consider a student interested in the work of nineteenth-century American artist Thomas Eakins. The student could get some knowledge about Eakins from a textbook or encyclopedia

(e.g., particular paintings Eakins made, that he studied and taught at the Pennsylvania Academy of Fine Arts [PAFA], that he favored nudes, etc.). But these facts alone may not satisfy the student. First, they rely on other knowledge to be of any real use: for instance, knowledge about what those paintings look like, about PAFA itself, and about the sociocultural issues surrounding artistic nudes in nineteenth-century America. Moreover, this knowledge, even once it is interconnected and integrated, may be unsatisfactory because of its one-dimensionality. To gain a deeper understanding of Eakins and his works, the student may read collections of Eakins's correspondence or criticism from his time, and even fictional works about nineteenth-century America, Eakins, or painters in general. Moreover, the student may visit the Philadelphia Museum of Art, where many of Eakins's works are on display, as well as various sites around the city that were influential to or visually represented in Eakins's art. For an even deeper understanding, the student may try their hand at life drawing, perhaps even enrolling in a course at PAFA.

This example illustrates how understanding constitutes common ground between traditional approaches to information behavior and those exploring *information experience*—that is, between epistemology and aesthetics. This should be welcome, as research in information experience has been of recent interest but no attempts have been made to link information experience to broader, ongoing themes in information behavior or information studies generally. I have proposed this link in an earlier essay (Gorichanaz 2017a), and in this paper I offer a more concrete discussion. To sketch my view: Information experience allows for the recognition of *pathic knowledge* (emotive, intuitive) as a legitimate way of knowing, whereas traditional frameworks of information behavior only recognize *gnostic knowledge* (procedural, conceptual); both forms of knowledge are important for building a rich understanding of a phenomenon. This reveals another benefit of focusing on understanding in information studies: understanding is downstream from knowledge, and as such, studying understanding has the capacity to reveal forms of knowledge that have not yet been identified or widely acknowledged.

Here the insight of Johnson's (2007) rallying cry for the unification of epistemology and aesthetics, with understanding as its conceptual locus and the human body as its physical locus, is clear. Again, this is fortuitous: Much as with information experience, threads of research on embodied or corporeal information have been ongoing within information studies but without clear connection to the larger tapestry of information studies. Here, too, understanding seems to offer a gangway for integration.

Conceptualizing Understanding as Diversity of Perspective

Jochen Briesen (2014) suggests that a person's understanding can be deepened through regarding a phenomenon from materially diverse per-

spectives, including medium (text, image, bodily practice), format (original, reproduction), and genre (history, journalism, fiction), rather akin to the strategy of triangulation in empirical research.

Briesen draws on the work of Thomas Nagel (1986) in describing how this organization and systematization takes place. In his (in)famous book *The View from Nowhere,* an essay on scientific objectivity, Nagel describes how a scientist can take a step back from their present situation to get a broader perspective and concomitantly a deeper understanding. Taking this to its extreme, Nagel suggests that considering a phenomenon *sub specie æternitatis* constitutes objectivity. Of course, the possibility for a human (being inescapably earthbound) to hold such a view is questionable. However, Briesen does comfortably argue that the more one steps back, the broader their perspective and the deeper their understanding becomes.

Thus a person can intentionally and continually consider a phenomenon from different perspectives to cultivate understanding: As these different perspectives are incorporated, a progressively more sophisticated and multidimensional view of the thing is attained, leading to progressively increased understanding.

Conceptualizing Perspectival Diversity through Form and Activity

Following Briesen (2014), we can conceptualize the depth of understanding as perspectival diversity within a web of inferential or explanatory relationships. In turn, we must conceptualize perspectival diversity. It should be noted that, in discussions of epistemology, perspectival diversity can denote the diversity of perspective across members of a group (as in Harding 2015, for instance) or within a single individual. In my discussion here, I mean perspectival diversity in the latter sense. In my view, conceptualizing perspectival diversity can be done through forms of information (Bates 2006) and information activities (Hektor 2001). This pairing is felicitous because, on the social constructionist worldview, information can only be said to exist within human activity. Here I suggest that the more diversity there is in terms of information form and activity, the greater the potential understanding.

Bates (2006) articulates a typology of forms of information for information studies. As she intends this framework to be used by and for humans, she offers the most granularity for describing the forms of information that are most relevant to humans, while situating these forms within an all-encompassing framework. Likewise, she makes no claims to be sketching an essential or universal ontology; her framework is decidedly anthropocentric. In her view, all patterns of organization of matter and energy in the universe are *natural information,* and such information that is associated with life (i.e., is living itself or was created by a life form) is *represented information.* Represented information is the most relevant to information studies and so is described in detail; Bates describes represented informa-

Table 1. Forms of represented information, described along two dimensions (Bates 2006).

Ontological Status	Flow Line
Encoded	Genetic
Embodied	Neural-cultural (Experienced, Enacted [Expressed])
	Exosomatic (Embedded [Recorded])
	Trace

tion along two dimensions: the encoded/embodied dimension and the genetic/neural-cultural/exosomatic/trace dimension. The first of these refers to the information's ontological status as physically existent or conceptual; the second refers to the evolutionary flow line to which the information belongs. This framework is summarized in Table 1.

To first sketch the ontological dimension, encoded information is that having a symbolic, linguistic, or signal-based pattern form, and embodied information is the corporeal expression of information that was previously encoded. Bates asserts that information can cycle from encoding to embodiment, though the details of this are bracketed from her discussion. Moreover, Bates seems to leave the precise ontological distinction between encoded and embodied information unclear. However, it seems that encoded information refers to a concept (and so, physically speaking, encoded information could be considered a pattern of neural activity in a system with materials in the world), while embodied information refers to a nonneural physical structure that can afford encoded information for an animal (including humans).

The second dimension receives much more thorough treatment. This dimension includes four forms of information: genetic, neural-cultural, exosomatic, and trace. Genetic information is encoded in the genotype and is not discussed further.

Neural-cultural information is created by or processed in animal nervous systems, and it includes experienced and enacted information. Experienced information is ascertained subjectively and embodied in the conscience, as a result of encoded neural information, as perceptions, thoughts, memories, etc. Enacted information is externalized through interactions with the environment, springing from experience and encoded neural information, which can be performed socially or in isolation. At the risk of oversimplifying, experienced information is input, and enacted information is output. Within enacted information, Bates mentions expressed information for its particular relevance to information studies: expressed information is enacted information that is communicative. In this category Bates includes language, pheromones, and gestures.

Exosomatic information is "stored" fully outside animal bodies and can be experienced by other beings. Within exosomatic information, Bates identifies embedded information, which results from the actions of ani-

mals, either incidentally or deliberately. And within embedded information is recorded information, which is deliberate, communicative, and durable. Bates does not discuss other possible forms of exosomatic information in much detail on the grounds that recorded information is of the most relevance to information studies (at least as traditionally conceptualized, and in my view perhaps unduly so).

Finally, trace information is informational residue produced as a by-product or left to decay into its natural form. Trace information is in the process of degrading from being associated with life (i.e., being represented information) to not being associated with life (i.e., being undifferentiated natural information).

It stands to reason that these denominations are only valid with respect to particular activities within which the information is picked out and the interests of the person describing the information. For instance, it would seem that all information is both encoded and embodied, but it can be called one or the other depending on whether a person wishes to emphasize its conceptual structure (in the case of encoded) or physical structure (embodied). Additionally, all information seems to be both neural-cultural and exosomatic: one animal's enacted information is another's experienced information; what is exosomatic to one being is endosomatic to another. The identification of trace information, too, seems to be a matter of intentional stance: Bates gives a decaying wasp nest as an example of trace information. It may indeed be trace information to someone emphasizing the disappearance of the wasps, but it could also be considered embedded information for someone engaging with the nest as information in itself.

Based on this, it would seem useful to have a systematic way to describe forms of information with reference to information activities. A typology of information activities is given by Hektor (2001). Hektor's work arose through rigorous conceptual and empirical research on everyday information behavior, and it was meant to build upon and synthesize the frameworks proposed by prior researchers. Hektor places the individual within a particular sociocultural environment and information/communication technology setting. In this environment and setting, the individual goes about life carrying out projects, which entail eight groupings of information activities:

- *Search and retrieve:* locating and accessing information in an active and directed way
- *Browse:* navigating in an environment with some perceived probability of encountering information of value
- *Monitor:* intentionally returning to familiar sources and services on an ongoing basis
- *Unfold:* engaging with information in order to take part in it

- *Dress:* constructing information to be imparted
- *Exchange:* participating in unfolding and dressing in a bidirectional process
- *Instruct:* imparting information informally
- *Publish:* posting or announcing formally or in public

As a result of these activities, the individual experiences outcomes and changes, which feed back into their sociocultural environment.[1]

In a conceptual article using Hektor's framework deductively to describe the information activities in serious leisure pursuits, Hartel, Cox, and Griffin (2016) note that Hektor's description of the *ICT Setting* is rooted in a now-outdated ontology of information sources. This is visible in the somewhat-dated terms Hektor gives to the information activity groupings. Still, in essence, these groupings seem reasonable even today, and a virtue of this framework is its coverage of the entirety of the information–communication chain—from seeking to use and creation.

Information Constellations for Mapping Understanding

It is evident that Bates's (2006) and Hektor's (2001) frameworks describe separate but essential dimensions of information. That is, all information takes some form and inheres within some activity. As such, any information should in principle be describable according to both dimensions.

Moreover, information seems to emerge in bundles—*information* is a mass noun, suggesting phenomenological difficulty in identifying discrete units of information. Indeed, the same material components can constitute different information at different theoretical frames, or what Luciano Floridi (2011) calls levels of abstraction. This, I suspect is part of the seeming incommensurability between information-theoretic and human-level accounts of information. For this reason, I find it useful to conceptualize *information constellations*, or clusters of information activities involving forms of information that unfold in time, from which understanding emerges. An information constellation implies a single level of abstraction for all its constituent information.

The concept of information constellations provides a way to concretize and describe the diversity of perspectives in the building of understanding. I would posit that the more different forms of information that are involved in the more diverse information activities over the longer span of time, the greater the understanding. This assertion is exemplified in the present study.

A Study of Understanding and Information in Ultrarunning

Information Research in Ultrarunning

This study explores information in the sport of long-distance running, specifically ultrarunning (for a philosophical discussion of the ethos of ul-

trarunning compared to other forms of distance running, see Gorichanaz 2016).

Sport has not long been of interest to academia, let alone information studies. However, recent philosophical work has argued that sport is not merely idle play, as has generally been assumed, but, rather, it is socially useful and even educational: "Athletic contests display the characteristics of authentic questioning, impartial testing, and public demonstration of results; features that endure in such modern practices as courtroom trials and scientific experiments" (Reid 2009, 40). Because of these features, sport has subversive power and can challenge established hegemonies. Taking an even stronger stance, Josef Pieper (1952) argued that leisure pursuits such as sport are the very basis of human culture. Pieper defines leisure as the state of mind of doing whatever one pleases, and he argues that it is only when we have access to this state of mind that breakthroughs in science, philosophy, and the arts can be made. James Taylor (1998) likewise argues that athletic training is not just a complement to the "intellectual" pursuits, but, rather, both are part of the same whole. According to Taylor, *gymnastic* for the Ancient Greeks denoted (along with poetry and music) a direct experience with reality that awakens the senses and opens the door for understanding and wisdom. On these lines, Taylor argues that human knowing is rooted in one's lived experience as a body in the world, and thus that accounts that fail to recognize the epistemic nature of bodily experience overlook a critical part of human being. Taylor's discussion is framed within educational philosophy, but Johnson (2007), described earlier, makes the same argument on more general philosophical grounds.

To more fully engage with this long-overlooked part of humanity, I have been conducting research on information behavior in ultrarunning, one of my own hobbies (Gorichanaz 2015, 2017b). In 2015 I drew on the theories of serious leisure and life in the round to frame ultrarunning events as small information worlds with a particular ethos and particular forms and activities of information. I presented an auto-hermeneutic study of my information experience during my first 100-mile race. The results from this study emphasized the central role the body plays in ultrarunning, both as an information source and as information in itself. Later, in 2016 (see 2017b), I presented an interpretative phenomenological analysis study of five participants in a 100-mile race, a mix of newbies and veterans. This study focused on the experience of building understanding through running, discerning three themes that characterize the experience: taking time, undergoing struggle, and incorporating diverse perspectives.

Besides my own work, most academic research in ultrarunning is medical in nature and will not be reviewed here, but there is a small body of work in sports psychology that warrants discussion. As reviewed by Rochat et al. (2017), this work has tended to take a "third-person" approach, isolating factors of interest that can be measured or observed. However, this domain is seeing an emerging thread of phenomenological research,

which honors the integral nature of human experience by exploring phenomena from a "first-person" perspective at the level of consciousness. As a metatheoretical note, this mirrors the situation in information studies, where the sociocognitive paradigm has begun to dominate in response to the limitations of cognitivist approaches but phenomenology is starting to find acceptance as another alternative. Considering distance running more generally, there has been some work done in the social sciences (see Bale, 2004; Bridel, Markula, and Denison 2016). A selection of this work is reviewed for its relevance to information studies by Cox, Griffin, and Hartel (2017).

In toto, this prior research has established the information-richness of distance running, focusing on the processual and experiential aspects of running itself as a bodily action. This has included the strategies runners use while running in pursuit of success, such as monitoring their bodily signals. This work has drawn lessons for athletes and coaches, and it has also offered insights to information researchers regarding bodily and experiential information management. However, this work has not been well integrated with the broader concerns of information studies, which canonically focuses on recorded information. This may be because, when it comes to sport—and perhaps leisure in general—recorded information is often considered marginal, if not irrelevant.

The same may be said for much of the research on information experience, which seems to silo apart informal (e.g., oral, embodied) and formal (e.g., recorded) information sources. For example, Angela Pollak (2015) sought to challenge the dominance of recorded information in information studies by exploring informal information behavior in everyday leisure contexts. Pollak found that understanding is built experientially, either through social dialogue or solitary reflection, based on experiential information. That is, Pollak bracketed recorded information from her framework entirely. Her research can be extended, then, by accounting for how experiential information *works with* recorded information in the process of understanding. This should involve a process-based, experience-sensitive exploration of human engagement with multiple forms of information on the path to understanding. This is what I seek to do in the present study. I will argue that the boundaries of running are not so clear—that recorded information *does* play a role in the running world, including the experience of running. It should be noted, however, that this is a study of ultrarunning, which is a serious leisure pursuit rather than one of everyday leisure; as such, it is more likely to involve active information seeking (Hartel 2005) than would more casual cases of shorter-distance running.

Georges Perec ([1976] 2009) characterized reading as a sociophysiological activity, describing how the eyes, mouth, hands, and social environment inhere in the reading experience. This perspective has since been

echoed by a number of researchers in various discourse traditions. In a converse move, here I propose to show how "reading" is involved in the running experience.

Methodology and Methods

To plumb this question, I conducted a phenomenology-of-practice study of ultrarunners' lived experiences. Phenomenology of practice is a philosophically informed, hermeneutic-phenomenological methodology developed by Max van Manen (2014) for studying the meaningfulness of the experiences of people engaged in practice, broadly construed.[2] In phenomenology of practice, a researcher analyzes the experiential accounts (called *examples*) of small groups of participants to develop nuanced theories "of the unique" (rather than the general). Phenomenology of practice is a mode of interpretive and descriptive inquiry that attempts to look deeper into what has been taken for granted. It provides a method for cultivating wonder. As such, it "is primarily a philosophic *method for questioning*, not a method for answering or discovering or drawing determinate conclusions" (van Manen 2014, 29), though these questions themselves may potentiate useful insights. Rather, phenomenology of practice "aims to open up possibilities for creating formative relations between being and acting, between who we are and how we act, between thoughtfulness and tact" (van Manen 2014, 70). The meaning of phenomenological research is not in the facts it apportions, but in the way it provokes readers to think—and feel and act—different, to borrow a locution from Steve Jobs.

That is, a key strength of phenomenology of practice is its capacity to surface what van Manen calls *pathic knowledge*, or the poetic, embodied, ineffable, emotive knowing of lived experience; traditional social science research, on the other hand, primarily affords *gnostic knowledge*, which is procedural and conceptual. Following the discussion in the previous section, pathic knowledge has been long overlooked in academia but plays an indisputable role in human being.

Though some may find it difficult to see how pathic knowledge builds on the primarily gnostic knowledge of the scholarly literature, I suggest that both contribute to understanding; thus, to reiterate, the concept of understanding provides a unifying framework for considering both pathic and gnostic results. Indeed, van Manen discusses how phenomenological research itself seeks to foment understanding, one which is "distinctly existential, emotive, active, relational, embodied, situational, temporal, technical, theoretic, and nontheoretic," thriving on "a certain irrevocable tension between what is unique and what is shared, between immanent and transcendent meaning, and between the reflective and the prereflective spheres of the lifeworld" (2014, 68).

In this study, I took a phenomenological eye to the information behavior of ultrarunners who took part in a 100-mile footrace in June 2016.

The study included pre- and postrace open-response online surveys, semistructured interviews, and narrative race reports. The surveys solicited free responses to open-ended questions about the participants' running-related information behavior (both while running and peripherally). This included their information needs, information sources, outcomes of information seeking (Kari 2007), and serious leisure career arc (Hartel 2010). The questions were informed by my earlier work on ultrarunning information behavior (Gorichanaz 2015). The semistructured interview protocol sought more detailed accounts of the runners' experiences. I recruited participants through a routine prerace email, in which the race director included a message to all race registrants inviting them to take part in my survey and, optionally, a follow-up survey and interview after the race. In all, forty-six participated in the prerace survey, twenty-seven of whom also participated in the follow-up survey. Five runners participated in the follow-up interview.

Phenomenology provides a rich toolkit of analytical methods for diverse forms of conceptual and empirical work. In this study, I employ phenomenological theme analysis (van Manen 2014, 319–23) to analyze all the empirical material I collected. This method differs somewhat from the traditional approach to thematic analysis in the social sciences (cf. Braun and Clark 2006). According to van Manen, phenomenological thematic analysis does not identify codes, abstractions or empirical generalizations. Rather,

> "analyzing" thematic meanings of a phenomenon (a lived experience) is a complex and creative process of insightful invention, discovery, and disclosure. Grasping and formulating a thematic understanding is not a rule-bound process but a free act of "seeing" meaning. (van Manen 2014, 320)

The goal of such "seeing" is to come as close as possible to the phenomenon as lived rather than as conceptualized post facto. This kind of seeing requires directing a naive eye toward the phenomenon, which involves constantly asking *why*—as the researcher, why I make the associations I do, why I think the things I do, etc. This is a way to challenge one's preconceptions and come closer to the phenomenon in its wholeness. Becoming naive is, of course, a tremendous challenge, as it seeks to defy dualistic, conceptual thinking, which has long been the hallmark of academic thought. However, it offers a necessary counterbalance: where dualistic (conceptual) thinking says either/or, nondualistic thinking says both-and; nondualistic thinking thus has the potential to recoup what falls between categories, feeding forward into the validation, extension, and possible reconfiguration of those categories. Perhaps unexpectedly, some inspiring guidance for this mode of thinking is offered by the contemplative traditions of many of the world's religions. Zen Buddhist teachers, for example,

have long sought ways to cultivate the "beginner's mind" (Suzuki 1970) or the "don't-know mind" (Sahn 1999) in life's pursuits. "How do you keep your don't-know mind from moment to moment? You must try, try, try" (Sahn 1999, 14).

To speak of nuts and bolts, such trying can proceed through iterative holistic reading (getting a sense of the whole), selective reading (singling out fragments that seem especially revealing or essential), and detailed reading (examining each sentence and asking what it contributes to the phenomenon) (van Manen 2014). This analysis is writerly in nature: "Research does not merely involve writing: research is the work of writing. Writing is its very essence" (Barthes 1986, 316, as cited in van Manen 2014, 364). As such, van Manen favors results taking the form of a narrative as a way of preserving pathic integrity, as oftentimes "words of conceptual language seem to fall short of the felt meaning" (2014, 46).

My analysis did lead to some general, count-based findings on the information seeking and use of ultrarunners, which will be described below. More centrally, however, it allowed me to construct a number of short (70–100 words) anecdotes that embody a range of information experiences of ultrarunning (see Table 2). Each has a beginning, middle, and end, and exemplifies the vicissitudes of human intention, which are essential elements of experiential narrative (Bruner 1986; Dewey 1934).

Prima facie, these anecdotes seem to demonstrate a change or growth in understanding. They all involve learning, changing behavior, or moving toward greater self-efficacy in some way. To explore how understanding unfolds in ultrarunning more deeply, I mapped these narratives according to the framework of information constellations. As coherent narratives, they each imply a particular level of abstraction and could thus be felicitously analyzed for their informational structure.

These mappings show the informational structure of these lived experiences of ultrarunning. As such, they provide a method by which understanding may be parsed in other contexts. Creating these mappings was an interpretive process, and my mapping does not purport to be the only one possible; pursuant to my methodology, I intend for my results to be illustrative and evocative rather than authoritative.

With its small groups of participants, humanistic methods, and meditative aims, phenomenology of practice does not aim to provide statistical generalizability. Rather, it strives for face and construct validity (Babbie 2007), trustworthiness (Riessman 1993), verisimilitude (Bruner 1986) and *analytical* generalizability (Yin 2014). That is, phenomenological results may not allow a reader to predict or explain, but rather to come to other cases with deeper thoughtfulness, considering how they are similar to and different from what was described in a given set of findings. To be sure, all examples of any phenomenon have unique aspects, just as all phenomena share certain aspects—the tension adumbrated above.

General Findings

Though the primary interest of this study was to explore ultrarunners' stories of building understanding in terms of information forms and activities, some general findings regarding ultrarunners' information sources and outcomes of information seeking bear mentioning. I make no claims to the statistical generalizability of these findings; they are offered merely to sketch in a broad way the information world of ultrarunning.

In the prerace survey (n=46), I asked about the runners' information sources and seeking outcomes. Several information sources were mentioned by over ten participants. In descending order of number of mentions, they are: fellow runners, personal experience, magazines, bodily signals, and race reports.

In the theme analysis of this survey, I discerned several key outcomes of information seeking for ultrarunners: having a specific question answered, tailoring training and nutrition, planning for a specific race, getting feedback during a race, and getting running-related entertainment.

Information Constellations in Ultrarunning

As discussed above, I constructed short anecdotes to encapsulate a range of information experiences of ultrarunning. Six are given in Table 2. Topically, these stories span the career, the training season, and the individual race, which are the three serious-leisure temporal arcs identified by Hartel (2010) and which I previously found to apply to ultrarunning (Gorichanaz 2017b). Taken as a whole, these anecdotes offer compelling insight into the information life of ultrarunners.

To digest these anecdotes systematically, I worked to identify the information constellations—that is, the bundles of pairings of information form and activity—that comprise each one. The full results from this analysis appear in the appendix. What these constellations demonstrate is the way multiple forms of information—say, from bodily experience and from textual recording—cohere across diverse activities in ultrarunning.

For illustration, one information constellation appears in graphic form in Figure 1. This representative form allows a reader to quickly grasp the informational structure of the anecdote, and it provides another representative form for understanding the information in ultrarunning.

Discussion

The primary findings from this study are the experiential ultrarunning anecdotes, which are meant to give a sense of how ultrarunners carry out their projects with diverse information, highlighting how the body is involved in every step along the way but also showing the decisive role that recorded information plays for the ultrarunner—from getting equipped and dealing with injuries to choosing races and planning runs.

This observation becomes clearer when these anecdotes are regarded

Table 2. Anecdotes resulting from phenomenological theme analysis

Career (Social group)	I'm part of a running group that meets every Wednesday evening. I've gotten to know the other runners in that group, and naturally we talk about running a lot of the time. We trade experiences about all sorts of things: mileage, additional workouts, nutrition, gear. One interesting thing that's helped is watching other runners' form. You can just tell who is running well—it's smooth, effortless—and then try to mimic them.
Career (Dealing with chafing)	I never experienced chafing until I started going over 20 miles on a regular basis. I did some research on Facebook, runners' blogs and also magazines and learned that different people have very different ways to deal with it—two main approaches are changing clothes and using lubricant. In my case the shorts were the problem, so I posted about the shorts on a running Facebook group and asked for recommendations. Someone recommended a particular brand after having the same issue, and then I looked up more reviews of that product before deciding to buy it.
Training Season (Choosing a race)	I'm constantly reading about new races. I'm a member of a few Facebook groups where people post their race reports, and when I hear about a new race I always look up reports or videos. That helps me choose my races—that and the online ultrarunning calendars. I haven't traveled much in my life, so ultrarunning provides an opportunity.
Training Season (Planning)	When a race is coming up, I get more detailed with my planning. One thing I do is read race reports and look for photos from people who ran the race in previous years. This gives me some insight about what to put in my drop bags—for instance, if there's a long stretch with no shade, I'll pack a visor. It's a way to learn from others' experiences. This time I read in several race reports that it is easy to get lost, so I'm planning to be extra aware of looking out for course markers.
Training Season (Injury)	When my training surpassed 100 miles per week, I started getting some pain on the outside of my foot. I searched on Google and suspected I had peroneal tendonitis. I talked to my brother, who is also a former collegiate runner, and he agreed that's probably what I had. He showed me a specific stretch to use for this injury. He also told me that I could train through the injury as long as I consistently did the stretch. This helped keep the symptoms under control while I continued training.
Race	During the race itself, things weren't too bad until mile 35 or so. I was running a seven-mile stretch and it felt like it was taking forever. I looked down at my GPS watch to see how long it had been—only four miles since the last aid station. I was feeling tired. I put on music to distract myself. While I run, when I'm feeling tired or bored, I think about other runners' stories I've heard, which actually help me get through many moments.

as information constellations—that is, analyzed in terms of their information forms and activities. Across all these stories, all the fundamental forms of information are represented except for embedded information (as these stories did not deal with any nonhuman animals). Likewise, all the information activity categories surfaced except *instruct;* however, the characters in these stories did unfold with others' instruction. Moreover, though Hektor (2001) describes exchange as a dialog between dressing and unfolding, in the context of ultrarunning it should perhaps be con-

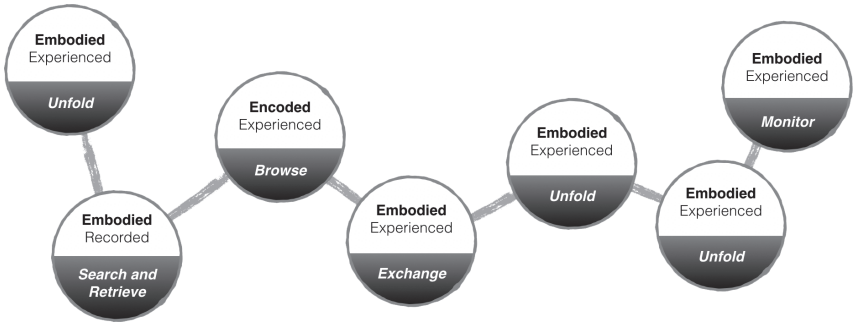

Figure 1. Information constellation from the fifth anecdote, about an injury during training

sidered one between dressing and instructing, given the informality of much of it.

Suggesting that recorded information is decisive in and for ultrarunning challenges somewhat the assertion made by Hartel, Cox, and Griffin (2016) that "while long distance running does entail information activities with documentary sources, these are relatively marginal, even optional, since a physical activity is primarily enacted and learned by doing." I argue that viewing running as "merely" running is overly narrow. Rather, as the name itself implies, *ultra*running is *beyond* running. The act of running is inextricable from the world, which involves recorded information as much as the physical experience of being a body. Simply put, were the recorded-information activities truly optional, ultrarunning would not be the same activity, and this becomes increasingly the case as modern technology continues to mobilize and penetrate the running experience (in GPS watches and biometric monitors, for instance). Of course, it may be that the same cannot be said for shorter-distance running and that which does not qualify as serious leisure—a topic for further research. Even outside running, today's reality is that engaging with documentary sources and the physical experience of being a body are not as clearly divisible as perhaps they once were—hence discussions of immersive and pervasive documents (Robinson 2015) and the human experience of documents (Gorichanaz and Latham 2016), which point back to Perec's ([1976] 2009) meditation on reading.

The concept of information constellations seeks to lend some concreteness to these issues. By conceptualizing information as form-and-activity, it avoids the philosophical problems associated with the conduit metaphor (Day 2000; Tkach 2017), and, by linking information in constellations, it shows how information "works together" in narrative bundles. Here I have utilized Bates's (2006) fundamental forms of information and Hektor's

(2001) information activities as the frameworks underlying my analysis, but in principle other typologies could be used. Indeed, other schemes may prove even more useful for discussing information constellations; those developed by Bates and Hektor provide a broad view of information, but this breadth does seem to obscure some of the logic of the narratives in question—that is, these constellations mean little on their own.

My discussion here serves to test these frameworks in a demanding context—ultrarunning is information-rich and corporeal, while these frameworks were developed for the "traditional" information contexts that have historically held the interest of information studies. While no effort is made to do so here, an information constellation analysis could be used to refine our conceptual frameworks. In particular, the graphic representation of information constellations may prove particularly useful in this regard, as it is meant to foment further questioning: Which forms of information are most prevalent? Which activities? Do certain forms tend to go with certain activities? How well does this typification "capture" the experience? In what ways is it lacking?

To speculate on where this discussion could lead, it would seem that future research could systematically analyze the information constellations of a larger body of narratives in order to draw more general conclusions about how the structure of an information constellation bears on the quality or depth of the understanding it represents, perhaps in relation to the temporal arc manifest in the narrative.

To summarize, in this paper I have suggested that understanding is an epistemic aim that brings together informational concerns about the human body with the longer-standing concerns of information studies having to do with documentary information. From there, I have sought to provide a way for researchers to analyze how information contributes to understanding: defining *information* multidimensionally as form-and-activity and using narrative as the cohering structure for multiple pieces of information. I have called these analyses information constellations, after the constellations in the night sky: The stars are out there, uncountable, bright and dim, clear and tenebrous, new and old—some, even, no longer in existence but shining on as traces—and we humans look up at night and specify how they're connected, what they mean, what stories they tell. Just as the stories of nighttime constellations have for millennia helped us humans understand ourselves, each other, and our place in the universe, so I hope information constellations may afford some insight into understanding information, technology, and humanity today.

Conclusion

In the novel *Kafka on the Shore*, Haruki Murakami tells a story of characters who slip into a world where not everything can be expressed in words or, consequently, put into print. Here, "words have no life in them." For the

bookish protagonist, this world is bewildering and contradictory—he is caught "between one void and another." And yet, this is the world we live in.

In our daily dealings, we oscillate between the world of literacy and that of whole being—between the world of words and the world of being a body. There is no real separation between the two. Indeed there is no "two" to speak of, as they are indistinct. Privilege though we do the world of literacy, we are unavoidably enmeshed in a world of emotional, pathic being as bodies whose very boundaries are malleable. It is not that we are merely experiential or merely literate. It is not that we think with our heads and do with our hands. We are always both, and we always do both. We "let ourselves be absorbed into things," as someone tells young Kafka at the climax of Murakami's novel.

Information studies has, for most of its history, sought only to organize the world of literacy. In the past few decades it has progressively opened up, recognizing that there is information also in other aspects of being. At present we seem to be like young Kafka, caught between worlds that, from their *interstitium*, appear as disconnected voids. We have had, on one hand, the rudiments of information needs, seeking and use, and on the other, this idea of bodily experience. What would seem to be most productive now is to recognize the unity of being—to bring our hands together.

Appendix

Table 3. Information constellation analysis of anecdotes.

			Form	Activity
1	Career (Social group)	naturally we talk about running a lot of the time. We trade experiences about all sorts of things: mileage, additional workouts, nutrition, gear.	Embodied-Experienced/Expressed	Exchange
1	Career (Social group)	One interesting thing that's helped is watching other runners' form. You can just tell who is running well—it's smooth, effortless—	Embodied-Experienced	Monitor
1	Career (Social group)	and then try to mimic them.	Embodied-Expressed	Dress
2	Career (Dealing with chafing)	I did some research on Facebook, runners' blogs and also magazines	Embodied-Recorded	Search and retrieve
2	Career (Dealing with chafing)	learned that different people have very different ways to deal with [chafing]—two main approaches are changing clothes and using lubricant.	Encoded-Recorded	Search and retrieve
2	Career (Dealing with chafing)	In my case the shorts were the problem	Encoded-Experienced	Search and retrieve

Table 3. *continued*

			Form	Activity
2	Career (Dealing with chafing)	I posted about the shorts on a running Facebook group and asked for recommendations.	Embodied-Recorded	Publish
2	Career (Dealing with chafing)	Someone recommended a particular brand after having the same issue	Embodied-Recorded	Unfold
2	Career (Dealing with chafing)	I looked up more reviews of that product before deciding to buy it.	Embodied-Recorded	Search and retrieve
3	Training Season (Choosing a race)	I'm constantly reading about new races. I'm a member of a few Facebook groups where people post their race reports,	Embodied-Recorded	Monitor
3	Training Season (Choosing a race)	when I hear about a new race I always look up reports or videos. That helps me choose my races	Embodied-Recorded	Search and retrieve
3	Training Season (Choosing a race)	that and the online ultrarunning calendars.	Embodied-Recorded	Browse
3	Training Season (Choosing a race)	I haven't traveled much in my life, so ultrarunning provides an opportunity.	Encoded-Experienced	Unfold
4	Training Season (Planning)	When a race is coming up, I get more detailed with my planning.	Encoded-Experienced	Unfold
4	Training Season (Planning)	One thing I do is read race reports	Embodied-Recorded	Unfold
4	Training Season (Planning)	look for photos from people who ran the race in previous years.	Embodied-Recorded	Search and retrieve
4	Training Season (Planning)	This gives me some insight about what to put in my drop bags	Encoded-Experienced	Exchange
4	Training Season (Planning)	for instance, if there's a long stretch with no shade, I'll pack a visor.	Embodied-Enacted	Exchange
4	Training Season (Planning)	It's a way to learn from others' experiences. This time I read in several race reports that it is easy to get lost, so I'm planning to be extra aware of looking out for course markers.	Encoded-Experienced/Enacted	Exchange
5	Training Season (Injury)	I started getting some pain on the outside of my foot.	Embodied-Experienced	Unfold
5	Training Season (Injury)	I searched on Google and suspected I had peroneal tendonitis.	Embodied-Recorded	Search and retrieve
5	Training Season (Injury)	my brother, who is also a former collegiate runner	Encoded-Experienced	Browse
5	Training Season (Injury)	he agreed that's probably what I had.	Embodied-Experienced	Exchange
5	Training Season (Injury)	He showed me a specific stretch to use for this injury.	Embodied-Experienced	Unfold

Table 3. *continued*

			Form	Activity
5	Training Season (Injury)	He also told me that I could train through the injury as long as I consistently did the stretch.	Embodied-Experienced	Unfold
5	Training Season (Injury)	This helped keep the symptoms under control while I continued training.	Embodied-Experienced	Monitor
6	Race	I was running a seven-mile stretch and it felt like it was taking forever.	Encoded-Experienced	Unfold
6	Race	I looked down at my GPS watch to see how long it had been—only four miles since the last aid station.	Embodied-Experienced	Unfold
6	Race	I was feeling tired.	Encoded-Experienced	Unfold
6	Race	I put on music to distract myself.	Embodied-Recorded/Enacted	Exchange
6	Race	While I run, when I'm feeling tired or bored, I think about other runners' stories I've heard, which actually help me get through many moments.	Encoded-Experienced/Enacted	Exchange

Notes

1. Hektor's framework focuses on *human* activity, but in principle many of these activities could apply to nonhuman actors as well; should such application be deemed useful, future research could seek to develop a universal framework of information activities.
2. Despite the name, phenomenology of practice is unrelated to practice theory.

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