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Ethnography and Cognitive Psychology: Shared Dilemmas of the Local and Unlocatable

Is there a productive intersection between ethnographic knowledge practices and the search for perduring structures of cognition within psychological inquiry? This article employs a brief ethnography of cognitive psychological experimentation to reveal that like ethnographers, experimental psychologists engage in a complex relationship between local particulars and generalized processes. In particular, I focus on the relationship between notions of "local" space and time and "unlocatable," abstract cognitive processes to explore how psychological inquiry, like critical ethnography, is at once concerned with identifying abstract processes and intimately tied to the particulars of the research context. [ethnography; cognition; experimentation]

Is there a productive intersection between ethnographic knowledge practices and the search for perduring structures of cognition within experimental psychological inquiry? At first impression, there is a fundamental disconnect. Until recently, conceptions of the ethnographic "site" and "moment" have been intimately tied to notions of "the field" and its empirical investigation, with data deriving from seemingly localized particulars. Ethnographic investigation has been predicated on the position that empirical insight best derives from observations of "localities" operating with minimal intervention on the part of the researcher.

In contrast, experimental cognitive psychology has what at first seems to be a virtually antithetical approach to field research. With the aim of understanding the mental processes underlying individuals' thinking, learning, and behavior across contexts, cognitive psychologists attempt to distance their research from any particular setting. Rather, insights are drawn through experimental comparisons between the cognition observed to emerge during two different yet designedly similar settings. Setting is considered to be a malleable forum for designing interactions to best reveal the internal cognitive processes, and the interplay among observable indicators of cognition and the relevant "differences" between the settings are the foci of the research analyses.

This article investigates unexpected parallels in the way cognitive psychological experimentation and critical ethnography represent and derive meaning from the relationships between "site"—local time and space—and abstract, generalizable processes. In particular, I focus on the relationship between notions of "local" space and time and "unlocatable" abstract cognitive processes to explore how psychological

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inquiry is at once concerned with identifying abstract processes and intimately tied to the particulars of the research process.

The article begins with a brief ethnography of experimentation in which some of the guiding premises of cognitive psychological experiments are critically considered. I focus on the relationship between detailed examination of local time and space particulars, and codified experimental practices of abstraction, such as across "conditions" and "research subjects." Next, I turn to disciplinary conceptions of cognition itself, and again consider the relationship between notions of cognition as "local" in space and time versus cognition as a collection of abstract, or "unlocatable," processes. Overall, I explore how psychological inquiry is at once concerned with identifying abstract processes and intimately tied to the particulars of the research context. In this way, the analysis reveals surprising and unexpected parallels between cognitive experimentation and critical ethnography.

Dualities: Local and Abstract Space and Time of Experimentation

Cognitive psychological theories of research and experimentation derive from the goal of identifying causal relationships between cognitive processes of "the mind," and behavior and action in the world. Because cognition, as located within the mind-space, cannot be observed directly, the field has developed methodologies for assessing the relationship between the ways mental processes interact with identifiable environmental conditions to produce measurable effects. Experimentation is the most frequent choice of cognitive psychologists due to its storied role as the only methodology that allows for causal interpretations of data (e.g., see Darley 1991). Although true causal interpretations are an idealization and many cautious researchers will hesitate to make full causal claims, this is largely the understood goal of experimental research. To restate, we seek to use experimental designs to discover whether, when, and how specified details of local time and space environments alter specified actions of the mind.

Experimental conditions as both local sites and tools for abstraction

Although experimentalists are theoretically seeking to derive abstract knowledge, on a practical level the field is heavily focused on the local particulars of experimental studies. In fact, it is only through a serious reliance on the details of experimental locales that one can derive statistical power or the ability to generalize beyond the unique locations in which the research was conducted. As is well known, experimental data are derived not from the results of what participants do in a single environmental "condition," but rather from the difference between what they do in two conditions in which everything is held "constant" except for a single "independent variable" that is varied purposefully. The independent variable is something local and environmental, such as the amount of time provided between learning and testing, or the order in which instructional activities are presented. Thus, the researcher can, ideally, determine a causal relationship between the varied local condition and the participants' actions as measured by a "dependent variable," that serves as an index of cognitive

processing. These causal claims are the heart of what experimental research seeks to accomplish, rather than making any conclusions about the parts of the environment not varied, or about the cognitive processing more generally.

Although experimental terms such as "constant," "independent/dependent variables," "subjects/participants," or "conditions" are a well-known part of discourses of experimentation, I invoke them here as a brief point of discussion because I think they serve as pivots between the local, sited research practices and the theoretical abstractions that are the rhetorical fruits of such research. On one level, the terms describe something about the local site (e.g., "our independent variable was the luminance of a dotted line projected onto a 17" screen in front of participants"), but at the same time they become a way to speak abstractly about the research (e.g., "the mean scores for participants in conditions 1 and 2 were significantly different"). This interplay is crucial to the statistical analyses that evaluate experimental data, since statistics rely upon the collapsing of data points into single categories (like "participants"), but that collapse can only be performed if the details of the data points are evaluated to be similar enough. If individual humans that participate in the study are not assigned randomly to conditions, for example, there might be some characteristic about them as individuals that prohibits a valid abstraction from the data (e.g., participants were assigned to luminance conditions by age).

Thus, the dilemma of locality and abstraction is evident methodologically. This is not specific to experimentation, and is likely quite similar to challenges inherent in drawing generalities from deeply contextualized ethnographic data. The positivistic frame of cognitive psychological research, however, makes this slippage and negotiation a crucial part of constructing and evaluating theoretical knowledge.

Time and experimental cognitive research

Like the local *space* details that are part of constructing, holding constant, and abstracting across aspects of experimental conditions, *time* plays a multifaceted role in experimentation methodologically and theoretically.[1] Time is at once an element of the local context and a feature of the way theoretical knowledge from a specific experiment is conceived and layered onto the current state of the field. Neither representation of time makes use of chronological, or "clock" time (e.g., the current time is 11:00 on September 21, 2007). Rather, both are more related to the notion of "timing."

Timing of cognitive tasks is a crucial element in the design of local experimental contexts. Many aspects of the environment are timed, for example, "four minutes" to complete part 1 of the task, "two minutes" to complete the second part, and so on. This enables researchers to improve the comparability across two conditions, or between each instantiation of the experiment with new individual participants. However, for most studies, researchers pay little attention to whether those four minutes begin at any particular chronological time of day. Similarly, the year of the experiment is not considered to largely impact the research. Part of this is due to the nature of the

experimental design. Because participants in conditions 1 and 2 are both being run in approximately the same chronological time, this source of variability will be ideally similar across conditions, and thus will be accounted for statistically. Thus, possible impacts of this aspect of time are not ignored, but rather are assumed to be "randomly distributed" across conditions.

Timing within the local experimental context is also used to both impact and assess the level and type of cognitive processes engaged in the activity. For example, forcing participants to respond within milliseconds to a prompt will require different cognitive functioning than allowing them ten minutes to complete a task. Additionally, as will be discussed further in the second half of this article, the amount of time that participants take to respond to prompts is often measured as an index of task difficulty, or of the cognitive processes at work. For example, imagine a classic "visual search" experiment in which participants are asked to locate a red dot in a scene. The scene either contains many other black dots of the same size and shape, or many other red shapes of the same size. Participants reliably take much longer to respond to the second task. This led researchers to differentiate between constructs of "parallel search," where one can visually assess the whole scene at once to make a decision, versus "serial search," where one must examine and evaluate each element of the scene individually (see Sternberg 1966; Thornton and Gilden 2007).

There is another quite different aspect of timing that bears upon the design and interpretation of experimentation. There is an aspect of professional time and timeliness that serves as a metric for research quality and disciplinary reception. The importance of performing "timely" research shapes much of the research process, including research questions, constructs of interests, selection of independent and dependent variables, and overall interpretations of research. In contrast to the easily delineated, local quality of timing as a feature of experimental designs, the dimension of professional timing is more "unlocatable," and broadly constructed.

Thus, time, and more specifically, *timing*, is intimately connected to experimentation and the development of theoretical knowledge. Any theoretical contributions derived from an experiment are entirely dependant upon the details of the research context, which include timing details. Both the local experimental details and the theoretical contributions, however, are also simultaneously constructed through discourses of the existent body of cognitive theory and notions of professional timeliness.

In sum

Overall, both space and time operate in multiple abstract and locally sited ways in the construction of experimental research knowledge about cognition. Though the nominal positivism of cognitive psychology draws attention to the notion of disciplinary knowledge as abstracted, it is also deeply interconnected with the local details of the experimental space and time. In fact, specification in the details of the locales of study serves as the leverage for responsibly identifying statistical differences of

interest. Most importantly, this analysis begins to reveal ways in which the methodology of psychological studies are not so unlike ethnography in its complicated relationships between the space and time of localities, or "site" and derivations of general processes, or theoretically "unlocatable" knowledge.

In further consideration of psychology's treatment of the local and the unlocatable, we can turn now to psychological investigations of cognition. The "actions of the mind" are implicitly understood as having their own local and unlocatable duality. A brief treatment of representative psychological texts reveals two main conceptions of cognition that interact but display distinct notions of cognition itself, as well as differing expectations and implications for research design.

The Space and Time of Cognition (in Cognitive Psychology)

Psychologists have a complex relationship to their own representations of cognition. These are integral to their use of experimentation, and guide the construction of independent and dependent variables. The complicated relations between time, space, and cognition also reveal deep parallels with ethnographic modes of inquiry that similarly draw strength of generalization from the details of local contexts.

Cognition as local(e)

On one level, cognition is considered something produced by structures of the brain, something that with an appropriate tool one could "see" at work. Cognition is thus represented as a physiological-physical activity that operates in specific times and places. Indeed, in recent years, a proliferation of research techniques have been employed which work to "locate" cognition as it operates at particular locales within the brain. Two of such technologies include functional Magnetic Resonance Imaging (fMRI) and Electroencephalography (EEG) allowing for electrophysiological measures of Event Related Potentials (ERP). These techniques provide data about brain blood flow and electric currents that researchers attempt to link to cognitive operations. These protocols, which in many corners of the discipline are seen as some of the more promising areas of cognitive research, foreground the representation of cognition as coextensive in time and space with actual, observable, physiological processes. Consider the following quotation taken from the introduction to a paper attempting to gain insight into how humans exert purposeful "cognitive control" over their emotions.

> In general, cognitive control is thought to involve interactions between regions of lateral (LPFC) and medial prefrontal cortex (MPFC) that implement control processes and subcortical and posterior cortical regions that encode and represent specific kinds of information. [Ochsner et al. 2002:1215]

Overlooking the neurological details of this statement, one notes that the authors are foregrounding actual *locations* of cognition, and pointing to interactions between

spatially represented entities (brain regions). They are not interrogating the existence or meaning of the construct "cognitive control." Rather, they assume that it is something that exists in a particular place and that probing the physiological details of the brain should "find" it.

Researchers in this theoretical tradition use experimental methodologies to compare brain activities when people participate in conditions in which a single variable is manipulated. For example fMRI technology allows for studying patterns of brain activation as participants do specified tasks. The assumption of random assignment can be absolutely crucial in studies using fMRI technologies. In order to analyze these data, researchers essentially take patterns of activation in participants' brains when they are ostensibly doing the activity of interest (e.g., exerting cognitive control over one's response to a stimulus) and "subtract" patterns of activation in the same or different participants' brains who are ostensibly doing something similar, but that is *not* the activity of interest (e.g., looking at the same stimulus without instructions to control their response).[2] Thus, the "left over" activation is theorized to show the spatial locus of the cause for the difference between conditions. Ideally, this cause may be interpreted as the hypothesized cognition. In this hypothetical, this would be the location for "cognitive control."

Cognition as abstract process

At the same time, the theoretical framework of information processing has widely captured the imagination of other investigators of cognitive research and a second kind of representation of cognition that emerges there. This approach originated in the 1940s from a computer metaphor, and drew attention to the abstract calculations involved in the way that the mind treats information "inputs" from the environment. Information processing theory has led the field to discursively represent cognition as a set of processes. These processes are described in nonlocalized terms, abstracted from physical or physiological phenomena. Rather, this approach represents cognition as sequences of mental activities that occur as the individual interacts with his or her environment. There is a tacit assumption that these processes occur somewhere between the ears of individual humans, but that area is not really parsed spatially. Most crucially, the "where" of cognition is not the focus of investigation. Rather, studies from this perspective emphasize the "how" and "when."

The following passage from an article reviewing psychological research on the nature of "concepts" illustrates this approach.

> One might (also) distinguish among kinds of concepts based on the types of processing that are done to develop and maintain them. (p. 124) . . . Abstract concepts, such as truth and justice, seem different from object concepts, such as dogs and boats. Yet little work has addressed how we understand abstract concepts. One suggestion has been that abstract concepts are understood through conceptual metaphors (Gibbs 1997; Lakoff and Johnson 1980). During this process, representations

> of concrete concepts are mapped onto the abstract concepts to facilitate understanding. For example, justice might be understood through a conceptual representation of a scale, and anger might be understood through a conceptual representation of boiling water. [Medin et al. 2000:128]

These researchers reveal interest in a theoretical, sequenced representation of the mental activities performed when a person thinks about an abstract concept. For example as noted above, Lakoff and Johnson (1980) suggest that when we conceptualize a concept such as "justice," that is, a concept that does not rest directly on perceptual cues, we draw upon stored representations of object-based concepts. They propose that in the case of processing the concept of justice, one might draw on a stored image and related conceptual framework of a scale and the images of things that weigh the same being treated as equals. This processing then reveals itself in common discursive phrases such as "the balance of justice" or "weighing evidence."

One must be clear that Medin and colleagues do not entirely divorce cognition from location. Later in the article they address the impact of damage to brain areas on concept processing (p. 132), thus revealing their tacit assumption that cognitive processing somehow relies upon the spaces of the brain. However, in spite of sharing this assumption and recognition that local space does have some explanatory value with the "local" view of cognition considered above, the "abstract process" view of cognition does not organize its rhetoric or theoretical energies into elucidating the details of place or time. Rather, damage in certain brain regions is typically used to theoretically elucidate cognitive processes, for instance, noting that with damage one might have intact *X* ability but impaired *Y* ability, which suggests that *X* and *Y* should be conceptualized as different processes.

Time

Cognitive psychologists' representations of time in notions of cognition reflect a similar multileveled pattern. Woven into the representations of cognition as "local" or as "abstract process" are attendant notions of time. As technologies have proliferated to study the *locations* of cognition, so too have techniques emerged to measure the *temporalities* of cognition. In particular, techniques that measure timing with which electric currents pass through the brain (ERPs) following an environmental stimulus are being increasingly used in attempts to locate and more fully understand the relationship between mental action and physiology. Pairing these methods enables close analysis of brain correlates of cognition, providing insights into the time-course of spatial activation.

Alternatively, some cognitive psychologists study time as an empirical window into the sequences through which individuals process environmental "inputs." One common dependent variable in experimental designs is defined as "reaction time." Precise measures of the delay between a stimulus presentation and a participants' response are used to index ease of processing, quantity of steps necessary to complete processing, resting activation level of a phenomenon, or other such qualitative

features of cognitive processing. For example, Kroger et al. (2004) used reaction time measures to better understand how participants make judgments of perceptually "same" or "different" relations. More specifically, these researchers sought to determine whether three versions of visual stimuli, each comprising two colored squares but with varying levels of complexity in their differences, were processed the same or differently. Forms of the stimuli were presented and participants were asked to make a response based upon their determination of sameness or difference. Participants' speed of responding was used to make interpretations about which types of judgments were more difficult, and which were more automatic and natural to processing "sameness" versus "difference."

Moving between representations of cognition

These complications in the spatial and temporal representations of cognition are heightened and made salient as researchers begin to combine the "local" and "process" views of cognition using the affordances of new technologies. On one level, this integration is quite exciting for the discipline and has opened new frontiers for empirical cognitive research. The following lauditory assessment of the impact of combining research focused on a place, "the frontal lobe," and research focused on a process, "episodic memory," argues that the integration has been profitable:

> The concepts of "frontal lobe functions" and "episodic memory" have been dynamic, evolving concepts over time, and the methods used to investigate different aspects of human cognition have changed as well. This progress has led to a modification of traditional concepts of episodic memory, and has influenced the emergence of new cognitive and neuroanatomical models of the role of the human frontal lobes in episodic memory. [Stevens and Grady 2007:207]

Importantly, these authors note that the new research is not only "locating" the theoretical construct of "episodic memory," but rather is giving rise to a reevaluation of both the concepts and the notions of anatomy and "place." The field of knowledge about the functions and capacities of the human frontal lobe have been undergoing rapid transformations of knowledge as studies engaging with cognitive constructs, such as episodic memory, reveal nuanced activities in which the frontal lobe is involved. With relation to memory, the frontal cortex is now thought to be involved in the strategic aspects of executing use of one's episodic memories. These include, for example, encoding new memories for storage, monitoring and verifying one's memory, and organizing search for the content during retrieval. At the same time, these acts of investigating the frontal cortex prompt novel consideration of the elements and steps involved in the construct of "episodic memory."

Tensions between the "process" and "location" views of cognition have also emerged, however. Uttal (2002) provides a vituperative articulation of a common disciplinary concern that cognitive processes as theorized have not been intended to be "located," or at the least that "place" was not part of their imagined entity.

> However precise may be the measurement and however sophisticated the analyses and instrumentation used when one is searching for the cerebral site of a cognitive process, the experiment is going to be deeply flawed if the cognitive target is but an artifact, a reification of an hypothetical construct, a name given to a process, or is otherwise imprecisely defined. In fact, the usual "cognitive" component being studied is more closely characterized by one of these nebulous terms than by a sharp operational definition. How far we can go looking for such phantoms will always be problematical. The search for cerebral locales of extremely vague ideas such as anticipation, affect, religiosity, linguistic competence, executive decision making, or many other hypothetical constructs created by psychologists over the years is certain to be chimerical. Even when an fMRI "hotspot" is located and associated with some putative cognitive process, how can the investigator know what part, component, or aspect of that cognitive process is being assayed? To assume simple construction and "pure insertion" for cognitive processes is not justified on any empirical grounds. [Uttal 2002:377]

Further, Uttal marshals results from a meta-analysis to posit that the data at present largely do not support attempts to find correlates between neuro-anatomy and abstract cognitive processes.

> When Cabeza and Nyberg (2000) compared the results of hundreds of cognitive-fMRI studies, they found that the locales assigned to what were assumed to be similar, if not identical, processes were spread out at least over quadrants and frequently over halves of the cerebral cortex. Thus, the large database being accumulated does not yet support any degree of sharp localization. [p. 378]

Importantly, one may note a difference between these positive and negative accounts of bridging "local" and "abstract" views of cognition. The first describes the integration as constructive, in that both notions of local space and abstract conceptual processes are revisited and revised. The second focuses more on aims to "find" neural sites in which existing constructions of abstract conceptual processes "occur." As identified by Cabeza and Nyberg's (2000) meta-analytic comparison, there is a danger to divorcing a construct from its context of origin, here the local details of the experimental design protocols, without thorough internal critique. As noted in the above discussion of experimentation, the local details of the research context are deeply connected with the abstract cognitive processes they are used to elucidate. Though researchers invoke a type of slippage and shorthand in which they talk about cognitive processes using an abstract term, such as "analogical reasoning" or "short-term memory," those in the field, in fact, hold a much more enriched representation. The title of a construct is embedded in the types of materials and research contexts that have been used to develop the construct.

The new methodologies such as the fMRI, however, bring attention to the unwelcome product of slippage when those constructs are "looked for" as single, coherent entities that would ostensibly be "found" in the same location of the brain regardless of

the experimental particulars used to investigate them. As evidenced by Cabeza and Nyberg (2000) and others, however, this assumption does not hold well empirically, and leads to studies who have "found" the construct in many different locations within the brain.

Summary

Overall, these internal tensions clearly complicate the framing of "cognition" and cognitive constructs, and highlight ways in which cognitive psychological theorizing about abstract constructs is intimately tied to localized space and temporal context. As evidenced above, implications of this debate are fueling both controversy and exciting transformations of the existing body of theory. New technologies and accordant advances in delineating neurological function directly impact research investigating abstract processes of cognition, both by raising questions about the component processes of larger constructs, and by prompting reevaluation of constructs themselves. Similarly, the complex nature of many abstract cognitive constructs derived from quite varied experimental contexts such as "decision making" or "morality," raise questions about the validity and optimality of aims and strategies for attempting to map cognition to brain locations.

Parallels with Ethnographic Inquiry

As an experimental cognitive psychologist regularly in contact with legal ethnographers, the shared dilemma of the relationship between the local and the abstract has emerged as a bridge between what sometimes seem to be antithetical approaches to research and data collection. Like the methodological discourses of experimentation, rhetorics of ethnography are predicated on the grounding of data in the particulars of "local" or "sited" spaces and times, even if the "site" is neither a bounded nor singular entity. Further, the localized analyses are conducted in pursuit of "unlocatable," abstract processes or concepts.

Beyond methodologically, there are further parallels in the treatment of the local and abstract constructs across these disciplines. The above discussion of psychological representations of cognition reveals how constructs can at once be imagined as general yet reflect local conditions, or be construed as local yet reflect general assumptions. For ethnographic treatments of this topic, I refer the reader to two articles in this special issue. In particular, the analyses treat specific ways that constructs such as tradition (J. Richland) and race (Greenhouse 1996) are simultaneously local and general, with consequential differences for the law and impacted individuals. In fact, these works reveal the crucial nature of law itself as simultaneously local—in its treatments of particular times, places and events—and general, in its aim to reflect abstract legal rules and principles.

Thus, although the nominal positivism of psychological experimentation and the orientation of ethnography as grounded in "local" details appear quite distinct, both methodologies face challenges inherent in deriving grounded, timely, and

theoretically engaged research. In both disciplines, this dilemma leads to the larger question of determining what it means for a process to be simultaneously abstract and tied to the particulars of local time and place. Does such a dual identity mean that creating such an abstraction is irresponsible or somehow "invalid," or that linking it with certain kinds of local particulars has the potential to somehow contaminate the generalized principle?

These questions are crucial to the debates within neuropsychological research on cognition. At one end of the spectrum lies the argument that any cognitive processes that cannot be reliably "found" in the brain should be abandoned as irrelevant models. As an alternative "localization" view, one might suggest that cognition should only be described within the context of its experimental conditions. Conversely, the "contamination" view holds that attempts to spatially or temporally locate abstract processes of cognition in the brain would lead to misleading constraints on representations of complex cognition.

In psychology, I believe that the answer is emerging through improved dialogue between researchers holding varying positions on this spectrum. The intradisciplinary metadiscourses of cognition are bringing into conflict what have traditionally run as semiparallel bodies of research in "cognitive psychology," "cognitive neuroscience," and most differently: "neuroscience." Without using such terms, this debate is drawing attention to the assumptions of "site" and abstraction that are implicit in current bodies of theory and research design. As techniques improve for localizing the space and time of mental activities within both brain architecture and experimental contexts, the gap between these theories of cognition may narrow. Studies of human brains may be able to inform and engage with theory about more complex cognitive processes than is currently possible.

However, there is a fundamental disconnect between the aims of research sought by the two ends of the spectrum. At one level, cognitive researchers are driven to break down cognitive processes in order to understand the minute details of the brain, and map cognition to what is possible to locate. On the other hand, we are under pressure to integrate studied cognitive processes together to explain cognition in highly complex, real-world environments. Interestingly even that requires an element of mapping between abstractions and local conditions. To extend generalizations of cognition, one must derive knowledge by studying the mental activities of participants acting within diverse local conditions—from manipulating the local environments of the psychological laboratory and specific time and space conditions to "real-world" contexts. Some interdisciplinary research programs in particular have combined experimental methodologies with ethnography in order to better develop cognitive models that represent mental processing across real-world contexts (Atran and Medin 2008).

Thus, regardless of research aims within cognitive psychology, one cannot escape the dilemma of the local and the general. More broadly, as evidenced by ethnographic and legal treatments of this topic in the same special issue, I believe that this pervading conflict is fundamental to the process of grounded, theoretical research. As such, I can only advocate what has been the most effective course of action in psychology—

the use of discord and debate resulting from this tension as a prompt for revisiting theoretical premises, assumptions, and methodologies.

Notes

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1. Thanks to Susan Coutin and Barbara Yngvesson for raising this point for discussion.

2. This is an example for the sake of clarity and may contain myriad problems as an experiment, so the author of the quoted cognitive control paper should not be considered responsible.

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