generated the empirical material on which to do the relevant theory building). It takes effort to start again as a beginner who performs badly at the outset, to confront colleagues in her home field who disapprove of her approach or scholars in the field she has ventured into who reproach her for not being thorough enough. And it takes compromise, because the knowledge developed in an interview is different from that found in a book or an article. From a philosopher's perspective it could be said that working with dynamic, malleable and contextual knowledge upsets every fiber in one's theoretical body, because it differs from the epistemology of the true vs. the false, the logical vs. the arbitrary, and the well-argued vs. the unfounded. It takes hard work and long argumentations (and requires a kind of second *epoché*) to integrate these two sources of knowledge.

« 11 » But even if demanding, Martiny's work shows that following Varela's radical proposal is worth the effort. He has provided an understanding of what it is like to live with CP and because of his transdisciplinary and radical openness, he has designed interventions and established art forums that improve the conditions for those living with CP.

« 12 » Besides the demanding nature of the endeavor, there is another risk for Martiny's radical openness, as it potentially comes at the expense of monodisciplinary rigor. It is not possible to perform interviews, design interventions and experiments with people with CP, and master the whole corpus of phenomenological writings. In order to do good transdisciplinary work, one must work with, and be trained by, researchers who fully master their own disciplines. It can be argued that Martiny's work, as well as my own with expert musicians, could not have been done well without mentoring from excellent phenomenologists such as Zahavi and Søren Overgaard.

« 13 » What can we conclude from all of this? Firstly, Martiny's radical proposal consists in researchers individually coming to master techniques and theories from first-, second- and third-person methodologies, and who employ their research "performatively," i.e., to benefit those they work with and society at large. Secondly, Martiny argues that more people should conduct their work in this way. I believe there are certain indications that things are moving in this general direction,[2] but I do not think all researchers in cognitive science should become so radically open, as this could jeopardize monodisciplinary rigor. The practical solution to find this balance could be the construction of cognitive science research centers, where some members of the research community would work in accordance with Martiny's suggestion. Yet they would collaborate with others with a monodisciplinary background. An open exchange between two such groups would be of mutual benefit and ensure radically open, yet theoretically and methodologically rigorous research.

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2| Going to conferences such as the recent "HerbstAkademie" at the University of Heidelberg on "Embodied Aesthetics," http://www.upd.unibe.ch/research/symposien/HA19, I find an increasing number of young scholars who from the perspective of neuropsychology are trying to bridge into phenomenology and inversely of philosophers of mind trying to embrace second-person methods.

The Reflective Science of Ethnography and Its Role in Pragmatic Design

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> Upshot • Analyses of the epistemological premises of modern ethnography suggest that "opening up" cognitive science is problematic, caught between a theoretically impossible "translation" of another world view or culture and reverting to an autobiography. Rather, an ethnography might be viewed as a "poetic" expression of interpersonal experiences, whose writing is a new experience contributing to ongoing conversations with ethical value. In particular, one can adopt an instrumental perspective in which an ethnography is a tool for engineering design; thus the "opening" is manifest as applied science within a design collaboration.

Introduction

« 1 » Kristian Martiny provides an incisive, constructive analysis of Francisco Varela's proposal to embody and open up cognitive science, illustrated by using the phenomenological interview; he argues for an even more radical reflective method.

« 2 » Martiny's analysis focuses on neurophenomenology, following Varela (1996: 347), which specifically addresses the study of consciousness:

> "This research programme seeks *articulations* by *mutual constraints* between the field of phenomena revealed by experience and the correlative field of phenomena established by the cognitive sciences."

« 3 » Martiny's thrust throughout and challenge to the community is to "open up the cognitive sciences" in general, in accord with the broader analysis of *The Embodied Mind* (Varela, Thompson & Rosch 2016) and the subsequent initiatives of Thomas Metzinger and Jennifer Windt (§§2f).

« 4 » In the broader critique of methods in cognitive science, the radical proposal is

grounded in foundational issues regarding cognitivism and objectivity (§11), which were previously encountered in the social sciences, particularly by anthropologists using the ethnographic method. Contemporaneous use of ethnography in engineering design provides an alternative perspective on opening up what we might call "applied cognitive science."

Relation of ethnography to phenomenological interviews

« 5 » An ethnography, a scientific document describing a culture or people, is typically based on interviews, photographs/videos, and first-person "participant observation" in everyday settings. Ethnography is a fundamental method for studying and articulating the practices of a community, including people's roles, habits, facilities, tools, clothing, ways of talking, etc. James Spradley (1980: 26) characterizes the participant observer as an "explorer […] seeking to describe a wilderness area, rather than to 'find' something."

« 6 » The ethnographic approach fits Martiny's description of the phenomenological interview in which "the cognitive scientist directly encounters another living subject and therefore first-handedly can take the lived experience of that subject seriously" (§7). Like ethnographic observations, the interviewer considers "tacit, situated and embodied knowledge" including "body language, facial expression, tone of voice, etc." (ibid); her approach is "empathic and reciprocal" (ibid). The challenge in studies of consciousness is to "take first person accounts seriously as valid domain of phenomena" (Varela 1996: 346). Insofar as first-person accounts are inherent in ethnography, an epistemological critique of ethnography is relevant to the phenomenological interview.

« 7 » As Martiny explains, Varela became aware of the circularity inherent in first-person accounts because "the study of mental phenomena is always that of an experiencing person" (Varela 1996: 346). Consequently, cognitive scientists should "reflect openly" on their "cognitive involvement in the scientific knowledge processes" (§40). Hence, Martiny speaks of two subjects (§7), one of whom is the scientist conducting an inquiry.

« 8 » Varela's approach is to "cultivate" this circularity, which means to include "the experientially lived and embodied aspects" of cognition (§20) by developing skills such as "attentive bracketing," intuition, and systematic "reflection on the spot" (Varela 1996: 337f). This reflective process creates "a 'circulation' between sciences of the mind (cognitive science) and human experience" (Varela, Thompson & Rosch 2016: lxi).

« 9 » Iterating between experiencing/observing and reflecting is familiar to anthropologists using the ethnographic method. However, some researchers have viewed the process as a form of translation: "A translation discovers the meanings in one culture and communicates them in such a way people of another cultural tradition can understand them" (Spradley 1980: 161). This claim is undermined by the first-person circularity because the scientist is necessarily acting within her own cultural tradition.

« 10 » A central theme of Stephen Tyler's critical analysis in *The Unspeakable* is that an ethnography cannot be viewed as a "translation" of another culture because textual mapping of world views is incoherent, it conflates meaning and description: "[E]thnography creates its own objects in its unfolding and the reader supplies the rest" (Tyler 1987: 214) (contra Spradley 1980). The alternative of framing the ethnography as an autobiography is unacceptable, for then the author becomes the focus of study.

« 11 » The problem with ethnography lies in the nature of writing itself and how the text is viewed. Accordingly, Tyler (1987: 216) prescribes a shift from viewing text as "data" to using it as a "meditative vehicle." Rather than equating an ethnography with experiences of others or the author (the text as a mirror of "reality," an idealized, context-free and impersonal scientific account), an ethnography can be viewed as an evocative expression, whose writing is a purposeful experience in some ongoing activity. The collaborative production of the ethnography within the culture being studied and its later uses, often within an academic Western culture, ground the text within lived experience, "the oral world of everyday expression and commonsense understanding" (ibid: 215).

Précis of Tyler's *The Unspeakable*

« 12 » Tyler's linguistic-philosophical analysis concerns the "epistemological challenges that underlie modern anthropology"; in essence, speaking alienates thought from action and writing alienates language from speech (Tyler 1978: 17). Operating then on their own productions, linguists question how words are related to things, concepts, experiences and performances, in analyses that further "alienate language from the self" (ibid). Edmund Husserl's critique of the objectivist, idealized conception of science and the distance from "lived experience" (§17) is similar.

« 13 » *The Unspeakable* is beautifully written in a semi-poetic style. However, Tyler's pithy encapsulations may appear as incomprehensible riddles to readers who do not already understand their theoretical foundations. For example, Tyler says that the resolution of the tension between subjectivity and objectivity is expressing "the subjective creation of ambiguous objectivities that enable unambiguous subjectivity" (ibid: 213). The text is deliberately crafted to be contemplated and interpreted: "Postmodern ethnography forgoes the tale of the past as error and denies the myth of the future as utopia" (ibid: 215).

« 14 » Martha Kendall's (1987) cogent review of *The Unspeakable* is helpful for interpreting Tyler and thus may prove useful for carrying out Varela's radical proposal. She emphasizes how ethnography (and description more generally) is "compromised and problematic," because it necessarily "erases" the involved people, both the individuals being studied and the observer:

> "It […] adopts a posture of disinterested observation and description, while at the same time arguing that human perception is culturally influenced or culturally determined. Ethnography is compromised in that it is grounded in first-hand experience, yet it cannot be *about* that experience. Ethnographies are supposed to be scientific descriptions, not personal accounts. This guarantees that ethnographers will not only erase themselves from their work, but erase as well any real flesh-and-blood people they encountered in the field, substituting in their places pale abstractions, phoney folk, counterfeit coin of a fake social realm […including] the Participant-Observer." (ibid: 322)

« 15 » Even in the physical sciences scientists erase themselves in their reports. For example, planetary scientists adopt a third-person stance in *Science* (Squyres et al. 2009), describing programmed, robotic laboratories as "exploring craters" and "examining outcrops." Erasing the science team's individual contributions and experiences makes the work appear impersonal and properly "objective" (Clancey 2012). The scientists are well aware of the limits of their data and analysis – exploring through the rover is like "trying to make your way through a dark cluttered room with nothing but a flashbulb […]" (Vertesi 2008: 2526). But published accounts, with the broad panoramic snapshots of Mars, create a larger-than-life illusion of completeness, just like ethnographies (Kendall 1987: 322f), as Tyler describes:

> "Ethnographers project their fragmentary and incomplete experience of exotic culture onto a rhetorical form that creates the illusion of a comprehensive and coherent whole, and readers, by prior acquaintance with this form, fill in missing parts, creating in their imaginations what is not given but must be there by implications drawn from the form itself. (Tyler 1987: 95)

« 16 » The essence of the radical challenge for scientists is to recognize this elision in their accounts, hence their subjective, interest-laden nature. In particular, the ethnographic study, *Working on Mars* (Clancey 2012), relates the scientists' personal experience to their scientific methods. The robotic exploration system enables a form of virtual presence, in which the scientists project themselves into the body of the rover, enabling them to do field science on another planet. The scientists' first-person experience reveals how the scientific knowledge of Mars "is an expression of the relation between our embodied cognition and the world that it purports to know" (Thompson 2016: xxvii).

« 17 » The first step in reframing the role of ethnographies in science is to appreciate how they construe a "living dialogue" as a collection of labeled and organized data. Tyler explains that a dialogue "appears in the text only as a means of verisimilitude in the interest of empirical verification, or as an object of linguistic analysis." The actual dialogue is reported not as an interpersonal experience, but as "'controlled elicitation' of 'evidence' for the ethnographer's interpretation of native categories" (Tyler 1987: 99).

« 18 » Kendall states the problem and its "post-modern" resolution – to locate the production and interpretation of ethnographies within an ongoing discourse:

> "[An ethnography] is a 'construction' of the world put together largely through discourse about it, through naming and labeling and talking about it.[…] [I]n post-modern anthropology, language – that is, *talk* – is central. *The focus of post-modern anthropology is the study of human beings talking.* (Kendall 1987: 323, emphasis added)

« 19 » Martiny's interpretation of phenomenological interviews is similar: "experience is not a thing, an object or static data to which one can retroactively return" (§52); "Descriptions should in fact be understood as a different manifestation of that very same experience" (ibid); and:

> "one should not consider the interviewees' descriptions of their experience as static data, but rather conceive of experience as subject to dynamically, open and developing processes and interpretations." (§56)

As summarized more generally by Tyler:

> "[Ethnography] is not a record of experience at all; it is the means of experience. That experience became experience only in the writing of the ethnography. Before that it was only a disconnected array of chance happenings. No experience preceded the ethnography. The experience was the ethnography. Experience is no more an object independent of the ethnography than all the others – behavior, meanings, texts, and so on." (Tyler 1987: 215)

« 20 » In §27, Martiny, following Varela (1999), consequently advocates "collaboration between cognitive science and contemplative traditions (e.g., Buddhism)," which fits viewing ethnographic writing as a "method of mindfulness meditation" (§§25f). Tyler, like Varela, stresses that this perspective seeks an ethical inquiry of human experience. The ethnography is "cooperatively evolved," intended "to provoke an aesthetic integration that will have a therapeutic effect. It is in a word, poetry […]" (Tyler 1987: 202). The ethical call is to treat the subjective, first-person aspect openly, as part of the factual story, making it part of the interaction:

> "The critical function of ethnography derives from the fact that *it makes its own contextual grounding part of the question* and not from hawking pictures of alternative ways of life as instruments of utopian reform.[…] *I call ethnography a meditative vehicle* because we come to it not as a map of knowledge nor as a guide to action, nor even for entertainment. We come to it as the start of a different kind of journey. (ibid: 216, emphasis added)

« 21 » Martiny characterizes the interaction of the two subjects, interviewer and interviewee, as co-generating knowledge (§7). For Kendall, this means that the ethnography is a conversation with the native people, "not the 'report' of an 'observer.'" And "no one's version of the tale [is] privileged over other versions." In essence, this means treating the ethnography with an integrity that is both more scientific and moral, facilitating an activity with "a genuine concern" for other people (Kendall 1987: 324).

Relating science and experience in practical design projects

« 22 » Tyler's analysis of modern ethnography was framed within the rubric of basic science, studying a culture for its own sake. In contrast, over the past 30 years, ethnography in "workplace studies" (e.g., Dourish & Button 1998) provides a scientific grounding to the design of work systems (e.g., roles, procedures, facilities, and especially computer tools). In particular, ethnography informs computer simulations of work practices, enabling a feedback "circulation" between the scientific models and experience – an iteration of imagining, designing, making, experimenting (collecting data), analyzing, reflecting, and reimagining (Clancey et al. 2008). Scientists and engineers pursue a "participatory design" approach with the people they seek to help, co-developing an ethnical transformation of their roles and practices, which Rosch (2016: xlviii) characterizes as "mutual par-

ticipatory sense-making." A similar method has been used to relate instructional theories and practices (Clancey 2011).

« 23 » Donald Schön's (1987) pioneering study of "the reflective practitioner" demonstrates a similar "circulation," stressing the role and relation of imagination, intuition, talk, and play in an empirical, embodied design practice. The inherent circularity of first-person reports (including ethnography) is embraced in an iterative "represent–act–represent–act…" feedback process of invention – the dynamic interplay between changing the perceivable world and mental experiences (Bamberger & Schön 1983).

« 24 » In conclusion, the issues relating the observer and the phenomena of interest raised in Tyler's critique and the general analysis of cognitive science in the *Embodied Mind*, appear less problematic when scientific methods of observation, measuring, and modeling are placed in the context of a pragmatic, iterative design project that adopts a reflective, participatory approach, opening up the relation between the scientific study of the work practice and role-playing experiences ("empirical requirements analysis," Clancey et al. 2011). In particular, interviews and ethnography more generally in multidisciplinary projects are embedded in the workplaces, schools, hospitals, etc. that researchers seek to improve, such that the reflective circulation between work and inquiry accomplishes a "direct, hands-on, pragmatic approach to experience with which to complement science" (Varela, Thompson & Rosch 2016: lxiv) and thus effectuates a "radical" methodology.

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On Embodying Decision-Making and the Endless Circularity of Understanding the Mind

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> Upshot • To provide an illustration of some of the author's theses, I firstly discuss contemporary accounts of embodied decision-making. I argue that they do not endorse the embodied cognition thesis in its essential (or radical) scope and thus cannot provide a meaningful account of decision-making. Secondly, I briefly discuss researchers' intrinsic embeddedness in their scientific culture and life-world and the associated inseparability of the subject and the world. I end the essay with a question pertaining to the seemingly endless circularity of knowledge emergence in cognitive science which, arguably, entails that we cannot reveal the "invariants of the mind."

« 1 » In theoretical as well as empirical accounts of the mind, one cannot but notice the growing trend of discussing and researching cognition as embodied, embedded, extended and/or enacted (the 4Es; see Vörös, Froese & Riegler 2016). But this, as Kristian Martiny rightfully claims in his target article (in §16, for instance), does not mean that the thesis of embodied cognition and the consequences it entails – at least as it was spelled out by Francisco Varela, Evan Thompson and Eleanor Rosch in *The Embodied Mind* (1991) – are taken into account in their full and *essential* scope.

« 2 » This holds especially for the professed third-person sciences (such as neuroscience or behavioural sciences) that advocate the embodied nature of cognition. There, one often "discovers" phenomena, claimed to be embodied in this or the other way, that are "embedded" in, conceptualised and researched from the perspective of the cognitivist (i.e., representationalist) framework (see e.g., Varela, Thompson & Rosch 1991: 134f). These so-called "embodied" approaches conceptualize the researched phenomena as objects, existing somewhere in a pregiven world, independent of the observer, of social and cultural practices and devoid of values (of individuals or researchers), experience and first-person(al) perspective (see also Strle 2013, 2016a). As such, these approaches essentially cannot be called embodied cognition (enaction) proper (or, said to be embodying cognition, as Martiny puts it) and considered to be in any way (radically) transforming cognitive science, for they linger in the cosy grounds of the tradition (see also Vörös & Gaitsch 2016 for a similar claim).

« 3 » A good example is decision-making research, where more and more scientists – with good intention, of course – are trying to "embody" decision-making. They claim, for instance, that the brain's sensorimotor regions are crucial for perceptual decision-making (e.g., Filimon et al. 2013); attempt to understand bidirectional influences between actions and decisions (e.g., Lepora & Pezzulo 2015); advocate the importance of studying real-time decisions of animals in interaction with their environment (e.g., Cisek & Pastor-Bernier 2014); or argue, for instance, for so-called embodied economics (e.g., Oullier & Basso 2010). Moreover, since most studies of decision-making are carried out in labs and use extremely simple "choice" tasks, some are beginning to show concern for the ecological validity of such studies (e.g., Camerer & Mobbs 2017) – however, without any reflection on the traditionally accepted presuppositions and methodological practices of third-person research they endorse.

« 4 » Notwithstanding the efforts to overcome the traditional assumptions and directions in decision-making research, none of the above-mentioned studies and approaches, even though most could be put under the umbrella of one or some of the 4Es in the "weak" sense, take the thesis of embodied cognition seriously enough, or consider – even though some do refer to it (e.g., Oullier & Basso 2010) – embodied cognition in the enactive sense of Varela, Thompson & Rosch (1991).

« 5 » Although one can identify many "points of departure" from the enactive understanding of cognition in the so-called embodied accounts of decision-