Springer

Dear Author,

Here are the proofs of your article.

- You can submit your corrections **online**, via **e-mail** or by **fax**.
- For **online** submission please insert your corrections in the online correction form. Always indicate the line number to which the correction refers.
- You can also insert your corrections in the proof PDF and **email** the annotated PDF.
- For fax submission, please ensure that your corrections are clearly legible. Use a fine black pen and write the correction in the margin, not too close to the edge of the page.
- Remember to note the **journal title**, **article number**, and **your name** when sending your response via e-mail or fax.
- **Check** the metadata sheet to make sure that the header information, especially author names and the corresponding affiliations are correctly shown.
- **Check** the questions that may have arisen during copy editing and insert your answers/ corrections.
- **Check** that the text is complete and that all figures, tables and their legends are included. Also check the accuracy of special characters, equations, and electronic supplementary material if applicable. If necessary refer to the *Edited manuscript*.
- The publication of inaccurate data such as dosages and units can have serious consequences. Please take particular care that all such details are correct.
- Please **do not** make changes that involve only matters of style. We have generally introduced forms that follow the journal's style.
  Substantial changes in content, e.g., new results, corrected values, title and authorship are not allowed without the approval of the responsible editor. In such a case, please contact the Editorial Office and return his/her consent together with the proof.
- If we do not receive your corrections **within 48 hours**, we will send you a reminder.
- Your article will be published **Online First** approximately one week after receipt of your corrected proofs. This is the **official first publication** citable with the DOI. **Further changes are, therefore, not possible.**
- The **printed version** will follow in a forthcoming issue.

Please note

After online publication, subscribers (personal/institutional) to this journal will have access to the complete article via the DOI using the URL: http://dx.doi.org/[DOI].
If you would like to know when your article has been published online, take advantage of our free alert service. For registration and further information go to: http://www.springerlink.com.

Due to the electronic nature of the procedure, the manuscript and the original figures will only be returned to you on special request. When you return your corrections, please inform us if you would like to have these documents returned.

Metadata of the article that will be visualized in OnlineFirst

ArticleTitle	Creatures of the world	
Article Sub-Title	Richard Menary (ed.): The extended mind. Cambridge: MA, MIT Press, 2010, 424pp, $40 HB	
Article CopyRight	Springer Science+Business Media B.V. (This will be the copyright line in the final PDF)	
Journal Name	Metascience	
Corresponding Author	Family Name	**Stotz**
	Particle	
	Given Name	**Karola**
	Suffix	
	Division	Department of Philosophy
	Organization	University of Sydney
	Address	Sydney, NSW, 2006, Australia
	Email	karola.stotz@gmail.com
Schedule	Received	
	Revised	
	Accepted	
Footnote Information		

Metascience
DOI 10.1007/s11016-011-9539-z

BOOK REVIEW

Creatures of the world

Richard Menary (ed.): The extended mind. Cambridge: MA, MIT Press, 2010, 424pp, $40 HB

Karola Stotz

It is simply common sense that we think with and in our head. But do we? Andy Clark and Alan Chalmers shook this view's foundation in a highly acclaimed but controversial paper published in *Analysis* in 1998. "The Extended Mind" thesis (EM) highlights the active role of the environment in driving cognitive processes. And not just them; minds, supervening on these processes, must equally extend via the body into the world. EM has been hailed by proponents and critics alike as a radical departure from the traditionally internalist view of cognition and mind in cognitive science. Radical as it may be in itself, it builds on earlier work by one of its author, Clark's *Being There: Putting brain, body, and world together again* (1997). More generally, extended cognition could be understood as the natural "extension" of a wide range of related accounts in the new cognitive sciences often described as the embodied, enacted, embedded, situated, and distributed view of cognition. For Clark, the real payoff of EM comes from integrating "real-world, real-time action with a search for the biologically basic roots of more decoupled forms of thought and problem-solving". The latter may just lie in our experiences with external symbol systems such as language, tools or cultural norms (Clark 1998, 47).

According to Richard Menary, the editor of a new collection of papers on "The Extended Mind", the primary motivation for EM "is the brute fact of our embodiment, especially our bodily manipulation of environmental vehicles" (229). I particularly agree with John Sutton that one ambitions of EM is to reclaim "the language of human nature from narrower forms of evolutionary psychology" and other nativist assumptions of what humans really are (192). That was certainly the expressed motivation of early developers of "extended" ideas such as Merlin Donald's *Origin of the modern mind* (1991), Chris Sinha's *Socio-naturalistic*

K. Stotz (✉)
Department of Philosophy, University of Sydney, Sydney, NSW 2006, Australia
e-mail: karola.stotz@gmail.com

Journal : Small-ext 11016 | Dispatch : 22-3-2011 | Pages : 4
Article No. : 9539 | LE | TYPESET
MS Code : MESC_REV_VIII-18 | CP | DISK

approach to human development (1989), and Tim Ingold's *People like us: the concept of the anatomically modern human* (1995) (cf. Stotz 2010).

Menary's collection serves as an informative, stimulating, and thought-provoking introduction into the Extended Mind literature by showcasing 14 reactions that interpret, defend, expand on, but also criticize Clark and Chalmers's original (and here reprinted) article. Menary, himself an outspoken proponent of extending cognition, does a good job of highlighting and summarizing the arguments in the mostly excellent contributions. While these are not ordered following any obvious principle, Menary roughly divides them into more functionalist (mostly Clark and Chalmers', Clark, and Wheeler) or more activity-oriented or "enactive" approaches of extended cognition (e.g. Sutton, Rowlands, Wilson, and Menary). For functionalists, it doesn't matter where a process is located as long as a process has a cognitive function. Enactivists, particularly Menary himself, care more about how the manipulation of environmental vehicles are *integrated* with neural processes in order to *constitute* cognitive processes.

Their focus on integration and constitution partly stems from what has been one of the main arguments of internalist critics against EM, such as Adams and Aizawa's defense of the bounds of cognition and Rupert's concern about the future of the orthodox *explananda* and methodology of cognitive science. The causal coupling of a cognitive agent with external props, the argument goes, does not make them cognitive in any way and hence, cannot render these props as constitutive parts of the cognitive system; to think so amounts to committing the "coupling-constitution fallacy" (67). To outline the conditions under which such a causal coupling becomes sufficiently integrated to form new cognitive wholes is one of the enactivist's strategies to counter this accusation (e.g., Menary's "cognitive integration", 227). A more substantial discussion about systems and their boundaries by EM's proponents would go a long way. One also wonders why they have so far not engaged more with the neurosciences.

Clark's strategy in his reply to Adams and Aizawa is rather to counterattack. By assuming that the parts of the system must have the same properties as the whole, Adams and Aizawa's succumb to the "fallacy of composition". He reacts to their theory of the "mark of the cognitive" intended to distinguish cognitive from non-cognitive part or process (68). The main condition for rendering an object "mental", rather than mere "physical" for them is to have "non-derived content". Apart from EM theorists denying that any object has the potential for becoming a genuine part in a cognitive process *in virtue of their own nature,* the orthodox and narrow, non-derived content condition certainly fails to convince them.

After all, one of the main motivations for embodied, embedded, and extended approaches to cognition is to question many of the received views of orthodox cognitive science, including that cognition must be based on the manipulation of internal symbols and representation. One of Clark and Chalmers's main arguments for an extended view rest on the "parity principle" maintaining that whenever a part fulfills a cognitive function, regardless where it is situated, it should be accepted as part of the cognitive system. This thesis serves two functions: first, as an "intuition pump" it undermines the Cartesian prejudice in locating cognition solely in the head; and second, it gives EM a functionalist reading—what matters is the

Journal : Small-ext 11016 | Dispatch : 22-3-2011 | Pages : 4
Article No. : 9539 | LE | TYPESET
MS Code : MESC_REV_VIII-18 | CP | DISK

functionality, not the *physical properties* of a process. Unfortunately, it is just this argument that has been picked up, and in the process, according to many EM proponents, rather misinterpreted by the critics who have been fast to point to all the causal-mechanistic differences between internal and external processes and parts.

For this reason a "second wave" of EM thinking sees the parity principle not necessarily as the best support for extended systems. Instead, it promotes the "complementarity principle": extension may not substitute or copy, but rather augment, improve, and build on top of internal cognitive resources. Because external processes are often radically different from internal ones they can make complementary contributions to cognitive processes (Sutton, 194). These approaches, rather than pointing to the functional similarities, celebrate the transforming potential of external props in allowing us humans to achieve, previously unavailable, things.

Arguments for EM often take the form of so-called cyborg fantasies that involve the technological enhancement of our existing cognitive powers, and seem to be more interested in the future of human cognition. For Wilson, however, the scope of EM is much wider and also more fundamental; it illuminates "what cognition is for at least as long as it has been a trait of human beings", and that notably includes our social environment, arguably the cognitively most significant form of our non-symbolic environment (Wilson, 181). However, Clark and Chalmers seem to agree when they argue that "the brain develops in a way that complements the external structures, and learns to play its role in a unified, densely coupled system. Once we recognize the crucial role of the environment in constraining the evolution and development of cognition, we see that extended cognition is a core cognitive process, not an add-on extra" (Clark and Chalmers, 32).

Sutton suggests that a "third wave of EM" may follow to take on the allegedly profound dichotomy between internal and external cognitive resources, e.g., by questioning the origin of so-called "natural", internal resources (211). He is certainly on to something. Already half a century ago, Jean Piaget understood the origin of cognitive structures as internalized actions in, and interaction with, the world. Jerome Bruner developed the term "scaffolding" to talk about the way caregivers and more generally, cultural structures assist young children in learning. One example is the joint construction of language between the learning child and the assisting adult. This support is gradually withdrawn as children gain independent mastery of the task. Similarly, Spurrett and Cowley argue that social interactions can provide powerful mediating structures supporting the learning process. Affective and socially legible infants readily exploit the environmental regularities afforded by caregivers, who, for example, interpret the infant's behavior in symbolic and intentionalistic terms long before it may be warranted, and thereby augment the infant's cognitive powers (316). "Symbolic language", according to them, originates out of the "communication-hungry interaction between human infants and caregivers" (303).

But organisms, and particularly humans, not just reliably couple to *ever-present* environmental features, they have the notorious capacities *to create, maintain, and manipulate their niche* and therefore, contribute considerately to its reliability. Donald, Sinha, and Ingold are among those that have for decades pointed to the importance of culture and artificial systems in structuring, calibrating, and

Journal : Small-ext 11016 | Dispatch : 22-3-2011 | Pages : 4
Article No. : 9539 | LE | TYPESET
MS Code : MESC_REV_VIII-18 | CP | DISK

transforming our biological cognitive architecture. Since then, Kim Sterelny and Wheeler and Clark brought the process of *cumulative cognitive niche construction* in sharp focus; they all conclude that by engineering our epistemic environments humans partially engineer themselves (see Stotz 1010 for a summary).

This inspiring collection will in itself not settle the arguments surrounding the merits and dangers of EM thinking. Which arguments will in the end prevail and convince most researchers in the cognitive sciences? I agree with Menary that this will to a large extent depend on the development of genuine advances in scientific explanations to be gained from extending cognition beyond brain and body (18). If a comparison to another science is any measure of future success, the case for the Extended Mind could be quite strong. For a century, the biological sciences focused most of their efforts and resources on the study of the gene, because it was this field that yielded tractability, regularity, and early successes. The science of systems biology emerged at the dawn of this millennium because more and more molecular biologists felt that the immense gene-chauvinist and reductionist advances had come to an end, and must give rise to an understanding of the higher complexities of living organisms. Let's hope that Sutton's call for "a more adventuresome interdisciplinary development of the extended mind" will help us to appreciate how truly we are "creatures of the world" (39).

References

Clark, A. 1998. Embodiment and the philosophy of mind. In *Current issues in philosophy of mind*, ed. A. O'Hear. Cambridge: Cambridge University Press.

Stotz, K. 2010. Human nature and cognitive-developmental niche construction. *Phenomenology and the Cognitive Sciences* 9(4): 483–501.

Journal : Small-ext 11016 | Dispatch : 22-3-2011 | Pages : 4
Article No. : 9539 | LE | TYPESET
MS Code : MESC_REV_VIII-18 | CP | DISK