access to consciousness using different methods for report [9], using explicit instructions to increase introspective awareness [10], or using reports of graded first-order experiences [11]. Yet other experiments have combined report paradigms with no-report paradigms and specifically investigated the effect of reporting [12]. Such experiments suggest ways to acquire knowledge of how to understand and operationalise experience, introspection, and report and may result in future methodological tools to differentiate NCCs from pre- and post-NCCs.

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Letter

No-Report and Report-Based Paradigms Jointly Unravel the NCC: Response to Overgaard and Fazekas

Naotsugu Tsuchiya,[1,2,*] Stefan Frässle,[3] Melanie Wilke,[4,5,6] and Victor Lamme[7]

In their recent letter to *Trends in Cognitive Sciences* [1], Overgaard and Fazekas provide constructive criticisms of our proposal to use no-report paradigms to extract the true neural correlates of consciousness (NCC) [2]. Here, we clarify our claims that are slightly misrepresented in their comments. Specifically, we re-emphasize that: (i) no-report paradigms should be combined with report-based paradigms; (ii) no read-out of perception is likely to generalize over all conditions; and (iii) theoretical approaches are a viable alternative to simply relying on the scientists' intuitions. Furthermore, we agree with their suggestion of a refinement of post-NCC processes and offer some existing examples.

Overgaard and Fazekas claim that no-report paradigms are no better than report-based paradigms because both are confounded 'in similar ways but for different reasons'. We acknowledge that, when used in isolation, no-report paradigms can indeed overestimate the NCC due to its potential inclusion of unconscious pre-NCC processes. Report-based paradigms typically avoid that (although see Table 1 in [2]), but run into the risk of including post-NCC processes, related to cognitive demands, such as attention, working memory, decision making, and action planning. Therefore, we propose that the combination of both paradigms will provide us with a framework to unravel the 'true' NCC at the intersection of the differently obtained NCCs. We argue that the inclusion of no-report control conditions in future experiments can bring us an important step closer to finding and disentangling the neural mechanisms leading up to, producing, and finally reporting conscious experience.

Overgaard and Fazekas further critique our advocacy of alternative ways to 'read out' subjects' phenomenology in the absence of report. We highlighted the use of eye movements (and pupil size) to gauge perceptual switches in binocular rivalry [2]. Overgaard and Fazekas counter that these may be unreliable measures of perceptual switches, that perception without reports may in fact differ from reported percepts, and that omitting explicit reports do not entirely avoid post-NCC processes, such as attention. Indeed, a read-out that works for all tasks and situations is unlikely to exist. Thus, while we do not believe that one type of autonomous measure by itself will provide a reliable perceptual readout for all stimulus and task configurations, it may be possible to combine multiple physiological measures to develop more reliable methods that match with phenomenology under specific stimulus conditions [3].

It is furthermore possible that phenomenology differs depending on whether a report is given, particularly in the case of near-threshold stimuli. Therefore, caution should be applied when combining near-threshold stimuli with no-report paradigms. By contrast, when using clearly visible stimuli, perception is typically cognitively 'impenetrable' [4]. The neural signature of Kanizsa illusions in visual cortex, for example, is not different for reported or not reported stimuli [5]. In such cases, it is more important to effectively exclude large post-NCC confounds than to worry about subtle (if any) changes in phenomenology when reports are taken away [6].

To avoid any and all post-NCC confounds, we have argued to use inattention paradigms, where a potential NCC can be fully dissociated from cognitive access and attention. In that case, the risk of including unconscious processes is, obviously, even larger, and combining such paradigms with report-based paradigms is even more important.

An alternative promising avenue for elucidating the presence or absence of perceptual states in the cases of full inattention and inability to report [7] are theoretical approaches, such as integrated information theory [8], that should in principle be able to predict the contents of consciousness without relying on report. While such theoretical approaches are still in their infancy, recent approaches have started to test such mathematical formulations against measured neuronal activity [9].

Finally, Overgaard and Fazekas propose to refine post-NCC through manipulation of introspection. We agree that this is a promising idea and we have already highlighted a few methods along this line: (i) varying sensory inputs in subtle ways, such as contrasting between forward versus backward masking at a comparable task performance [10]; (ii) manipulating the history of stimulus presentation using perceptual adaptation, prior exposure of a subset of stimuli, or the order of presentation [11]; and (iii) manipulating decision criterion to report independently of stimulus visibility to disentangle neural processes of perception, decision making, and report [12].

Overall, using no-report paradigms and contrasting them with report-based paradigms gives rise to promising experimental designs to study the NCC that control for some of the major confounds. Importantly, such approaches also ask scientists to pay closer attention to conscious experience or phenomenology itself, rather than taking what subjects report at face value. Without reports, do we really lose consciousness? Taking phenomenology seriously is the basic and first step towards identifying the neural basis of consciousness.

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Forum

Caring About Dostoyevsky: The Untapped Potential of Studying Literature

Roel M. Willems[1,2,3,*] and Arthur M. Jacobs[4,5,6]

Should cognitive scientists and neuroscientists care about Dostoyevsky? Engaging with fiction is a natural and rich behavior, providing a unique window onto the mind and brain, particularly for mental simulation, emotion, empathy, and immersion. With advances in analysis techniques, it is time that cognitive scientists and neuroscientists embrace literature and fiction.

Literature has been rooted firmly in the territory of the humanities for centuries. Scholars from the humanities have studied the great works of literary writers, and it may seem unlikely that literature could be part of the academic lexicon of cognitive scientists. In the final part of this paper we argue against an often heard reason against the neurocognitive study of literature, namely that it is technically impossible. We begin by showcasing four subdisciplines of cognitive science for which the study of fiction is relevant and has provided interesting insights. Note that we use the terms 'fiction' and 'literature' loosely for ease of reading.

Mental Simulation of a Fiction World

It is often assumed that we mentally simulate a fictional world [1] (Box 1). For example, it was observed that cortical areas implicated in actual motion perception are also activated when participants read descriptions of motion in a narrative