

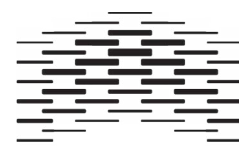
# REPORT ON RESPONSIBLE RESEARCH AND INNOVATION FOR HUMAN COGNITIVE ENHANCEMENT: POLICY BRIEF



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Human cognitive enhancement (HCE) applications and technologies have the potential to address significant societal challenges, ranging from ageing and well-being to increased economic competitiveness (Nuffield Council 2012; Nicholson et al., 2015). At the same time, there are considerable ethical and social implications of HCE that warrant deliberation and discussion, particularly with regard to governance issues and policy-making (Farah et al., 2004; Coenen et al., 2009; Nuffield Council, 2012; Zwart, 2015). Responsible Research and Innovation (RRI) has been proposed as a governance approach that aims to anticipate and assess potential implications of new and emerging science and technologies (Nuffield Council, 2012; ter Meulen, 2013). RRI can be applied to the area of HCE as a means of working towards ethically sound and societally desirable research and development (Nuffield Council, 2012; ter Meulen, 2013).

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## SHOULD WE FUND HUMAN ENHANCEMENT RESEARCH?

The purpose of an international workshop titled “Should we fund human cognitive enhancement research? RRI for human cognitive enhancement: a case study” held in Brussels in January 2017 was to provide practical guidance to research funders and policy makers regarding the integration of societal values and interests in research and development in the area of human cognitive enhancement. Research funders are uniquely positioned to deliberate on values and expectations that might shape our futures and to actively shape research and development trajectories so as to include societal values. A select group

of key European research funders, policy-makers and scholars within the fields of human cognitive enhancement and ethics and governance of new and emerging science and technologies participated in the one-day workshop.

### KEY INSIGHT #1 **THE NEED FOR NEW INSIGHTS INTO HCE**

Since the early 2000s, much of the discourse on human cognitive enhancement (HCE) has been triggered by European Union funded projects. This is despite the fact that, in many instances, HCE is not permissible due to strict regulations. Thus, debates on

HCE tend to be somewhat removed from practice. Dimensions of HCE are both generic and specific and there are transversal questions regarding HCE that cut across various areas of new and emerging science and technologies (NEST). However, overall, there is a need for novel empirical and sociological insights in the area of HCE to drive the discussion forward – most issues in the discussion on pharmaceutical cognitive enhancers (PCEs), for example, appear in RRI discussions of new and emerging science and technologies more generally.

#### KEY INSIGHT #2 **THE IMPORTANCE OF ETHICS AND PUBLIC HEALTH POLICY**

The highly addictive nature of many cognitive enhancing drugs or ‘smart drugs’ highlights the importance of ethics and public health policy in the area of human enhancement. Ethics should play a role in two particular areas. First, the drug Modafinil has been found to be highly addictive, necessitating regulation and public health considerations, in addition to consideration of questions of autonomy (should free choice to use addictive drugs such as Modafinil be

limited?) (ter Meulen 2013). Second, it appears that most smart drugs do not enhance cognitive ability beyond a person’s optimal level (e.g. in decreased conditions such as sleep deprivation) (Coenen et al., 2009). For this reason, the use of drugs to enhance cognitive function in impaired people should be considered.

#### KEY INSIGHT #3 **REGULATION IN THE EUROPEAN UNION**

The role of law and regulation in HCE is absent. Indeed, there is a need to think about how RRI and regulation are related and can be aligned. Research on cognitive enhancing drugs is not possible, for example, as clinical

trials cannot be carried out for enhancement purposes. In addition, there is a need to think about professional practice and the issue as to whether the use of cognitive enhancers may be made compulsory for shift workers and people in high-re-

sponsibility professions (cf. The Academy of Medical Sciences, the British Academy, the Royal Academy of Engineering and the Royal Society, 2012; Santoni de Sio et al., 2014).

**ETHICAL DISCUSSIONS ON HCE SHOULD BE BROUGHT TO SOCIETY RATHER THAN REMAINING IN THE ACADEMIC REALM. FOR EXAMPLE, EARLY ADOPTERS TEND TO BE AN UNDERAPPRECIATED STAKEHOLDER IN DEBATES ON ETHICS OF ENHANCEMENT. INDEED, THERE IS A NEED FOR ETHNOGRAPHIC RESEARCH ON USERS. MOREOVER, ENHANCEMENT IS INCREASINGLY AN ISSUE FOR CONSUMERS AS PRODUCERS (PROSUMERS). THUS, CITIZEN SCIENCE IN THE AREA OF HCE MAY HAVE AN IMPORTANT ROLE TO PLAY IN THE DEVELOPMENT OF THE AREA.**

#### KEY INSIGHT #4 **RRI FOR HCE: RESEARCH POLICY AND FUNDING**

RRI for HCE is not about discarding expertise but rather about an opening up and broadening of the debate. Academia can contribute here by providing guidance on ethical issues while taking into account the views of publics. There could also be a role for expert ethics advice in the area of HCE, such as the advice given by the European Group

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on Ethics in Science and New Technologies (EGE). The process of reviewing applications raises questions with respect to how policy can respond to developments in science and technology (such as experiments with geo-engineering). There is a need for a guiding framework on how to proceed with socially beneficial innovation trajectories. RRI can provide for such a framework.

## **ESSENTIAL FEATURES OF RRI FOR HUMAN COGNITIVE ENHANCEMENT**

An article titled “*Responsible Research and Innovation for HCE: some essential features*” (Shelley-Egan et al., 2017) forms part of a special issue of the *Journal of Responsible Innovation* that draws from and builds on the Organisation for Economic Cooperation and Development’s (OECD) 2016 International Workshop on Responsible Innovation and the Brain-Societal Dimensions of Neurotechnology Advances.

The article advances some essential features of RRI for HCE, with a particular focus on making the concept of RRI practically useful to decision-makers responsible for adopting a socially responsible approach to HCE in a certain context. The paper centres in on a concrete example of HCE, namely pharmaceutical cognitive enhancers (PCEs), prescription medications used to treat cognitive impairments that are also used by some healthy



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individuals in order to achieve enhanced cognitive abilities. PCEs are widely discussed in the literature on non-therapeutic cognitive enhancement (Farah et al., 2004; Sahakian and Morein-Zamir, 2007; Greely et al., 2008; Cakic, 2009; Ferrari et al., 2012), with many issues discussed for PCEs relevant to the HCE field more generally.

The essential features of RRI highlight those issues that require attention in the governance of HCE, with an emphasis on understanding both the scientific state-of-the-art and societal contexts in which HCE technologies may be adopted. The features encompass concrete questions and issues that can be taken up as a departure point for decision-makers to generate knowledge about and understand the application of RRI to the particular context of PCEs and HCE, more generally.

The essential features include:

- **openness and transparency** with respect to meaningful communication of research and the truthful representation of uncertainties and a lack of knowledge about the off-label use of prescription medications
- **generating knowledge of the situation** regarding issues of risk and efficacy, fairness and personal achievement, and coercion in the context of

use of prescription medications in a non-therapeutic context

- **engagement of stakeholders** in order to elicit the views and perceptions of a variety of stakeholders regarding PCEs
- **anticipation and reflection** regarding impacts and societal consequences of the use of drugs for cognitive enhancement
- **responsiveness** with respect to the cultivation of a capacity to adapt and respond to new knowledge as it emerges and to the variety of normative views held by stakeholders
- **solution to societal challenges** concerns the ways in which pharmaceutical cognitive

enhancement might contribute to addressing societal challenges

The essential features are interdependent and link up as an integrated whole. However, ‘openness and transparency’ and ‘responsiveness’ are especially important in the development of a HCE governance approach. Knowledge of the scientific context and real-world complexities is necessary to be able to identify the ‘right impacts’ or less positive impacts of PCEs, which, in turn, allows for a responsive approach in deciding as to whether dedicated funding for HCE should be pursued.

OPENNESS, TRANSPARENCY AND RESPONSIVENESS ARE ESPECIALLY IMPORTANT IN THE DEVELOPMENT OF A HCE GOVERNANCE APPROACH.

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