How do Ethical Concerns differ in Active and Passive Brain-Computer Interfaces?

Ronja Rönnback[1]*, Fenna Blom[1], Maryam Alimardani[1]

[1]*Tilburg University, Tilburg, Netherlands*

*Warandelaan 2, 5037AB, Tilburg, Netherlands. E-mail: r.g.i.ronnback@tilburguniversity.edu

Introduction: Brain Computer Interfaces (BCIs) are intelligent systems that enable direct communication between the human brain and machines [1]. While BCI systems are promising for future medical and non-medical applications, studies concerning their ethical considerations are growing [2-6]. However, no previous study has examined how the public's ethical perception of the BCI technology is affected by the particular BCI type in question. This study thus considered whether the public experienced active and passive BCIs differently in the prominent ethical domains of personhood, responsibility and privacy.

Methods and Results: A within-subject survey consisting of pre-existing questionnaire items about the aforementioned ethical concerns was conducted amongst 34 students (17 males, between 19 and 36 years old, M_{age}=25.3, SD_{age}=3.9). Results suggest that active BCIs induce a higher ethical concern regarding personhood (Fig. 1), and that women experienced privacy to be more concerning in passive BCIs compared to active BCIs (p = .03).

Discussion: Our results show that particular concerns need to be addressed when developing future BCI systems. Privacy and personhood seem to raise more concern than responsibility, which echoes previous research indicating general worry about BCIs and personhood in particular [2-3,5].
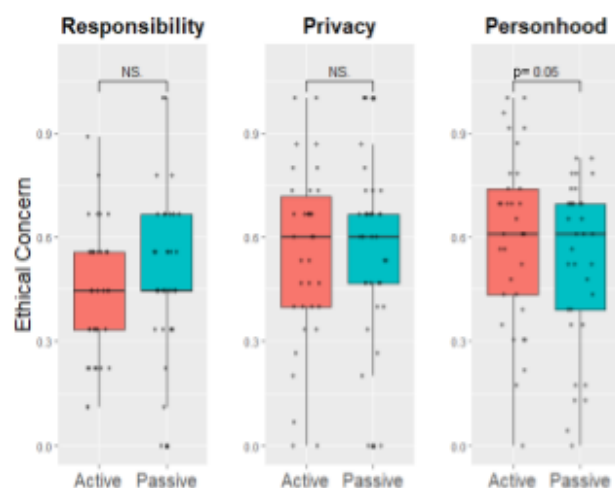

Figure 1. Boxplots of the normalized total score per ethical domain, for each BCI subtype. A significant difference between the two subtypes was found for personhood only.

Significance: This study suggests that the two types of BCIs might require different considerations for mainstream adoption by the public, and provides preliminary insights for the development of ethically informed BCI systems.

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