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Research Paper

Attitudes toward Brain-Computer Interfaces among Adults: A Study of Awareness, Skepticism and Ethical Concerns

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ABSTRACT

Brain-Computer Interfaces (BCIs) are an emerging neurotechnology that enables direct communication between the human brain and external devices. It helps in medical rehabilitation, assistive communication and human-technology interaction. The present study aimed to examine the public awareness, skepticism and ethical concerns of BCI technology. The sample of 100 (50-Male and 50-Female) adults was chosen as the sample and the findings revealed that adults have low awareness of BCI technology, most of the participants showed non-acceptance and skepticism and the majority of the participants have ethical and risk concerns about BCI technology.

Keywords: *Brain-Computer Interface, Ethical Concerns, Skepticism and Adults*

Brain- Computer Interface (BCI) is a technology that connects the human brain directly to a computer. This works by reading human brain signals and transforming them into commands, which help in controlling devices like a computer, robotic arm or wheelchair. BCI helps assist people who cannot move or speak by making communication possible. BCIs emerged from rapid advancements in neuroscience and Digital technologies. Initially, it was developed for assisting individuals with severe neurological impairments and it is potentially enough in restoring communication, mobility and autonomy (Boninger et al, 2013).

In the past decade, the growth of BCI expanded beyond clinical rehabilitation toward broader application includes integration of artificial intelligence, enhancement in cognition and human-machine symbiosis. Moreover, the BCI increased with the development of invasive implants by private corporations, most notably Neuralink. Neuralink was founded in 2016, which aims to develop implantable brain chips capable of recording and stimulating neural activity at high resolution (Musk, 2019).

From a psychological perspective, BCI challenges fundamental concepts of mental privacy, autonomy and identity of an individual. So, the bidirectional characteristic of BCI led to concerns about external influence on cognitive processes, manipulation of thoughts and leaving no space for cognitive liberty (Steinert & Friedrich, 2020).

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Apart from individual-level concerns, BCI may lead to issues in societal issues of accessibility and social inequality. These kinds of advanced technologies are accessible only to economically privileged groups, not to economically weaker group so such disparities result in social and economic inequality.

Need for the study

Despite the increasing attention from academics and the media, more research is still needed and public awareness and acceptance of BCI technology remain underexplored in India. Public awareness plays a vital role in shaping technological advancement and adoption, ethical governance and policy regulation. Hence, the present study is an attempt to assess the attitudes toward BCI technology by examining awareness, acceptance and skepticism and perceived ethical and psychological risks among the adult population.

REVIEW OF LITERATURE

Sattler and Pietralla (2022) explored the public perception of neurotechnological devices such as Brain Stimulation Devices (BSDs) and Brain-Computer Interfaces (BCIs). The results showed that People had moderate moral acceptance of neurotechnology and public acceptance of BCI and BSD depends strongly on the technologies used, how invasive they are and people's personal needs and values.

Xia and Yang (2024) discussed the impact of social factors on public acceptance of the Brain-Computer Interface among the Chinese population. The finding highlighted that people who show interest to learn new technologies, who have social support, better health and high socio-economic status are more likely to accept BCI technology. On the other hand, older individuals are less likely to accept BCI technology.

El-Osta et.al. (2025) conducted a cross-sectional study among community-dwelling adults in the UK. The study revealed that individuals showed strong acceptance of BCI technology for medical purposes such as stroke rehabilitation and helping people with paralysis. In contrast, they had concerns about ethical issues regarding privacy, safety and social inequality.

METHODOLOGY

Objectives

1. To assess awareness, acceptance and skepticism toward Brain-Computer Interface technology among adults.
2. To identify ethical and psychological concerns associated with the integration of Brain-Computer Interface technology into society.

Hypotheses

1. Most of the adults have a low level of awareness about BCI technology.
2. Most of the adults will exhibit attitudes of non-acceptance and skepticism towards the integration of BCI technology into society after considering its ethical implications.
3. Adults will perceive ethical concerns related to Brain-Computer Interface technology.
4. Adults will perceive risks associated with Brain- Computer Interface technology

Sample

One hundred adults (F=50, M=50) aged between 18 and 55 years have been selected using a simple random sampling method. The simple random sampling method is a probability sampling method in which every participant has an equal chance of being selected.

Inclusion Criteria

- Adults in the age range 18-55 years.
- Individuals with good comprehension ability.
- Individuals who are willing to participate.

Exclusion Criteria

- Individuals aged below 18 and above 55 years.
- Individuals who are not willing to participate.

Tools and Measures

1. **Socio-Demographic Profile**-The researchers constructed it to collect basic information from the participants. It includes initials, age, gender and educational background.
2. **BCI Attitude Self-Report Measure-** A researcher-developed survey questionnaire consists of 17 items to assess participants' awareness, acceptance, skepticism and perceived ethical risks related to BCI technology.

Informed Consent

The subjects were provided with a brief introduction about the current research and BCI technology and informed consent was obtained to ensure that all the collected information would be kept confidential.

Procedure

After obtaining consent, the participants were instructed to complete the socio-demographic profile sheet and BCI Attitude measure. The respondents were encouraged to answer honestly. After that, all the collected data were coded and tabulated.

RESULTS AND DISCUSSION

Table 1 Awareness level of Brain- Computer Interface technology among Adults (N=100)

Awareness level	Frequency	Percentage (%)
Not at all aware	23	23.0
Slightly aware	47	47.0
Moderately aware	21	21.0
Very aware	9	9.0

As shown in Table 1, it was found that only 9% of the participants were very familiar with BCI technology, whereas 23% of the participants were not aware of the existence of BCI technology before the introduction of BCI technology in the research. 47% of the participants were slightly familiar with the topic, and the remaining 21% were moderately familiar. It is inferred from the collected data that only a minority were well informed about this technology and the majority were not; therefore hypothesis “Most of the adults have a low level of awareness about BCI technology” is accepted.

Table 2 Acceptance, Skepticism and Non- Acceptance toward BCI technology among Adults (N=100)

Attitude Category	Ethical Alignment of BCI (%)	Willingness to personally use BCI (%)	Mean Percentage (%)
Acceptance	22	7	14.5
Skepticism	33	50	41.5
Non-Acceptance	45	43	44.0

As shown in Table 2, 14.5% of participants were accepting of BCI technology in both ethical alignment and willingness to personally use but in contrast, 41.5% of the participants showed skepticism and 44% of the participants showed non- acceptance toward BCI technology. So, the hypothesis "Most of the adults will exhibit attitudes of non-acceptance and skepticism towards the integration of BCI technology into society after considering its ethical implications. " is accepted**.**

Table 3 Perceived Ethical Concerns associated with BCI Technology (N=100)

Ethical Concern	Percentage (%)
Privacy of thought and memories	22.0
Consent and informed decision-making	9.0
Risk of misuse by the government or corporations	26.0
Access inequality	8.0
Psychological and Mental Health Impacts	19.0
Long-term effects on the brain	10.0
Other concerns	6.0

As shown in Table 3, the results for ethical concerns on BCI revealed that 6.59% of the participants showed consent & informed decision making was the most pressing ethical concern, 9.89% of the participants considered unequal access as an issue, 12.08% of the participants take undisclosed long term effects on brain as an issue, 18.68% of the participants believed it might have an Impact on mental health, 24.17% of the participants considered violation of privacy of thoughts as an issue and the remaining 28.57% of the participants had misuse of data as an issue. From the collected data, we can infer that most people are concerned about their private data being misused by corporations or even the government**.**

Table 4 Perceived Risks associated with BCI Implantation among Adults (N= 100)

Perceived Risk	Percentage (%)
Increased anxiety about thoughts being monitored	10.0
Dependence on technology for cognitive functions	30.0
Identity confusion or change in sense of self	20.0
Long -term neurological side effects	26.0
Other perceived risks	14.0

As shown in Table 4, 10% of the participants were more worried about Increased anxiety about thoughts being monitored, 20% of the participants were more worried about Identity confusion or changes in sense of self, 26% of the participants were more concerned about Long-term neurological side effects, 30% of the participants were more concerned about

Dependence on the technology for cognitive functions and 14% of the participants thought there were more important concerns other than those mentioned. So, when it comes to concerns about general risks, the majority are worried about being too dependent on technology for basic cognitive functions. Hence, the hypothesis "Adults will perceive risks associated with Brain-Computer Interface technology" is accepted.

Major Findings of the research

1. 47% of the respondents were slightly familiar with BCI technology
2. Only 44% of the sample were non-accepting of BCI technology and 41.5% were skeptical about it.
3. Only 14.5% of respondents were accepting of BCI technology which constituted a significantly small portion of the sample compared to those who were non-accepting and those who remained skeptical.
4. The most concerning ethical concern among 26% of the participants was their data being misused by governments or corporations and 22% of respondents were concerned about the privacy of their thoughts and memories being violated.
5. When it comes to general risk concerns, most of the respondents (30%) were worried about increased dependency on technology for cognitive functions and (26%) were worried about long-term neurological side effects.

Suggestions for future research

1. Larger and more diverse population.
2. Incorporating with other psychological variables
3. Cross-cultural and comparative studies would help to identify sociocultural factors that influence acceptance and resistance toward neurotechnology.

REFERENCES

Boninger, M. L., Cooper, R. A., Shimada, S. D., & Rudy, T. E. (1998). *Shoulder and elbow motion during two speeds of wheelchair propulsion: A description using a local coordinate system.* Spinal Cord, 36(6), 418–426. https://doi.org/10.1038/sj.sc.3100588

El-Osta, A., Ammouri, M. A., Khan, S., Altalib, S., Karki, M., Riboli-Sasco, E., & Majeed, A. (2025). Community perspectives regarding brain-computer interfaces: A cross-sectional study of community-dwelling adults in the UK. *PLOS Digital Health*, *4*(2), e0000524. https://doi.org/10.1371/journal.pdig.0000524

Musk, E., & Neuralink. (2019). *An integrated brain-machine interface platform with thousands of channels* [White paper]. *Journal of Medical Internet Research, 21*(10), Article e16194. https://doi.org/10.2196/16194

Sattler, S., & Pietralla, D. (2022). Public attitudes towards neurotechnology: Findings from two experiments concerning Brain Stimulation Devices (BSDs) and Brain-Computer Interfaces (BCIs). *PLoS ONE*, *17*(11), e0275454. https://doi.org/10.1371/journal.pone.0275454

Steinert, S., Bublitz, C., Jox, R., & Friedrich, O. (2019). *Doing things with thoughts: Brain-computer interfaces and disembodied agency.* Philosophy & Technology, 32(3), 457–482. https://doi.org/10.1007/s13347-018-0308-4

Xia, R., & Yang, S. (2024). Factors influencing the social acceptance of brain-computer interface technology among the Chinese general public: an exploratory study. *Frontiers in Human Neuroscience*, *18*, 1423382. https://doi.org/10.3389/fnhum.2024.1423382

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Conflict of Interest
The author(s) declared no conflict of interest.

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