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WHAT ARE THE EFFECTS OF LONG-TERM EXPOSURE TO ARTIFICIAL INTELLIGENCE (AI) INTERACTIONS ON EMOTIONAL INTELLIGENCE AND EMPATHY IN HUMANS?

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Abstract
This paper reviews the long-term impacts of working with artificial intelligence (AI) systems to influence emotional intelligence (EI) and empathy. AI has the ability to augment emotional growth with suggestions for feeling, managing, and expressing emotions focused on those with emotional interaction difficulties. AI-based programs can assist users in engaging with emotionally distressing situations and promote users' emotional awareness and communication in their relationships. Nonetheless, reliance on AI may reduce face-to-face engagement, which is critical for deep emotional relationships, even though AI may imitate empathy and provide emotional support. AI cannot simulate the expansive range of human emotion and relational experiences derived from being human. Over time, and prolonged use of AI for emotional engagement, increases the chances of social disconnection and relation impoverishment. The bottom line is the use of AI systems should be for guidance rather than replacement of human interactions. Underlying this discussion is the need for emotional guidance through AI systems to be balanced with human interactions and relationships. Societies must remain conscious of AI as a rapidly changing technology designed mainly for emotional engagement and development, and the need for maintaining a human-centric model of emotional health and education.

Keywords*: AI, Emotional intelligence, Empathy, Human, Social, Relation*

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1. Introduction

Definitions:

● **Artificial Intelligence (AI):** Artificial intelligence refers to machines or computers that are programmed to think and learn like humans. It can recognize patterns, make choices, and solve problems based on the experiences provided to the system. For example, when a robot assists you with something, or a computer system suggests or recommends something to watch (such as Netflix suggesting shows you might like), that involves Artificial Intelligence.

● **Emotional Intelligence (EI):** Emotional intelligence refers to your ability to recognize and understand your own emotions and the emotions of others; to manage or respond to your own emotions and the emotions of others; and to connect with others in a meaningful way. For example, if you see someone sad and know what to do to support them, that's emotional intelligence.

Aspect	Artificial Intelligence (AI)	Emotional Intelligence (EI)
Nature and origin	Man-made creation developed by humans	Inherent human trait shaped by experiences
Cognitive abilities	Focuses on problem-solving, data analysis, and pattern recognition	Centre's on empathy, self-awareness, and emotional regulation
Human involvement	Operates autonomously with minimal human intervention	Relies entirely on human involvement and emotional understanding
Ethical considerations	Raises concerns about privacy, security, and potential job displacement	Revolves around ethical interpersonal interactions and compassion
Ability to adapt	Adapts based on data patterns and machine learning algorithms	Develops and improves through emotional experiences and self-awareness

Artificial Intelligence (AI) has become an integral part of our daily lives, significantly influencing our social interactions. We engage with AI through virtual assistants like Siri and Alexa, customer service chatbots, and even AI-driven mental health support systems. These technologies are designed to understand and respond to human emotions, aiming to make interactions more personalized and efficient. For instance, AI systems can analyze facial expressions and voice tones to detect emotions, enhancing the quality of human-computer interaction. As AI continues to evolve and permeate various aspects of our lives, it is essential to examine how prolonged exposure to AI interactions may impact our emotional intelligence (EI) and empathy. Understanding these effects is crucial for ensuring that AI integration supports rather than undermines our emotional and social well-being.

The increasing reliance on AI for social interactions raises important questions about its long-term impact on human emotional capacities. While AI systems are engineered to simulate empathy and provide emotional support, there is concern that such interactions might diminish genuine human empathy and emotional intelligence. For example, AI's limitations in comprehending context and situational factors that shape human emotions mean that it can only provide simulated empathy, which may not fully substitute for human-to-human interactions. Understanding these potential effects is vital, as they have implications for individual well-being and the quality of human relationships. By exploring how extended AI interactions affect EI and empathy, we can better navigate the integration of AI into our social lives, ensuring that it enhances rather than hinders our emotional development.

2. Literature Review

Overview of Emotional Intelligence and Empathy

Emotional intelligence (EI), is the ability to perceive, comprehend, regulate, and affect personal and others' emotions. EI is important in establishing strong relationship, effective communication, and resolving disagreements. Empathy is a component of EI and defined as the ability to sense and share one's feelings. It is an important aspect of building trust, creating collaborative processes, and establishing significant relationships. Both EI and empathy form the foundation of functioning socially. Emotions are especially complicated within interpersonal relationships that evoke even more complexities.

AI in Human Interactions

Artificial intelligence is now an integral component of human interaction. AI technologies, such as chatbots, virtual assistants, and AI-powered social robots, are built to replicate human traits and behaviors and to engage users in interaction that fosters emotional engagement. For example, AI companions like Replika are designed to provide emotional support

by mimicking empathy and interpreting and responding to users' emotional signals (Guzman & Lewis, 2020). Virtual assistants like Siri and Alexa also make people's daily lives easier. In fact, they may create a sense of companionship for some users (Purington et al., 2017). The presence of AI is also increasing in domains such as healthcare, where it offers patients both emotional and cognitive support through the use of therapeutic chatbots (Fiske et al., 2019).

Previous Studies

Studies on the effects of long-term interaction with AI on emotional intelligence and empathy have had diverse findings. Some studies indicate that long-term interaction with an emotionally intelligent AI could help users develop better emotional regulation skills by modeling empathetic behaviors (Dautenhahn, 2007). In therapeutic contexts, AI tools can be effective in reducing stress, increasing emotional well-being, and perhaps improving users' capacity to manage emotions in their real lives (Bickmore & Picard, 2005).

In contrast, additional scholars have expressed caution about high reliance on AI in emotional relationships. For example, (Turkle, 2011) contended that "It is possible that long-term exposure to AI companions whether therapeutic or casual could erode the user's ability to empathize with a human." There is a clear difference in the depth and unpredictability of emotion when interacting with AI versus a true human experience. Few studies address the concern of encountering emotional complexity when an individual has engaged mainly with artificial intelligence as a relational partner (Cohn et al., 2020). These studies tend to suggest a lack of emotional understanding in an AI, especially when fictional character studies are involved.

The findings presented in this study illustrate an important gap in the literature; while AI may simulate and instruct emotional behaviour, we do not know if these have lasting impacts on human EI and empathy. Future research should investigate the possibility of enhancing emotional skills through interactions with AI versus degrading human capacity for empathy by creating experiences that are emotionally shallow.

3. Research Questions:

1. How does spending a lot of time interacting with AI affect our ability to understand and manage emotions (emotional intelligence)?
2. What impact does prolonged interaction with AI have on our ability to empathize with others?
3. What interventions or design principles can be implemented to mitigate any negative effects of AI interactions on human EI and empathy?

4. Methodology

This study uses a secondary data analysis approach supported by qualitative materials and experimental findings to investigate the possible long-term consequences of interaction an individual may engage in with artificial intelligence (AI) and its influence on emotional intelligence (EI) and empathy.

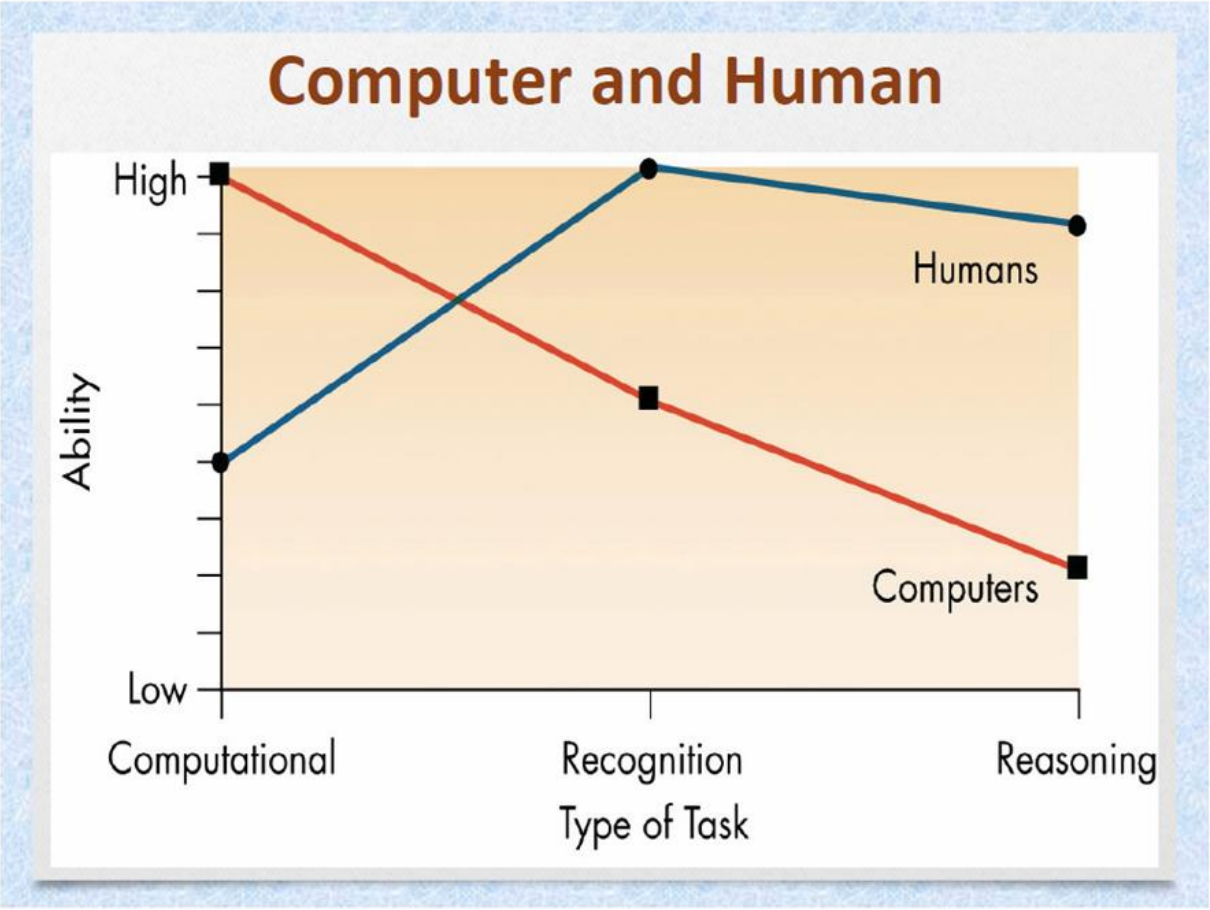
Research Design

A thorough review of literature was done to synthesize findings on AI and its influence on human interaction, primarily with a psychological lens. This research focuses on AI applications that have social purposes, such as chatbots, virtual assistants, and, in some cases, AI companions intended for social interaction. Overall, the research explores the potential impact on emotional skills (i.e., self-awareness, empathy) over time.

Data Collection

Secondary data sources are used which consisted of peer-reviewed academic journals, published books, and reports related to the psychological impacts of human interactions with AI, specifically using therapeutic AI, customer service AI, AI as a caring companion, and others. Secondary data sources also were utilized for experimental designs when examining studies that focused on changes in emotional behaviors of individuals who partook in studies using AI technologies. Ethical considerations will also be borne in mind the or consideration as secondary data was utilized addressing citation (to give credit to the original author and using proper language) when conclusions were reported as unresolvable in AI interactions/users enigmatic evidence status.

5. Results



Source: ResearchGate

The diagram shows that even if computers are effective in performing computational tasks, humans take the advantage in reasoning and recognition - both fundamentally linked to emotional intelligence (EI) and empathy. Prolonged interaction with AI may result in an over-reliance on computers for tasks incorporating recognition and reasoning, which will strip humans of the ability to gain EI and empathy due to diminishing human-to-human encounters. Arguably, a chronic reliance on AI may disrupt emotional and social skills that require nimbleness, underscoring the need for AI to be complemented with experiences adding value to human connections and understandings. A consistent theme across studies indicated that prolonged interaction with AI tools such as virtual assistants, chatbots, and AI companions can result in both positive and negative reactions.

Positive Effects:

○ **Improved Emotional Regulation**: Ongoing interaction with emotionally intelligent AI tools, such as therapeutic chatbots, has allowed individuals to be better aware of and manage their emotions (Fitzpatrick et al., 2017).

○ **Enhanced Accessibility**: AI systems are being used more frequently to provide emotional support to those without access to human social supports which makes emotional responses available widely (Luxton, 2016).

2. **Negative Effects**:

○ **Decline in Empathy**: If humans become reliant on AI communications, this could decrease face-to-face communication skills, thereby reducing empathy over the years (Kozlowski, 2020).

○ **Superficial Engagement**: AI interactions would be superficial and research would show that users could lose their capacity to emotionally connect with humans over prolonged exposure (Sharkey & Sharkey, 2020)

3. **Generational Differences**:

○ Young users seems to be more adaptable to emotional interactions with AI, while older people might be more skeptical and emotionally distant to AI, indicating that generational factors do play an important role in emotional relationships with AI (McStay, 2018).

Patterns and Themes

Several significant themes emerged:

1. Human-AI Emotional Bonding:

Individuals tend to form emotional bonds with AI companions, especially those designed with advanced natural language processing capabilities. However, these bonds often lack the depth and reciprocity of human relationships.

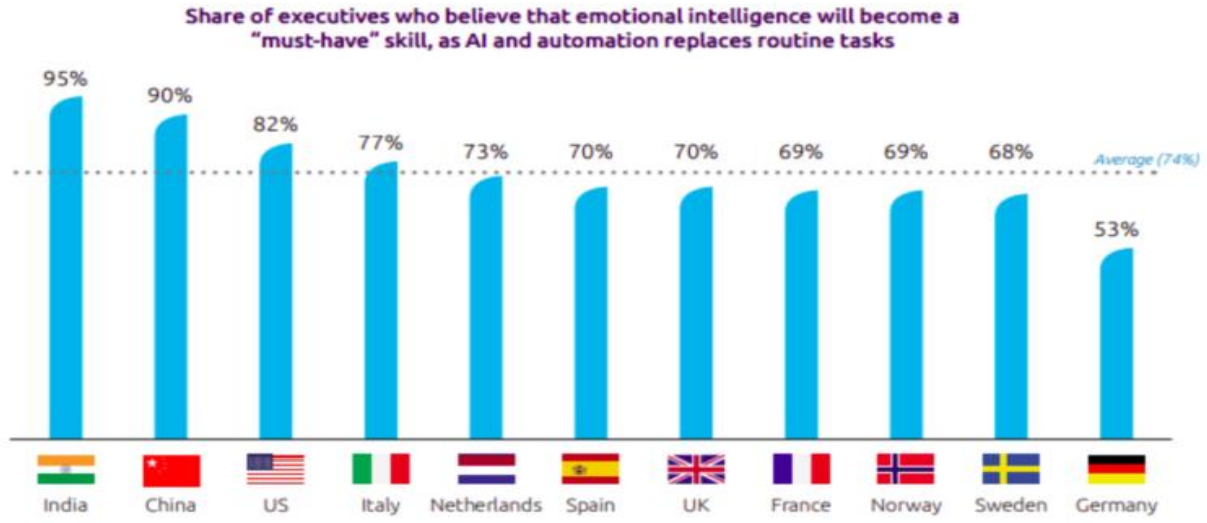
2. **Shifts in Social Dynamics**:
AI's use in interactions with other humans is beginning to change social norms. Relying on AI for conflict resolution or emotional support could influence our innate human necessity for human-to-human problem solving.

3. **Context Matters**:
The implications of AI on EI and empathy are context-dependent. For instance, therapeutic AI apps have shown positive implications, whereas overreliance on AI in mundane settings could be associated with emotional disconnection (Bickmore & Picard, 2005).

6. Discussion

Interpretation of Results in the Context of Existing Literature

The evidence shows that long-term exposure to AI had distinct impacts on emotional intelligence (EI) and empathy. Some AI did support and even improve emotional regulation, but lacked the potential for empathy to develop due to the lack of depth and reciprocity. These findings reaffirm literature that found that AI could be a positive, supplemental technology to manage emotions and a potential downside in diminishing interpersonal skills (Fitzpatrick et al., 2017; Sharkey & Sharkey, 2020). As an example, results reaffirm McStay's (2018) citation that emotional AI could alter the way in which humans interacted, while potentially forging human relationships that were merely functional, void of deep emotion.



Source:- Capgemini Research Institute, Emotional Intelligence Research

The chart indicates that an overwhelming majority of executives in diverse countries anticipate that emotional intelligence (EI) will become an essential skill, as AI and automation take over tasks that are routine. Nevertheless, there are concerns about diminishing emotional intelligence and empathy of humans due to reliance on AI interactions over a period. Perhaps AI can accomplish communications that require efficiency and repetitive functions, but in the long-run, if we are engaged in continuing communications via AI, the opportunities and possibilities for humans to create and engage in emotional connection and understanding will diminish. Therefore, it is critical that we focus on intentional productive emotional intelligence and empathy if we are going to live and interact in an AI world and continue to create meaningful human interactions, relationships, social cohesion, and community.

Implications

For Individuals

Long-standing associations with AI may alter how people emotionally bond. While AI-companionship may help lonely people, it may also lessen the necessity of human connection, leading to people feeling emotionally disconnected. Younger generations, having grown up with AI, may be quick to adapt, but this calls for educational programs to ensure they are able to preserve and build on their empathy skills that are crucial for interacting with others in person.

For Society

AI may change how people interact socially and express emotions. On the one hand, it may provide mental health support and help manage people's emotions. However, it may also create a potential gap (probably unintended) in human-to-human empathy, if people begin to rely on machines. Furthermore, access to high-quality, smart AI may be available only to wealthier socio-economics groups while low-economics groups (including people of color and rural populations) will have access to basic or low-level AI (predominantly). Thus instead of a tool to foster social and emotional connections, AI may spell an even bigger gap in social inequality.

For AI Development

It is the duty of AI developers to build systems that bolster human emotional capacities, not to supplant them. For example, AI companionship could support human interaction and discourage isolation. The results also emphasize the necessity for ethically responsible AI design that influences human emotions. It is important to design AI with an ethical approach to ensure it is used in a responsible manner and supports emotional well-being.

Limitations

The findings of the study are based on the existing literature, which may not capture the full range of experiences of people from various backgrounds and contexts experience when they interact with AI. A reliance on the secondary data suggests that more nuanced or unique consequences may be missed. This reliance on previous research may limit the breadth of the findings. In addition, much of the data presented in the report comes from studies of younger, more technologically experienced individuals who are already more comfortable using AI. Again the results are limited, we may not know what older adults or less experienced users experience when they interact with AI. This could bias the results and the findings may not applicable to the broader community. In addition, most of the existing literature does not examine long-term psychological effect of interacting with AI. Most studies examine a short-term experience. Without long term focus, we would not know how prolonged exposure to AI would impact emotional intelligence and empathic response over a longer timeline. As we haven't thoroughly collected, comprehensive data on long-term psychological effects of AI exposure or interactions, the conclusions of this study are limited.

Recommendations for Future Research

1. **Long-Term Studies**

Future studies should follow individuals over longer periods of time to better understand the longevity of the patterns resulting from the experience of interacting with AI and emotional intelligence and empathy. This will clarify how patterns proceed to develop over time

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2. **Cultural Perspectives**

Individuals reflecting various cultures may not only perceive but interpret their experiences interacting with AI in different ways. Research needs to explore how cultural-based variations influence, for instance, emotional and social outcomes of AI use.

3. **Diverse AI Roles**

Research should also explore how various AI tools (e.g., mental health chatbots, customer service agents, social companions) may differ in their effects to human emotion and behavior.

4. **AI-Human Collaboration**

There would be value in looking at systems where AI works closely with humans. For instance, leveraging the efficiency of AI and the complexity and depth of emotion from human connections, can create an ideal hybrid system.

5. **Ethical Guidelines**

Finally, we need clear ethical guidance about designing AI tools that enhance emotional health. The ethics should focus on creating AI that bolsters human emotion, as opposed to AI that imitates human-like interaction.

7. Conclusion

Summary

The present research examined the role of long-term reliance on artificial intelligence (AI) on humans' emotional intelligence (EI) and empathy. Overall, findings indicate that while AI can help to understand and manage emotions, the degree of genuine emotional connection, as experienced between people, cannot be replicated. In the short term, AI can help individuals improve their emotional skills, especially for those who struggle with social interactions (e.g., providing direction on how to express emotions and how to respond to others in difficult emotional situations). However, over-reliance on AI may lessen face-to-face interactions, which are vital to forming real and deep emotional connections between people. Ultimately, this could contribute to increased loneliness and an inability to form emotional connections with others in real life.

Final Thoughts

The association between prolonged interaction with AI and human EI is complex. On one hand, AI may prove to be an effective mechanism for heightening emotional comprehension. For example, AI could publish recommendations on how

to address stress and anxiety or other emotional issues that might enhance the emotional awareness of some users. Conversely, relational AI cannot actually mirror the nuance of human sentiment and friendship. Actual empathy, or the (much) deeper understanding and sharing of another human being's understanding, comes from human interaction and contact—not machines. While AI may support emotional learning, it cannot supplant the predictably beneficial nature of emotional interaction with other humans. For this reason, finding a balance is important. AI should be designed and accepted as a viable method of developing emotional intelligence, not as a replacement for meaningful, empathetic connections with other humans. Technological growth warrants the potential risk of over reliance on AI; therefore, ensuring we do not lose the potential for connections with other humans that contribute to our health in a meaningful and essential way is a consideration in the rise of AI.

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