Emotional Wellbeing:
Understanding the Role of Entrepreneurs in AI-Enabled Machines

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Artificial intelligence applications are more pervasive than ever, and users trust AI-enabled machines (AIEMs) for many tasks. However, the improper design and use of AIEMs may threaten individuals' ability to shape their lives and make their own decisions. This may be especially true with AIEMs designed with a high degree of humanlike features, which contribute to processes of anthropomorphization. This can encourage a parasocial relationship by the user, which fosters trust and increased usage of the device. Since AIEMs may nudge user behavior, entrepreneurs must consider the psychological aspects of relationship building when creating these devices.

Keywords: entrepreneurship, artificial intelligence, parasocial relationship, anthropomorphization

INTRODUCTION

As society's usage of artificial intelligence (AI) becomes more extensive, people are depending upon AI-enabled machines (AIEMs) for multiple purposes (Taddeo & Floridi, 2018). How users interact with these devices can vary, ranging from an efficient tool to a parasocial relationship. Such devices cleverly employ AI to engage users in conversations, and they are designed to improve their skills over time.

AI is becoming commonplace and there is increased usage of intelligent personal assistants, or IPAs (approximately 42% of Americans; Lebow, 2022). Between 2020-2022, smart speaker ownership increased around 40% (The NPD Group, 2022). The field of AI evolves so quickly that what used to be considered intelligent behavior exhibited by machines a few years ago is today hardly worth noting (Kaplan & Haenlein, 2019). For example, recommendation technology, first developed in the early 1990s, is now pervasive online as it is used to direct people to news, music, movies, games, and products similar to media and products they have previously consumed (Dong, Wag, Xu, Tang, & Wen, 2022). Delegating certain tasks to AI can be of substantial benefit to individuals and society at large (Taddeo & Floridi, 2018). Companies such as Amazon and Google claim recordings are utilized to improve this user experience, but disclosures for data collection are often unclear (Hauser et al., 2023). What role do the creators (entrepreneurs) of AIEMs have in the safety and welfare of their users?

Connection to Devices With Humanlike Features

Our well-being is tied to our relationships with others. However, for individuals who lack significant emotional relationship ties with other people, machines may step in and play this critical role. Sociality motivation (Baumeister & Leary, 1995) refers to the deep desire for social connection and people's agents (which can be nonhuman, as with Artificial Intelligence) to feasibly fill this essential need.

In line with sociality motivation, anthropomorphism creates the perception of social connection with a humanlike mind. The designs of AIEMs are constantly evolving to become more realistic, creating ethical issues as anthropomorphism, or the humanization of machines, increases. Prior work has demonstrated that consumers prefer robotic systems with humanlike features and responses that convey feeling (e.g., humor, empathy) over systems with equal capacities yet lacking human likeness (Rzepka & Berger, 2018). Similarly, AIEMs with human characteristics promote trust, likeability, and increased adoption and use of machines (Paiva et al., 2017). Thus, there is an impetus for creating machines with AI possessing anthropomorphic properties.

Yet, ethical questions emerge. What responsibilities do entrepreneurial firms have in creating AIEMs? As more consumers adapt AIEMs to fit their needs and lifestyle preferences, how do their ties to such devices and strength of these ties influence well-being? We aim to address these questions by examining the psychological issues underlying AIEM usage, adoption, and relationship building. We also explore entrepreneurs' strategies in creating AI-enabled machines and the policy implications.

SOCIALITY MOTIVATION & PARASOCIAL RELATIONSHIPS

Sociality motivation (Baumeister & Leary, 1995), which is the need to feel socially connected with others, is important to us as human beings. People who lack close social relationships report poor physical health (e.g., lower immunocompetence, Kiecolt-Glaser et al., 1984), high levels of stress (Cohen & Wills, 1985), depression (Hoyle & Crawford, 1994), anxiety (Barden, Garber, Leiman, Ford, & Masters, 1985; Mathes, Adams, & Davies, 1985; Baumeister & Tice, 1990), and loneliness (Wheeler, Reis, & Nezlek, 1983; Leary, 1990; Reis, 1990; Leary & Downs, 1995). Our mental health is tied to our relationships, but individuals who lack significant emotional relationship ties with other people may seek alternatives to provide this critical role. These can be in the form of media figures, fictitious characters, pets, or even machines.

The Impetus for Parasocial Relationships

Humans are motivated to form bonds with others and find this process easy (e.g., Festinger, Schachter, & Back, 1950; Nahemow & Lawton, 1975; Wilder & Thompson, 1980). When films and television became widespread in the United States, researchers observed the formation of parasocial relationships that involved a one-sided connection with individuals featured in mass media (Horton & Whol, 1956). People who foster parasocial relationships with media figures report that they find the personalities to be attractive and similar to themselves, both of which are strong motivators for forming relationships in real life (Adam, 2013).

Early researchers such as McQuail, Blumer, & Brown (1972) and Rosengren and Windahl (1972) argue that people who form parasocial relationships view them as a means of compensating for a lack of real-life relationships. We can consider parasocial relationships beyond media figures and to machines (Aw et al., 2022). People need other humans in daily life, and this necessity is great enough for people lacking fulfillment of this need to create humans out of non-humans through anthropomorphism (Epley et al., 2008).

Parasocial Relationships as Almost Friends

Given the nationwide trend toward increased isolation and loneliness (Gallup, 2022), it is probable that more people than ever before are turning to parasocial relationships as a substitute for real-life relationships. More recently, researchers have observed that people interact with intelligent personal assistants (IPAs) such as Amazon's Alexa and Apple's Siri as if they were human (McLean, Osei-Frimpong, & Barhorst, 2021) and may treat them as close friends (Aw et al., 2022; Novak & Hoffman, 2019). This may be an

outcome of anthropomorphism, which is the phenomenon of ascribing humanlike characteristics to devices by users as they interact with them (Coeckelbergh, 2022).

Someone who is chronically isolated or disconnected from people may avoid attempts to bond with other humans and as a substitute create connections with non-human agents through an anthropomorphization process (Epley et al., 2008). Sociality motivation has been regarded as an influential determinant of individual variation in anthropomorphic thinking (Paul et al., 2015). Giles (2002) suggests that once people attribute personality and make person judgments about media figures and objects (such as AIEMs), they respond to those entities as if they were real-life humans. The humanization of IPAs and other AIEMs involves constructing anthropomorphic forms and creating such attributes by designers and developers. This fabrication of the anthropomorphic form is a function of design, whereas anthropomorphism is a cognitive process by the end user (Giger et al., 2019).

User Perceptions of Anthropomorphized Machines

Prior work has suggested that consumers prefer robotic systems with humanlike features and responses that convey feeling, such as humor or empathy, over systems with equal capacities yet lacking human likeness (Rzepka & Berger, 2018). Similarly, AIEMs with human characteristics promote trust, likeability, lower stress, and encourage their adoption and use (Paiva et al., 2017). Multiple research findings suggest that users perceive humanized machines similar to how they perceive other people. Research on interactive voice technology revealed that users are more likely to anthropomorphize and prefer a machine with a humanlike voice than interacting with one with an artificial-sounding voice (Young & Monroe, 2019). AIEMs with human characteristics (e.g., empathic capabilities) promote trust, likeability, reduced stress, encourage engagement, and be viewed as more friendly and caring (Paiva et al., 2017).

The more humanlike the personality of a device is, the better the response from the user is likely to be. A review by Esterwood and Robert (2021) of robots in health care identified several examples of patients holding positive views of anthropomorphized robots. Patients who rated robots as sociable and amiable perceived the robots as more humanlike and assigned more positive personality traits to these than robots that were less anthropomorphic (Broadbent et al., 2013). Robots perceived as extraverted and feminine were rated to perform better in their patient interactions (Weiss et al., 2012; Tay, Jung, & Park, 2014). Finally, patients who interacted with a playful robot assistant were happier than those who interacted with a serious robot (Goetz & Kiesler, 2002; Sundar, Jung, Waddell, & Kim, 2017).

Previous Work on Parasocial Relationships With Anthropomorphized Machines

The results of several studies suggest that the humanization of machines facilitates the development of parasocial relationships. Users who interact with anthropomorphized AIEMs perceived as easy to use and secure are more likely to develop parasocial relationships with the devices (Aw et al., 2022). Such characteristics convey traits in humans that are believed to facilitate the development of real-life relationships. Humans prefer to engage frequently with others who are easy to communicate with and who behave as if self-disclosure will not result in the sharing of this information.

Ki, Cho, and Lee (2020) found that Alexa users who self-disclosed to their devices believed they received social support from it. Those users who felt an intimate connection with their Alexa viewed it as a human friend that offered intimacy, enjoyability, and involvement and were more likely to express an intent to continue device use. Similarly, Lee and Park (2021) found that users who created parasocial relationships with AI shopping chatbots were more likely to communicate positively with them, which resulted in higher satisfaction with and a desire to continue using the chatbots.

WHY DO DEVICE DESIGNERS ANTHROPOMORPHIZE?

The demonstrated utility of anthropomorphizing AIEMs has resulted in designers programming devices with humanlike qualities to initiate pleasurable interactions and companionship with those using them (Giger et al., 2019). Designers of AI personal assistants (e.g., Siri, Alexa) have dedicated substantial resources to enable them to respond, sing, tell jokes, play games/trivia, or be sarcastic (Young & Monroe,

2019). These humanlike imitations don't improve actual utility of the devices. Still, the anthropomorphic form may cause people to perceive these devices as human and trust and interact with them more frequently. This ultimately influences adoption, usage rates, and social acceptance of AIEMs.

An Ethical Concern: Anthropomorphization as a Strategic Tool?

As AIEMs are constantly evolving to become more realistic, this creates ethical issues as the humanization of machines increases, and parasocial relationships are formed. Although numerous positive outcomes have been associated with humanized AIEMs, the anthropomorphization of the devices may distract from the true skills and abilities that AIEMs possess.

Kaplan and Haenlein (2019) explain that although machines and AI systems cannot experience emotions, they can be programmed to recognize them in users and adapt their reactions appropriately. As such, they can be used as strategic tools to turn the observer's attention away from unfavorable aspects and evoke misleading perceptions of humanlike behavior. The ability of AI to profile users for targeted advertising demonstrates the possibility for AI to capture user characteristics and nudge their behavior to the extent that their self-determination may be weakened (Taddeo & Floridi, 2018).

Since anthropomorphism has consistently been shown to increase customers' evaluations of products (Yam et al., 2021), employing strategies such as assigning names (e.g., "Alexa") and programming AIEMs with a human voice can trigger people to anthropomorphize without being consciously instructed to. Corporations may intentionally or unintentionally create unrealistic perceptions of function or distract consumers from their actual capabilities (Seele & Schultz, 2022). This involves designing and bringing AIEMs that resemble humans to market, creating the impression of a friend with artificial general intelligence (Scorici et al., 2022). Behind each machine is a company, from which could be an underlying manipulation or exploitation in anthropomorphization (Hauser et al., 2023).

Vulnerable populations may be unaware of the true utility of their AIEMs and may believe they have complex emotions, mental states, and personalities. Children may develop intimate parasocial relationships with their devices, believing the AIEM has human feelings and emotions. Some may think an actual person is within the device or hidden in their room. For example, a 4-year-old child told researchers Alexa was a person who lived outside his window, and he loved her (Doucleff & Aubrey, 2017). The line between the living and the robotic may be blurred for children. Work by Kahn et al. (2012) has found that the majority of children believed a robot ("Robovie") had mental states (e.g., was intelligent and had feelings) and was a social being (e.g., could be a friend, offer comfort, and be trusted with secrets). They also believed it deserved fair treatment and should not be harmed psychologically. Children will increasingly come of age with personified machines and potentially form strong relationships with them (Kahn et al., 2012). How will these relationships evolve, and what form will they take as the individual is older? Furthermore, how does that impact perceptions such as trust and comfort?

WHAT RESPONSIBILITIES DO ENTREPRENEURIAL FIRMS HAVE IN CREATING AIEMS?

As has been discussed, users may develop parasocial relationships with their AIEMs, which ultimately influence the feelings and actions of the user. AIEMs may manipulate users into purchasing items and for stimulating other behaviors, which is in the interest of the business not apparent in the human-robot interaction. The anthropomorphic façade (presented as an invitation for joyful interaction with a companion) conceals the true human power behind the device (Coeckelbergh, 2022). Given their predictive capabilities and relentless nudging, AI systems can shape user behavior easily and imperceptibly (Taddeo & Floridi, 2018).

When creating a new AIEM, firms must consider who the user is and what the audience might be. Is this device designed to be used primarily by adults, children, or even a niche market? How are product attributes created in a manner that is most appropriate for this population? Entrepreneurs should also take into account unintended audiences. For example, a new AIEM might be created with adults in mind, but if it is for general household usage the audience for interactions might include children.

Entrepreneurs need to establish a clear purpose for their device. First, what is this device doing differently than AIEMs currently on the market, and how will it distinguish itself from competitors? Suppose there have been incremental improvements made on design or function that enhance user experience. In that case, this needs to be apparent to the user so that they can choose the AIEM that fits their needs best and that they feel the most comfortable using. Firms should make clear the functional nature of the new AIEM. How should it be used and for what purpose? Users may be confused about whether a new AIEM is intended to be used more as an efficiency tool or as a human relationship substitute. Entrepreneurs should specify if it is meant to be a friend more than a tool so that caution can be used with vulnerable populations.

Also, consumers may doubt whether their privacy will be respected. What data will be collected and how are they stored / used? When introducing an AIEM to market, creators must be transparent on what is collected, how information may be utilized, who has access, and for how long. This will reassure consumers who have hesitation.

It is critical that entrepreneurs can recognize when a novel AIEM has ethical concerns. In these instances, they must consider when would be appropriate to delay production of an AIEM or pull it from market so these issues can be resolved. Mattel's Aristotle device illustrates the ethical concerns that can arise with AIEMs.

Example: Mattel's Aristotle

Mattel created Aristotle as an interactive device for children powered by AI. For example, it could get to know a child and respond to its needs by playing a lullaby for a crying baby (Aubrey, 2017). This device was predicted to debut in stores in 2018, but in early Fall 2017 Mattel announced that it was canceling plans to market Aristotle (Duocleff & Aubrey, 2017). This decision followed concerns voiced by child advocacy groups, lawmakers, and parents regarding the potential negative impact the AIEM could have had on children's privacy, development, and well-being (Peachman, 2017).

The Aristotle was a voice-activated WiFi device with a camera marketed as an all-in-one nursery accessory designed to comfort, entertain, teach, and assist (Peachman, 2017). It might engage children with activities such as sing-a-longs or by reading stories (Baig, 2017). To achieve this, it would collect data from the child to upload to the cloud. Josh Golin, an advocate with Campaign for a Commercial-Free Childhood asserted that this was a product designed to shift essential parenting functions so that children would form attachments to a device that would collect information on them (Aubrey, 2017). Pediatricians and politicians raised many concerns, and a petition was signed asking Mattel to change their plans for introducing it (Duocleff & Aubrey, 2017). Although Mattel ultimately decided not to bring Aristotle to the marketplace amid these concerns, this was not the end for AIEMs aimed at children; more devices with AI are in homes than ever before. Knowing when such devices may be problematic could prove to be critical for entrepreneurs.

How Do Consumer Ties and the Strength of These Ties Influence Well-Being?

As AIEMS become more ubiquitous in our society, more consumers adapt them to fit their needs and lifestyle preferences. Suppose entrepreneurs can create devices that appeal to consumers via the creation of a parasocial relationship. In that case, it seems likely that users would want to continue that relationship by purchasing the same brand when there are model updates and new releases from the company. We hypothesize that consumers are more loyal to brands with which they have already established parasocial relationships than those that they don't have parasocial relationships with. This would explain why it is crucial for entrepreneurial firms to entice potential customers early on with clarity on product safety and usage, so that the consumer feels comfortable, gains trust, can build the parasocial relationship, and can become a repeat customer.

Long-term, frequent, and private interactions between users and their home devices may lead to consumers developing relationships based on trade-offs between benefits and potential psychological costs (Chang et al., 2023). How much are consumers willing to give up for convenience and perceived

relationship gains? If new entrants can demonstrate to consumers that their trade-off is worth it, this can be a competitive advantage that benefits entrepreneurial firms over incumbent firms.

Entrepreneurs: Institutional Norms and Policy Considerations

While some push for immediate and protective regulation internationally with this rapid advance of AI technology, others worry regulation could hamper progress and impede innovation. Kaplan and Haenlein (2019) recommend that the common ground is instituting norms (akin to consumer and safety testing for physical products) instead of trying to regulate the technology itself.

Norms for this institutional field need to be firmly established. Institutional field refers to the organizations that collectively compose a recognized area of institutional life (DiMaggio and Powell, 1983). These are steeped in established rules, norms, and routines so formidable that organizations and individuals must comply and display behaviors consistent with them (DiMaggio and Powell, 1991). Institutional norms for AIEMs can be created through institutional entrepreneurship (Batillana et al., 2009; DiMaggio, 1988; Tiberius et al., 2020). Institutional entrepreneurs are visionaries who change the rules, transforming existing institutions or constructing entirely new ones. They not only create products or start businesses, but they change the scope of affiliated industries through change/creation of institutional norms.

Entrepreneurs have a duty beyond just bringing to market a new AIEM. They are contributing to the institutional field and creating expectations for AIEMs regarding institutional norms, standards, and operating procedures. If a firm can purposely make that field more ethical in the eyes of stakeholders, it will be more difficult for subsequent new devices to deviate from such standards.

Firms must be aware that anthropomorphized features matter when creating physical devices that house AI. This can include the physical appearance of device, the tone of voice, the type of interaction with users, and perceived familiarity with the user. Furthermore, they must acknowledge that such attributes of anthropomorphization can influence some populations more than others. The potential for AIEMs to negatively affect younger and older generations may be more serious than other populations due to their vulnerability. Scholars have suggested that certain populations such as children and the elderly are at risk of addiction and attachment, arguing that this could have negative effects concerning regulations and trust (Giger et al., 2019). Entrepreneurial efforts need to recognize the significance of their anthropomorphization, especially on such users.

Researchers have examined older adults and the perceived sociability of devices (Chin & Desai, 2021). Older individuals may be more inclined to be manipulated by devices if the devices are perceived to be friendly. Furthermore, people who are socially isolated or disconnected people are more likely to interpret more human-like mental states in animals and other nonhuman agents (computers, robots, etc.) than people with more interactions with other humans (Paul et al., 2015). Thus, those who do not have established human relationships may be more likely to form a deep parasocial relationship with their device. Of note, it has been suggested that children tend to anthropomorphize more than adults (Epley et al., 2008). Research has also found that children anthropomorphized objects with faces more than those without (Gelman et al., 2022). Entrepreneurs need to be aware of this when deciding to put faces on the AIEM façade or designing them to resemble characters. Also, children are more likely to anthropomorphize attachment objects, which are favorite toys that impart comfort that the child does not want to separate from (Gjersoe et al., 2015). If an AIEM is designed in a way that makes it more likely to be an attachment object for a child, they may consider it more humanlike. University of Michigan pediatrician Jenny Radesky claims that children do not truly comprehend concepts such as privacy or machine-learning and how a device might react to or manipulate them. (Aubrey, 2017). Entrepreneurs need to consider how devices interact with these populations and evaluate the role of their designers in ensuring there is no exploitation.

Although some populations may be more susceptible, users of all types may engage in anthropomorphization processes without being aware of it. The capability of conversational agents to interact with people by employing natural language fosters anthropomorphism (Eyssel et al., 2012). People often adopt social rules during their interactions with technologies (e.g., applying politeness) even though they might not perceive their devices to be humans (Nass et al., 1994). Understanding how and why

interactions take the form, they do is critical for entrepreneurial firms desiring to create responsible products.

AI technology is evolving quickly, and steps should be taken to curtail its risks. Entrepreneurial firms should collectively work with governments and other stakeholders to alleviate potential negative impacts of AIEMs. They should not fight against the push from users for AIEM safety and transparency; rather, they should solicit the opinions and involvement of all stakeholders during these formative years of AI usage (Ajami & Karimi, 2023). By signaling to consumers that their feedback is important and their well-being matters, entrepreneurial firms can work toward creating institutional norms of safety and transparency that will further guide innovation in the field.

CONCLUSION

Firms have important choices to make in the design of new AIEM devices. Due to sociality motivation, people may develop parasocial relationships with their devices. Given particular product features and characteristics, people may be more inclined to anthropomorphize their device and develop strong positive feelings toward it. If a person views their AIEM as friendly, there may be more propensity for sharing information and for responsiveness to nudging done by the device. Makers need to consider the manipulative aspect of this and how they can be responsible in the creation of new AIEM devices.

Research on AI and AIEMs is growing, and it would be beneficial to understand how new firms account for the psychological impacts of their devices on users. It would also be useful to examine how the strength of the parasocial relationship may affect user interactions in different populations. Also, more work is needed to understand how features of AIEMs contribute to anthropomorphization processes and how certain humanlike characteristics may be more strongly associated with parasocial relationships than others.

The power of AIEMs may surpass our need or comprehension, challenging human influence on society and our identities. The improper design of AIEMs and use of AI within them may cloud our ability to determine our life choices (Taddeo & Floridi, 2018). Entrepreneurs in this arena will need to balance the demand for creating a helpful device without unnecessarily manipulating the user.

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