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Title: Addressing the ethics of telepresence applications through end-user engagement

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Running title: End-user engagement in robotics

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Abstract:

Portacolone et al.'s Ethics Review highlights the ethical challenges associated with the implementation of telepresence devices and applications in the context of aging and dementia. In this response, we review ethical considerations as they relate to specific modalities of telepresence, with an emphasis on the continuum of potential interaction agents, from known individuals to fully automated and intelligent interlocutors. We further discuss areas in need of empirical evidence to inform regulatory efforts in telepresence. We close with a call for meaningful end-user engagement at all stages of technology development.

Keywords: Robotics, telepresence, ethics, Alzheimer disease, patient engagement

Main text:

Portacolone *et al.*'s Ethics Review presents a controversial application of telepresence technology (the "Care Coach") in which older adults interact with an animal-like avatar controlled by an individual unknown to the user. The authors describe the technology and review its ethical implications through the lens of biomedical ethics. As telepresence devices and applications are growing in popularity, and may be particularly useful in times of social isolation due to the Covid-19 pandemic, the Ethics Review is timely and raises important questions for the protection of existing and potential end-users. In this response, we consider the Care Coach a form of telepresence, defined as the use of technology for participation in distant social interaction. We briefly review the different types of telepresence applications, then explore how ethical considerations related to deception, monitoring and tracking, social isolation and displays of affection differ based on the specific type of telepresence. We conclude with a call for greater end-user engagement in telepresence technology development.

The specific case study described in the Ethics Review, the Care Coach, is situated mid-point on a continuum of possible interaction agents in telepresence applications for older adults, from human to machine. At one end of the continuum are telepresence applications that connect individuals to their loved ones such that technology facilitates connectedness and social engagement. Commercially available devices at this end of the continuum include applications such as Skype and Zoom as well as systems commonly referred to as "Skype on wheels" [1] such as the Beam, Giraff and Texai, three examples of telepresence that embed video conferencing devices onto mobile robots that can be steered remotely (for a review of mobile robotic

telepresence, see [2]). At the mid-point of the continuum are applications such as the Care Coach whereby technology is used to connect an older adult to an unknown human interlocutor who is masked by a virtual avatar. At the other end of the continuum are technologies that involve interactions with completely artificially intelligent companions. Examples include virtual assistants such as Siri and Alexa as well as elaborate embodied autonomous and articulated robots such as the Care-O-Bot. These three different types of telepresence ((1) with a known human; (2) with an unknown human through a virtual avatar; (3) with a fully artificially intelligent companion) have very different ethical implications. As such, the development of guidance and regulations in this area should carefully consider these differences and avoid a one-size-fits-all approach. In the following sections, we explore these differences based on the themes discussed by Portacolone et al.

Deception: Different forms of telepresence involve different levels of deception. Interacting with a known person through a telepresence robot involves minimal deception, because seeing someone looking at you through the device makes it implicit that the person can see you. The Care Coach, described in the Ethics Review, involves several levels of deception as the authors aptly point out: the potential for deception around who or what controls the avatar, and the ambiguity about the authenticity of expressions of emotions. Fully automated systems that involve no human interaction but that seem human-like or human-controlled can deceive users even further. Although deception has been identified by scholars as an important ethical issue in technology to support aging [3], more empirical research on the attitudes of older adults towards the different forms of deception described above is required to inform guidance in this

area. Should deception be found to be incompatible with the values of older adult end-users, it will be critical to ensure that end-users understand and accept, on an ongoing basis, how and by whom telepresence devices are controlled.

Monitoring and tracking: Similarly, monitoring and tracking capabilities differ in various levels of telepresence, from obvious video monitoring during a videoconferencing call to unobtrusive, constant monitoring via applications such as the Care Coach. The potential harms of monitoring, such as intrusions on privacy, can be mitigated through an effective and meaningful consenting process. However, informed consent for technology applications that involve monitoring and tracking is jeopardized by the routinization of consent in everyday technologies. As one example, mobile technology users, including older adults, routinely agree to terms and conditions of applications that involve location tracking without reading the documentation. As a result, implementing a similar consenting process for a telepresence application would likely not support a truly informed consent. To address this issue, telepresence and other companionship devices and services would benefit from implementing ongoing, dynamic and evidence-based processes for consent, harnessing various types of media to clearly explain the benefits and harms of the technology. In addition, models where telepresence is only allowed under specific conditions (e.g., when answering a request to initiate a telepresence session) should be favored.

Social isolation: The issue of social isolation is complex, and telepresence applications have been described as both mitigating and contributing to isolation in older adults [4]. However,

there is currently little evidence that social isolation is due to or enhanced by telepresence applications or devices. Carefully designed and well-controlled studies in this area will be needed to determine the impact of telepresence applications on social isolation and to inform ethical guidance on this important issue.

Expressions of emotion: In their recommendations based on the analysis of the Care Coach, Portacolone *et al.* suggest re-designing the avatar to appear like a robot rather than an animal and limiting the avatar to forms of support that do not include “expressions of affection”. In practice, regulation of this kind is likely to be problematic. Making the avatar appear robot-like does not eliminate deception - it simply shifts the representation of a human social actor as a robot. Enforcing this type of complex regulation in the absence of evidence that users are genuinely deceived and harmed by the animal-like appearance of the tool may be misguided and would undoubtedly raise a broader question about the use of animal-like figures across a range of application areas, such as therapeutic toys for children. The issue of “expression of affection” also raises important questions about how we define such terms and the strength of the available evidence on the benefits and harms of emotional alignment in assistive technology. Early evidence suggests that assistive technologies for older adults that are responsive to affective identities and emotions are more effective than non-adaptive, one-size-fits-all solutions [5]. As one example, an artificially intelligent cognitive assistant developed to assist older adults with Alzheimer disease during activities of daily living (COACH) was found to be more effective in prompting end-users to correctly wash their hands when it was programmed to be emotionally responsive to the end-user [6]. These findings are especially

important in light of qualitative work that reveals that in persons living with Alzheimer disease, emotional processing is much more resistant to decline compared to cognitive processing [7]. Given these lines of evidence and the fact that people have strong tendency to read human-like intent into many different types of technological artefacts [8], attempts to eliminate interactions that can be interpreted as affectionate may negatively impact the adoption of potentially beneficial technologies [5].

Portacolone and colleagues describe, in their Ethics Review, the limited landscape of regulatory guidelines for telepresence applications for older adults. Critically missing from this landscape are guidelines co-developed with older adults and their trusted advocates. Close and collaborative engagement with end-users can be instrumental in addressing the ethical challenges of emerging technologies. Key insights that can be gathered through engagement include, for example, the determination of how closely the device or application intersects with end-user values, whether stated or implicit – a factor that has been shown to be important for adoption [9]. Consultation with end-users should also inform the dynamic monitoring of the balance between benefits and risks of a given telepresence application over the course of aging and age-associated conditions such as the various dementias. When meaningfully engaged in research and technology development, end-users can also contribute valuable expertise in addressing the constant tension between protecting the rights of older adults versus over-protecting them. This tension is especially salient as health care ethics as field is increasingly shifting away from paternalism as a governing principle. End-users should also be closely

involved in the evaluation of telepresence applications, and while few of the existing evaluation tools have been designed with end-user input, this landscape is rapidly evolving [10].

The issues raised by Portacolone et al. are not only timely but also pressing as the landscape of telepresence applications and artificially intelligent companionship is evolving rapidly. Further complexifying the issues identified in the Ethics Review is the advent of technology such as deepfakes (from “deep learning” and “fake”), which commonly refers to the manipulation of media to replace a person’s likeness with another in a way that makes it look authentic. This type of digital manipulation can result in content with very high potential for deception. A potential scenario would be an application similar to the Care Coach where the end-user interacts with a manipulated video of a loved one instead of the avatar – for example, one could manipulate a video to make it seem like an older adult’s son or daughter is reminding them to take medications, despite this interaction having never occurred . In light of these advances, answering the ethics questions raised in the Ethics Review through interdisciplinary collaborations and end-user engagement is an imperative to set an ethical foundation in this fast-moving field.

Conflict of Interest: Tony Prescott is the director of company, Consequential Robotics Ltd, that is developing service robots for research, education and healthcare applications. All other authors have nothing to disclose.

References:

- [1] Dahl TS, Boulos MNK (2014) Robots in Health and Social Care: A Complementary Technology to Home Care and Telehealthcare? *Robotics* **3**, 1–21.
- [2] Advances in Human-Computer Interaction, A Review of Mobile Robotic Telepresence, Last updated 2013, Accessed on 2013.
- [3] Sharkey A, Sharkey N (2012) Granny and the robots: ethical issues in robot care for the elderly. *Ethics Inf Technol* **14**, 27–40.
- [4] Prescott TJ, Robillard JM (2019) Robotic automation can improve the lives of people who need social care. *bmj* **364**,.
- [5] Robillard JM, Hoey J (2018) Emotion and Motivation in Cognitive Assistive Technologies for Dementia. *Computer* **51**, 24–34.
- [6] Lin L, Czarnuch S, Malhotra A, Yu L, Schröder T, Hoey J (2014) Affectively Aligned Cognitive Assistance Using Bayesian Affect Control Theory. In *Ambient Assisted Living and Daily Activities*, Pecchia L, Chen LL, Nugent C, Bravo J, eds. Springer International Publishing, pp. 279–287.
- [7] König A, Francis LE, Joshi J, Robillard JM, Hoey J (2017) Qualitative study of affective identities in dementia patients for the design of cognitive assistive technologies. *Journal of Rehabilitation and Assistive Technologies Engineering* **4**, 2055668316685038.
- [8] Prescott TJ (2017) Robots are not just tools. *Connection Science* **29**, 142–149.
- [9] Robillard JM, Cleland I, Hoey J, Nugent C (2018) Ethical adoption: A new imperative in the development of technology for dementia. *Alzheimer's & Dementia* **14**, 1104–1113.

[10] Tao G, Charm G, Kabacińska K, Miller WC, Robillard JM (2020) Evaluation Tools for Assistive Technologies: A Scoping Review. *Archives of Physical Medicine and Rehabilitation*.