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Robot Collaborations: Using Theatre Performance to Engage Robots and Humans

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Narratives of human-robot science fiction in literature, on the stage, and in the cinema have often expressed machines and humans as harsh adversaries (Hirata, 2013, Lang, 1927, Čapek, 1920, Asimov, 1950, Jonze, 2013). However, the reality of a shared human-robot connection aiding humans is well-established in collaborative work settings (Hopko, et al., 2022, Wang, et al., 2022). Currently, there is a growing need for robots that provide care to people of aging populations and limited financial and human caregiving resources (Johansson-Pajala, et al., 2020). These "vulnerable" populations no longer being defined in a stereotypically negative context, but rather, as the result of inequitable social and political practices and will now be argued as "a disability bioethics whose goal ought to be to strengthen cultural, political, and institutional environ-

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ments so that disabled people can flourish" (Garland-Thomson, 2022). Additionally, there are people with intellectual disabilities that have similar unmet care needs, and robots make therapeutic benefits possible for this population (Van Wingerden, et al., 2020). Socially assistive robots (SARs) in particular have been designed to engage vulnerable people, such as older adults and people with disabilities in social interactions, while augmenting human performance and functioning (McGinn, et al., 2020, Robaczewski, et al., 2021; Nakamura, et al., 2021). Yet, the finest engineered social robot will not succeed in its interaction with a human if the performance and behavior needs of the human are not met on an authentic and human-like level. An interdisciplinary research team including Theatre/Liberal Arts, Social Work, Engineering, and Kinesiology developed an experimental pilot study to examine a human-robot interaction for respite and positive health and well-being outcomes for human participants. This manuscript addresses the performative theoretical concepts of when a robot is essentially programmed to 'perform' for a human to provide respite and well-being.

Studies have explored relationship design between social robots and humans, building in empathetic capabilities and human social norms into the robot's performative and behavioral repertoire, including non-verbal communications (i.e., Garcia-Corretjer, et al., 2022; de Graaf, et al., 2015; De Jong, et al., 2021; Leite, et al., 2013; Saunderson & Nejat, 2019). Social robots have provided caregiving acts to older adults (Lehourx, 2018, Beer, et al., 2012, Pino, 2015), mediated by some person-like aspects of humanoid social robots (Kim, et al., 2013). Robots as caregivers have eased issues of older adults living with memory loss (Tanioka, et al., 2021, Tapas, et al., 2009), and socially interacted with people to dispel isolation (Child, 2019, Brito et al., 2021, Clair, et al. 2021). Robots have also been found to enhance the assistance available to social care workers in a long-term home care setting (Carros, et al., 2022). Similarly, robot-assisted therapy is developing into an increasingly effective intervention for individuals with Autism Spectrum Disorders (ASD) and intellectual disabilities (Di Nuovo, et al., 2018).

Both the design and the dynamic interplay between humans and social robots are a significant aspect of robot collaborations. Studies of robot-mediated caregiving have highlighted the need to build trust, ensure safety, provide recognizable social cues, privacy and data protection, while clearly demarcating the temporary nature of the robot caregiving as a supplement to, rather than replacement for, human caregiving (Etemad-Sajadi, et al., 2022; Van Maris, et al., 2021). A recent systematic review has found that the overall picture of SAR results in health and social care settings for older adults is mixed, and will require additional studies (Papadopoulos, et al., 2020). What the available evidence suggests is that usability, reliability, familiarity, and personalization, are salient to individual-level acceptance of the technology by users (Papadopoulos, et al., 2020).

In the wake of the pandemic, social robots have an increasing appeal in care settings for vulnerable older adults (Jecker, 2021). COVID-19 has jump-started a shift toward more remote work with a greater use of technology and virtual connections across public and private life, especially in care contexts with vulnerable populations (Tavakoli, et al., 2020). The question of whom robots should serve, and how, looms large for the design and deployment of robots to assist and care for vulnerable older adults, as well as others with limitations in their capacity to express what they need, such as adults with intellectual and developmental disabilities (Johansson-Pajala, et al., 2020; Shulka, et al., 2019).

As the general population ages and people with disabilities live longer, the need for caregiver assistance for older adults who care for their adult children with disabilities becomes more acute. Socially assistive robots have the potential to fill this growing gap. A recent study by Shulka and colleagues (2019) explored robot-assisted mental health interventions for users with intellectual disabilities viewed through the perceptions of caregivers, and the evaluations of professionals. They found that the attention of the user with an intellectual disability was engaged by the robot intervention, but the intervention effectiveness suffered from a lack of real-time feedback for the continuous improvement of more human-like interactions. Nonetheless, the caregivers reported positive impressions of the robot's engagement of the user, and the effect on their workload. Caregivers urged for more personalization, greater adaptability, and interactivity for the robot's behaviors.

Given the human caregiving gaps arising from changing demographics and service/care staffing limitations, the logical next step is to explore the potential of SARs to serve as a source of temporary respite for caregivers, examining both their perceptions of the robot's interactions with the care recipient, and to the greatest extent possible, the care recipient's perceptions. Our current pilot study (Bricout et al., 2021, Xu et al., 2021, Greer et al. 2021) contributes to the research literature by exploring the possibility of a socially assistive, humanoid robot providing temporary respite for older adult caregivers of young adults with intellectual and developmental disabilities (IDD). Our interdisciplinary team incorporated a collaboration to examine an interaction by a robot and a human using an interactive learning scenario in a laboratory setting. The study's design included a co-located young adult group with intellectual and developmental disabilities (IDD) and a robot (A.B. Williams, et al., 2019, Shulka, 2019) with an older caregiver adjacently located. The performance of the robot was programmed to promote social connectedness through components of theatre and performance theory. Specifically, a representation of the classic performance theory of Richard Schechner. Schechner revolutionized the theatre as a founder of the discipline of Performance Studies. In so doing, he defined a contemporary space that transformed performance through a re-imaging of ritual, play, social, and cultural events of every-day actions and life (Schechner, 2013).

This interdisciplinary team chose to develop a study for human-robot collaboration with young adults identified with IDD and their older (50+) caregivers. The experimental pilot study was planned to provide connectedness for the examination of a potential human-robot companionship model benefitting both the young adult and the older caregiver. Throughout the manuscript, we will build the theoretical process associated with the results of the experimental study. The manuscript will define what elements of performance theory were addressed during the human-robot interaction (HRI) defining the study's interdisciplinary nature and potential creation of identity, culture, and experience for the human(s) during the study.

In this experiment, a humanoid robot, Softbank Robotics Inc, Pepper© is programmed to provide connectedness and potential companionship for young adults with IDD and respite for their older adult caregivers. The complexities of developing a study for multiple human stakeholders was a challenge the team purposefully addressed in the complex layering of relational trust, design, and connection issues between the robot and the participants.

Methodology of the study

The potential companionship between a young adult with IDD - the care recipient, an older adult – the caregiver, and a SAR was intended as exploratory research using the SAR as the platform for connection with the human being. For this article we interchange the terms participant, care recipient, and young adult with IDD, as well as caregiver, caretaker, and older adult. The use of a SAR to promote social connectedness and respite is driven by shared goals within our team. Interdisciplinary work creates multiple structures from which to frame conclusions. This article highlights the field of performance and theatre theory by examining the performance of the robot for the human participants. Respite for families that include young adults with IDD is established (McIntyre, 2020), Mitter et al., 2019). Our pilot study examined Social Work, Engineering, Kinesiology, and Theatre/Liberal Arts collaborative research to develop a potentially assistive social robot for companionship, given the caregivers may potentially age out of the ability to adequately provide care for their children. This article frames the component that theatre performance theory had in the performance interactions between the participant(s) and the robot. Our team was charged to provide "caregiver respite" for the older adults, but in doing so we needed to create an engaging performative relationship for the young adult care recipient with a social robot.

Our interdisciplinary research group strived to promote the value and benefit of a social robot that encouraged engagement based on theatrical components of performance theory specifically physical movement and spoken narrative storytelling. The team developed an ethical and safe structure to protect and guide the wishes of both the care recipient and the caregiver. Two pre-study

focus groups were held including a caregiver and a care recipient focus group and each respective focus group was held twice. Discussions during the focus group included questions regarding the study, the participant's role, and the plan for the interaction. Both groups received a hard-copy visual image of the robot, Pepper, for reference before their first in-person meeting. Additionally, a one-minute introductory video of the Pepper robot, a research team member, and two members of the administrative team of Helping Restore Ability (HRA) was captured for the first pre-study focus group to facilitate trust and discussion in the study. The performance of the robot with its human partner (participant) was of the utmost importance as a robot that is not programmed with human-like social cues and awareness does not fully engage a human's interest. The team developed a specialized performative interaction between the humanoid robot and the human being utilizing theatre performance of narrative and movement. The focus groups examined the concept that young adult children with IDD may have more limited friendship networks, thereby increasing the benefit of the robot companionship performance. The performative aspects of the study included programmable decisions for movement and speech/narrative with the care recipient. The older adult caregiver watched the intervention from an adjacent room via wireless streaming with research personnel present. Components of Richard Schechner's performance theory including narrative and movement will be addressed below as they related to the research goals for the study and the programmed engagement of a human with a SAR.

Richard Schechner

Richard Schechner is an innovative experimental performance analyst, artist, director, instructor, and writer. He is considered one of the founders of performance studies and theory. Schechner defines performance studies somewhat as an oxymoron, as *indefinable*, or at least always changing, "… (Performance studies is) a way to understand the world in its ceaseless becoming, and a necessary tool for living…" (Schechner 2013, p. x). He asserts there is, "one overriding and underlying assumption of performance studies [and it] is that the field is open" (Schechner 2013, p. 1) and finally that performance analysis is an active, living theory:

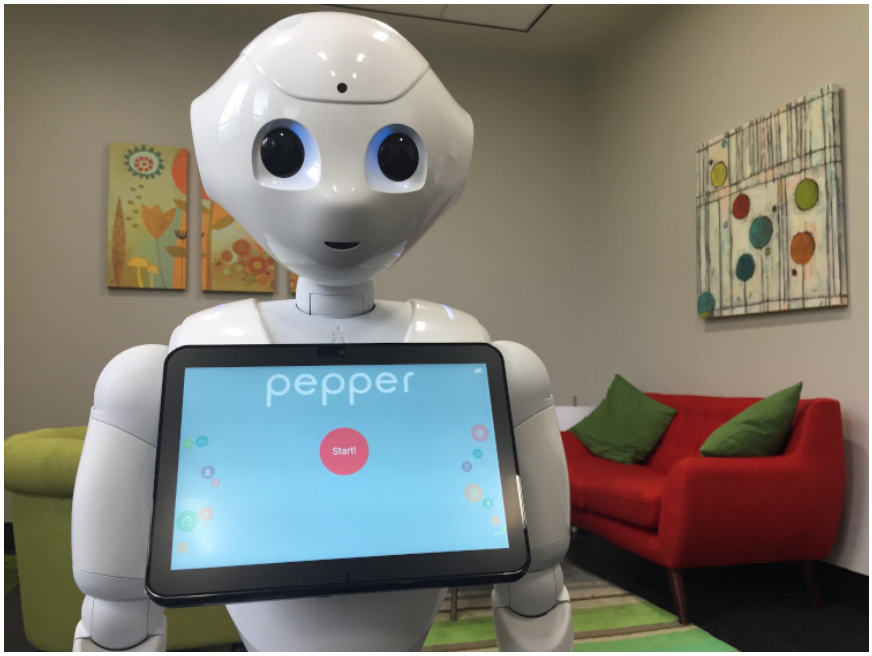
> Performances are actions. As a discipline, performance studies take actions very seriously in four ways. First, behavior is the 'object of study' of performance studies…Second, artistic practice…the relationship between studying performance and doing performance is integral. Third, fieldwork…participant observation is a way of learning about cultures other than that of the fieldworker [and] Fourth, it follows that performance studies is actively involved in social practices and advocacies…" (Schechner 2013, p. 1-2).

It was with these conceptual ideas that this manuscript develops a relational interaction between Pepper the robot and a human participant with IDD, examining an emerging and modern performance platform of humans and human-like machines. In this way, this research study continues the exploration of performance as 'open' and 'always changing.' Schechner's work is known globally and has been applied to emerging robotic or computer platforms, including a non-human virtual influencer, such as 'il Miquela' (Black, 2020) and a *spidercrab* robot drawing on performance theory for authenticity in the design process (Wallis et al, 2010); however, to the best of our knowledge, our team notes that our pilot study is novel and that a humanoid robot has not been used as a performance platform for respite and healthcare aspects for young adults with IDD and their older caregivers.

Movement

In our research study the movement of the robot was programmed for a one-on-one (with research personnel co-located) performative event utilizing Schechner's use of ritual and everyday life actions with the participant. The human-robot event lasted approximately 11 – 15 minutes. As the participant entered the room, Pepper the robot occupied the space in the center of the Emotional Robotics Living Lab (ERLL fig. 1) in a physical representation of stillness and quiet respect. We did not have the robot move toward the participant, but rather allowed the participant to physically move toward the robot. This physical agency on behalf of the participant we believed would comfort the potential nervousness of the participant. We were hopeful that the previously distributed hard-copy image of Pepper and the video of Pepper with trusted adults would also calm any anxiety the participant may have felt being introduced to the robot for the first time. As Pepper is relatively large (65 lbs, 4 ft) with joints that could potentially pinch, we outlined an area which the participant should not cross into. However, we programmed a physical greeting of a fist bump for the participant to perform, should they wish to physically interact a greeting with the robot. The fist bump was introduced and performed by a member of the research team before the participant was asked if they wanted to interact with the robot. After the performative fist bump greeting, the movement portion of our performance commenced and there was a space change from the middle of the Emotional Robotics Living Lab to a corner of the ERLL, where a couch was situated, and the participant was asked to sit. This movement programming directly related to the focus group discussions with the caregivers. During the discussion, the caregivers asked if the robot could initialize a physical movement from one space to another and ask the participant to join them. The movement path was approximately 7 feet in length and the robot rolled first before the participant to indicate the way. After the story, the robot moved back to the center of the room, and requested the participant to follow and engage in games including a theatre

game titled mirroring, and three free-form dances which included playing air guitar, air saxophone, and Tai Chi. The participant was encouraged to move with improvisational expression to the dance air instrument events. At the end of the performance event, the robot thanked the participant for coming to the ERLL and for interacting with them through story, music, and movement.



Pepper the robot in the Emotional Robotics Living Lab

Greeting

The first physicalization the team created was that of a friendly greeting between machine and human. In Schechner's theory this could be described as ritual, as greetings are performative and happen at specific times between humans as they introduce or reintroduce themselves. "Rituals are performative: they are acts done; and performances are ritualized: they are codified, repeatable actions" (Schechner, 1994). The research team wanted to create a ritual of introduction that would be familiar and comforting to the participant. A ritual in which the participant chooses the degree of interaction through their proximity to the robot. In this way we were introducing a sense of ritualistic greetings from a western culture that mirrored their own experience and honored their agency and identity. This ritual was performed as an initial act and was meant to bond the participant to the robot. The greeting ritual developed in our study can also be

read performatively by Schechner and defined as, "Rituals emphasize efficacy…forming and cementing social relations…Rituals are performed at a specific location…they mark days and places of importance…and are hung on life's hinges where individual experience connects to society" (Schechner, 1994). The team's decision to understand the initial greeting as a ritualistic act was further served by placing the study in a 'living lab' space. The ERLL serves as a bridge from a traditional research space to a potentially human-inhabited space, e.g., a home. The lab was originally designed with future research in mind allowing participants to view the space as a proxy for their own homes which one day may house robots. In developing the space for the study, a ritualistic lens can be created featuring the lab also as a center for a ceremonial gathering, not unlike the every-day performance in our homes as well as the performances that occur in a theatre space. Using Schechner's theory, the potential of the human-robot interaction that occurs as performance in a ceremonial centre, was created in the ERLL lab. This research performative event may have, "functioned in at least the following ways: (1) to create or maintain friendly relations; (2) …to exchange goods, food, mates, techniques; (3) to show, enjoy, and exchange dances, songs, stories… People came to a special place, did something that could only be done at that place, something that could be called 'theatre' (and/or 'dance and music') and went on their separate ways" (Schechner, 1994). In this way, the team created a space for the participants to interact and for the caregivers to watch the interaction that was engaging, ceremonial, and familiar. It is a space that was new to the humans involved, but ritualistic in its conventionality. As our interdisciplinary team co-created the ceremonial ritual of the space for the participant and the robot, it was clear, the space and interaction impacted the culture, experience, behavior and understanding of the young adult and older caregiver. Physical engagement for the participant included a mirroring movement, listening to a shared narrative, and expressing their own movement techniques with the robot as a partner. Affective responses from the older caregivers were sensitive, receptive, and empathetic. The older caregivers were positively impacted by the interaction and echoed the future potential for respite the robot could potentially afford. The lab provided a social space to communicate, to learn, to interact with new technologies, to create or maintain friendly relations and to exchange dance and story narratives between humans and machines. Ritual performance was significant to our research study specifically to create a space that the participant may interact in a human-like and authentic manner with a non-human partner.

The Emotional Robotics Living lab

Moving through the ERLL – an Environmental Theatre model

Two distinct physicalizations during the study are the movement toward the couch for the participant to sit and the movement away from the couch to play a series of games in the center of the room. This paradigm of a leader and a follower, the robot, and the participant, was initially suggested at a focus group for repetitive behavior; however, Schechner's performance theory can also accurately speak to the movement being a deeper connection for the participant in the space. Schechner describes movement in the theatre space as a pattern of understanding environmental theatre (Schechner, *Enviro* 1994). As defined by Britannica, environmental theatre is a 1960s co-created theatre that emphasized the elimination between the actor and the audience (Environmental 2022). As a founder of this theatre genre, Schechner encouraged a sensory and multimodal approach to physically moving through a space, "Western thought accustoms us to theatre space visually. But acoustic, thermal, tactile, olfactory and brain-work maps can also be drawn" (Schechner, *Enviro* 1994). Schechner's theory allows for more human experience than the primary visual sense with which to process space. By adding the additional sensory modalities to our experiment, a potential for deeper engagement can be postulated. If the study did not move to the couch

and back, what modalities of expression might have been limited to the participant by remaining in a static pose. By creating a performance that took the social machine from one portion of the space to another, the participant's desire to connect with the robot, per Schechner, may have become more intense, as more sensory platforms were added beyond the primary visual sense. Schechner's performance theory and our desire to examine a connected interaction between a robot and a young adult was positively impacted through an analysis of multiple sensory objectives. "In environmental theatre there are endless degrees of attention, subtle gradations of involvement. The experience of being a spectator… is not smooth, but a rollercoaster" (Schechner, *Enviro* 1994).

Movement Games

After the original speech narrative at the couch between the young adult and the robot, the young adult is asked to move to the center of the room for mirroring and dance games. These include a mirroring exercise, and free-form movement for air guitar, air saxophone, and Tai Chi interaction. The team purposefully chose the mirroring exercise to occur first as this exercise included a simulation of the robot leading the participant and we believed it would help bond the participant to the robot through movement and music. The music chosen was J. Strauss II, The Blue Danube waltz. The music was chosen for its gentle fluidity in its rhythm and pacing allowing the participant to easily follow the robot's movements accompanied by aesthetically pleasing music. The mirroring game, and theatre games in general, are a demonstrable theatrical exploration for communication. Viola Spolin, founder of iconic theatre games and improvisational exercises, adds, "Theater Games are a process applicable to any field, discipline, or subject matter which creates a place where full participation, communication and transformation can take place" (Spolin). The goals of the interaction in our study between a social machine – Pepper – and our young adult participant, were similar to the goals of Spolin's mirroring and theatre exercises. The team hoped the theatrically based games would foster communication and creativity in the participant through the shared movement, leading to a simulation and interaction of a communal human-like experience. Humans do communicate with each other, perform rituals together, and dance together; however, for our pilot study, the team believed the participant may also benefit from the addition of a communicative, social machine. The older adult caregivers were aware they may age out of the caring for their adult child, so the study offered the potential for a future companion for their children. A human-like creation of identity, culture, and friendship that considers companionship, not only with an engaged human, but with an engaged social machine, specifically for a person with IDD.

Original Narrative and Speech

Up to this point, our experiment has discussed Richard Schechner's performance theory from a movement perspective. The article has discussed ritualized movement as in a greeting and movement through a ceremonial space that potentially can encourage a more nuanced sense of the self in the space as it addresses multiple sensory modalities. The experiment now turns to the examination of the original story and the quality of the social machine's communication and narrative elements.

The original narrative story of the study featured literary and affective components of resilience and companionship between a friendly robot and a young adult with IDD. The narrative story was delivered by Pepper and included images on its tablet incorporating the complex feelings that may occur before a major life-event (e.g., first day of school). The original story below is produced in its entirety:

> It was a beautiful morning, and the sun was shining and birds chirping happily. It was my first day of school. I was so excited to meet new friends and to learn many new things. But I was a little scared too.
>
> When I arrived at school, I became a little anxious. It seemed like everyone did things different than me. The teacher tried to help, but I was still a little sad. This continued for a few days.
>
> Suddenly, one fine day, a friend like you, showed up and we ate lunch together. The music you played made me feel happy. I felt like a superhero and was happy being with you. I enjoyed moving, dancing, and playing with you, my friend. And I liked this robot dance. When I went to school the next day. I talked to the teacher and even smiled at the other students. That felt good, too. My friend and I do many things. We even go shopping for groceries. There are days when I am a little down, but friends like you always make it better. That was my happy little story. I would love to hear a story about you, now. Would you like to tell me a story? You can say yes or no (Greer, et al., 2021).

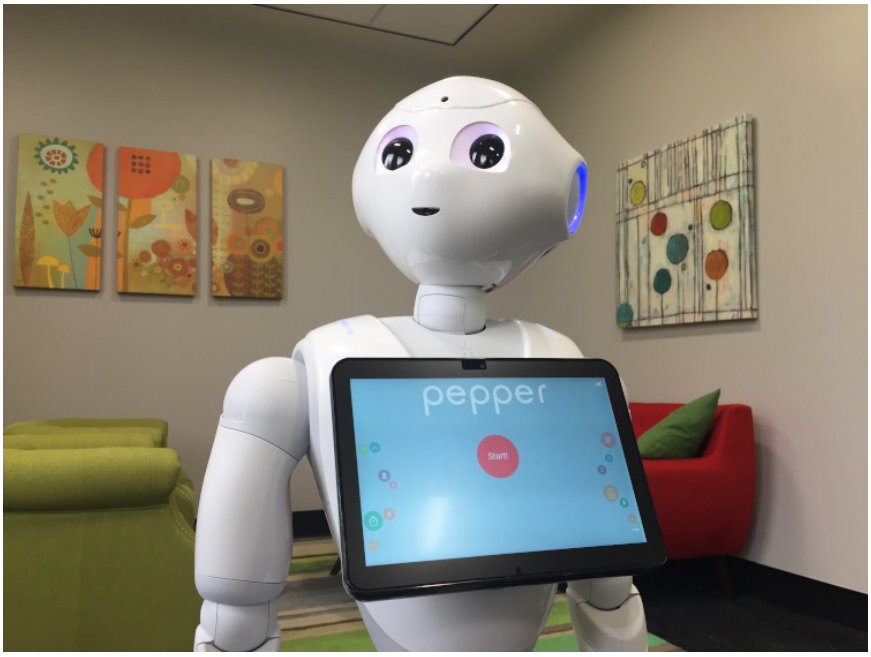
The original narrative used a first-person point of view emanating from a robotic platform. The narrative was programmed from the frame of reference of an embodied performer who was not human yet empathizes with the anxiety, excitement, and friendship in a major life event such as the first day of school. In this way, the experiment used a literary mirroring technique to help the participant potentially feel connected to the robot. At the end of the narrative the robot encouraged the care recipient to tell their own story and express their own personal narrative. Robotic storytelling has been examined in recent research studies including *Emotional Storytelling Using Virtual and Robotic Agents* which found physical attendance between the robot and the participant produced more interest and/or attention from the participants (Costa, et al, 2018). Literature presents a

robot that works with participants to develop their personal narratives (Plaisant, et al., 2000), as well as the acceptance of storytelling robots from a parental perspective, "[A storytelling robot's…] social and economic value is clear. Not every child has a caregiver with leisure time for storytelling" (Lin, et al., 2021). This final reference may be blunt, yet the truthfulness of its reality is striking. Social robots can be programmed to read stories and to act out emotional narratives for the engagement and companionship of the human interacting with them. In doing so, a new sense of human identity, culture, and experience may emerge. Our experiment begins to examine performative analysis as humans and social robots move toward deeper social relationships. In our study the older caregivers were acutely aware of the straightforward need for companionship for their young adult children and were positive regarding the movement and narrative possibilities a social robot may bring to them.

Regarding the timbre of a mechanized voice comparative to a human voice, some research finds participants do not prefer a roboticized voice (Costa, et al, 2018). Although, the Pepper robot can change the tonal range of its speech. The team programmed a higher tone to accommodate the young adult's sense of communicating with a peer or a friend, rather than a deeper, older, potentially more authoritarian, tone of voice. The theatrical relational elements were purposeful to create an engaging connection between the robot and the care recipient. The robot's voice is not gender-specific and although the gender of the Pepper robot has been described as both male and female, Softbank Robotics genders its robotic units as "it." The speed of the robot's speech is also programmable, and the team slowed down the pacing of the script to facilitate cognitive understanding.

Conclusion

Performance studies and robotics are still at an emerging intersection. Our study incorporated interdisciplinary precepts as an experiment to solve a need impacting persons with IDD and their caregivers. The interdisciplinary work presented in this manuscript demonstrate that music, narrative, movement, and performance techniques are indeed meant to express the human condition; yet also to heal the human soul – and that technology can collaborate with this goal. The purposeful inclusion of Schechner's performance techniques allows a more subtle distinction of human behavior and connection to be transferred from its original human-human model to a human-robot model of companionship. In doing so, the research remains as Schechner states 'open' and 'always changing' to the needs of modern humans. When social machines perform for humans, the future of performance studies and social robotics can become less of a harsh provocation and more of an essential collaboration.



Works Cited

Asimov, Isaac. *I, Robot*. 2020. Del Ray, New York.

Čapek, Karel, *RUR: Rossum's Universal Robots*. Aventinum, 1920.

Beer, Jenay. M., Cory-Ann Smarr, Tiffany L. Chen, Akanksha Prakash, Tracy L. Mitzner, Charles C. Kemp and Wendy A. Rogers. "The domesticated robot: design guidelines for assisting older adults to age in place." *Proceedings of the seventh annual ACM/IEEE international conference on Human-Robot Interaction (HRI '12)*. Association for Computing Machinery, New York, NY. 10.1145/2157689.2157806

Black, T. C. "Just a Robot Keeping It Real: Lil Miquela, Instagram, and the Performance of Authenticity". *Tba: Journal of Art, Media, and Visual Culture*, vol. 1, no. 1, Nov. 2020, pp. 44–59, https://ojs.lib.uwo.ca/index.php/tba/article/view/7968.

Bricout, John, Julienne Greer, Noelle Fields, Ling Xu, Priscila Tamplain, Kris Doelling and Bonita Sharma (2021) "The 'humane in the loop': inclusive research design and policy approaches to foster capacity building assistive technologies in the COVID-19 era." *Assistive Technology*. DOI: 10.1080/10400435.2021.1930282

Brito, Lilian, Valderi Abreu de Lima, Luis Paulo Gomes Mascarenhas, Jorge Mota, and Neiva Leite. "Physical activity, eating habits and sleep during social isolation: from young adult to elderly." *Revista Brasileira de Medicina do Esporte* 27 (2021): 21-25.

Carros, Felix, Isabel Schwaninger, Adrian Preussner, Dave Randall, Rainer Wieching, Geraldine Fitzpatrick, and Volker Wulf. "Care workers making use of robots: Results of a three-month study on human-robot interaction within a care home." (2022). *CHI '22*, April 29-May 5, 2022, New Orleans, LA. https://doi.org/10.1145/3491102.3517435.

Child, Stephanie and Leora Lawton. "Loneliness and social isolation among young and late middle-aged adults: Associations with personal networks and social participation." *Aging & mental health* 23.2 (2019): 196-204.

Clair, Ruta, Maya Gordon, Matthew Kroon, and Carolyn Reilly. "The effects of social isolation on well-being and life satisfaction during pandemic." *Humanities and Social Sciences Communications* 8.1 (2021): 1-6.

Costa, Sandra, Alberto Brunete, Byung-Chull Bae, and Nikolaos Mavridis. "Emotional Storytelling using virtual and robotic agents." *International Journal of Humanoid Robotics,* 2018 15:03. https://www.worldscientific.com/doi/abs/10.1142/S0219843618500068.

de Graaf, Maartje, Somaya Ben Allouch, Tineke Klamer. "Sharing a life with Harvey: Exploring the acceptance of and relationship-building with a social robot." *Computers in Human Behavior*, 43, 1-14 (2015). https://doi.org/10.1016/j.chb.2014.10.030.

De Jong, Dorina, Ruud Hortensius, Te-Yi Hsieh, and Emily Cross. "Empathy and Schadenfreude in Human-Robot Teams." *J Cogn*. 5/4(1):35. (2021). https://doi.org/10.5334/joc.177.

Di Nuovo, Alessandro, Daniela Conti, Grazia Trubia, Seraphino Buono, and Santo Di Nuovo. "Deep Learning Systems for Estimating Visual Attention in Robot-Assisted Therapy of Children with Autism and Intellectual Disability." *Robotics*. 2018; 7(2):25. https://doi.org/10.3390/robotics7020025.

Greer, Julienne, John Bricout, Ling Xu, Noelle L. Fields, Priscila M. Tamplain, Gajendran Palaniyandi, Bonita Sharma, and Kristen L. Doelling. "Theatre and Robots – Envisioning interdisciplinary collaborations beyond the stage." Wireless RERC State of the Technology (SoT), Georgia Tech, May 2021,

"Environmental Theatre." *Britannica.* Accessed July 22, 2022. https://www.britannica.com/art/environmental-theatre.

García-Corretjer, Marialejandra, Raquel Ros., Roger Mallol and David Miralles. "Empathy as an engaging strategy in social robotics: a pilot study." *User Model User-Adap Inter* (2022). https://doi.org/10.1007/s11257-022-09322-1.

Her. Directed by Spike Jonze. Warner Bros. Pictures, 2013

Hirata, Oriza. *I, Worker.* The Japan Foundation and Japan Society, 2013. https://www.youtube.com/watch?v=58MlpKX-JWQ

Hopko, Sarah, Jinkung Wang, and Ranjana Meta. "Human factors considerations and metrics in shared space human-robot collaboration: A systematic review." *Frontiers in Robotics and AI*, 9 (2022). DOI.10.3389/frobt.2022.799522

Jecker, Nancy S. "You've got a friend in me: sociable robots for older adults in an age of global pandemics." *Ethics Inf Technol* 23**,** 35–43 (2021). https://doi.org/10.1007/s10676-020-09546-y

Johansson-Pajala, Rose-Marie, Kirsten Thommes, et al. "Care Robot Orientation: What, Who and How? Potential Users' Perceptions." *Int J of Soc Robotics* 12, 1103–1117 (2020). https://doi.org/10.1007/s12369-020-00619-y.

Garland-Thomson, Rosemarie. "Disability Bioethics." *The Disability Bioethics Reader*. 2022, Routledge. Reynolds, J.M., & Wieseler, C. (Eds.). DOI: https://doi.org/10.4324/9781003289487

Kim, Ki.Joon, Eunil Park, S. and Shyam Sundar. "Caregiving role in human–robot interaction: A study of the mediating effects of perceived benefit and social presence." *Computers in Human Behavior*, 29 (4), 1799-1806. (2013). https://doi.org/10.1016/j.chb.2013.02.009.

Lehourx, P. and Grimard, D. "When robots care: Public deliberations on how technology and humans may support independent living for older adults." *Social Sci & Medicine. Sci Direct*. Vol 211, Aug. 2018, pg. 330-337. https://doi.org/10.1016/j.socscimed.2018.06.038

Leite, Iolanda, Andre Pereira, Samuel Mascarenhas, Carlos Martinho, Rui Prada, and Ana Paiva. "The influence of empathy in human–robot relations." *International Journal of Human-Computer Studies*, 71(3), 250-260. (2013). https://doi.org/10.1016/j.ijhcs.2012.09.005.

Lin, Chaolan, Selma Šabanović, Lynn Dombrowski, Andrew D. Miller, Erin Brady, Karl F. MacDorman. "Parental Acceptance of Children's Storytelling Robots: A Projection of the Uncanny Valley of AI." *Frontiers in Robotics and AI*. Vol 8, 2021. https://www.frontiersin.org/article/10.3389/frobt.2021.579993

Pino, Maribel, Melodie Boulay, Francois Jouen, and Anne-Sophie Rigaud. "Are we ready for robots that care for us?" Attitudes and opinions of older adults toward socially assistive robots." *Frontiers in aging neuroscience* 7 (2015): 141.

Plaisant, Catherine, Allison Druin, Corinna Lathan, Kapil Dakhane, Kris Edwards, Jack Maxwell Vice, and Jaime Montemayor. "A storytelling robot for pediatric rehabilitation". 2000. In *Proceedings of the fourth international ACM conference on assistive technologies*. Association for Computing Machinery, New York, NY 50-55. https://doi.org/10.1145/354324.354338.

McGinn, Conor, Eamonn Bourke, Andrew Murtagh, et al. "Meet Stevie: A Socially Assistive Robot Developed Through Application of a 'Design-Thinking' Approach." *J Intell Robot Syst* 98**,** 39–58 (2020). https://doi.org/10.1007/s10846-019-01051-9.

McIntyre, Laura Lee, "Family-based practices to promote well-being." *American Journal on Intellectual and Developmental Disabilities,* 125, no. 5 (2020): 349-352.

Metropolis. Directed by Fritz Lang. Erich Pommer, Prod., 1927.

Mitter, Natasha, Ali Afia, Katrina Scior. "Stigma experienced by families of individuals with intellectual disabilities and autism: A systematic review," *Research in Developmental Disabilities*, 89, (2019): 10-21.

Nakamura, Mio, Kohei Ikeda, Kuzuki Kawamura, and Misato Nihei "Mobile, Socially Assistive Robots Incorporating Approach Behaviour: Requirements for Successful Dialogue with Dementia Patients in a Nursing Home." *J Intell Robot Syst* 103**,** 45 (2021). https://doi.org/10.1007/s10846-021-01497-w.

Papadopoulos, Irena, Christina Koulouglioti, Runa Lazzarino, Sheila Ali. "Enablers and barriers to the implementation of socially assistive humanoid robots in health and social care: a systematic review." *BMJ open* vol. 10,1 e033096. 9 Jan. 2020, doi:10.1136/bmjopen-2019-033096

Robaczewski, Adam, Julie Bouchard, Kevin Bouchard, and Sebastien Gaboury. "Socially Assistive Robots: The Specific Case of the NAO." *Int J of Soc Robotics* 13, 795–831 (2021). https://doi.org/10.1007/s12369-020-00664-7.

Etemad-Sajadi, Reza, Antonin Soussan, and Theo Schöpfer. "How Ethical Issues Raised by Human–Robot Interaction can Impact the Intention to use the Robot?" *Int J of Soc Robotics* 14**,** 1103–1115 (2022). https://doi.org/10.1007/s12369-021-00857-8.

Saunderson, Shane and G. Nejat. "How Robots Influence Humans: A Survey of Nonverbal Communication in Social Human–Robot Interaction." *Int J of Soc Robotics* 11**,** 575–608 (2019). https://doi.org/10.1007/s12369-019-00523-0.

Schechner, Richard. "Ritual and Performance." *Companion Encyclopedia of Anthropology*. 1994: 613-647.

Schechner, Richard and Sarah Brady. "Performance Studies: An Introduction." Pg. x, 1, 2. Oxon: Routledge, 2013.

Schechner, Richard. "Environmental Theater: An Expanded New Edition Including 'Six Axioms for Environmental Theater'", Applause, New York, 1994.

Shukla, Jainendra, Julian Cristiano, Joan Oliver and Domenec Puig. "Robot assisted interventions for individuals with intellectual disabilities: impact on users and caregivers." *International Journal of Social Robotics* 11.4 (2019): 631-649.

Spolin, Viola. "Birth of Viola Spolin, creator of Theater Games." *Jewish Women's Archive*. Accessed July 22, 2022. https://jwa.org/thisweek/nov/07/1906/this-week-in-history-birth-of-viola-spolin-creator-of-theater-games.

Tanioka T, Tomoya Yokotani et al. "Development Issues of Healthcare Robots: Compassionate Communication for Older Adults with Dementia." *International Journal of Environmental Research and Public Health*. 2021; 18(9):4538. https://doi.org/10.3390/ijerph18094538.

Tapus, Adriana., Cristian Tapus and Maja Mataric. "The use of socially assistive robots in the design of intelligent cognitive therapies for people with dementia," *2009 IEEE International Conference on Rehabilitation Robotics*, 2009, pp. 924-929, DOI:10.1109/ICORR.2009.5209501.

Tavakoli, Mahdi, Jay Carriere and Ali Torabi. "Robotics, smart wearable technologies, and autonomous intelligent systems for healthcare during the COVID-19 pandemic: An analysis of the state of the art and future vision." *Advanced Intelligent Systems*, 2, 2000071(2020). https://doi.org/10.1002/aisy.202000071.

Van Maris, Anouk, Nancy Zook, and Sanja Dogramadzi, et al. "A New Perspective on Robot Ethics through Investigating Human–Robot Interactions with Older Adults." *Appl. Sci.*, 11 10136 (2021). https://doi.org/10.3390/app112110136.

Van Wingerden, Evelien, Emilia Ivanova Barakova, et al. "Robot-mediated therapy to reduce worrying in persons with visual and intellectual disabilities." Journal of Applied Research in Intellectual Disabilities, 34(1), 229-238. https://doi.org/10.1111/jar.12801.

Wang, Qiao, et al. "Computational Model of Robot Trust in Human Co-Worker for Physical Human-Robot Collaboration." *IEEE Robotics and Automation Letters* 7.2 (2022): 3146-3153.

Wallis, Mick. Sita Popat, Joslin McKinney, John Bryden, David C. Hogg. "Embodied conversations: performance and the design of a robotic dancing partner." *Design Studies,* Volume 31, Issue 2, 2010, Pages 99-117, https://doi.org/10.1016/j.destud.2009.09.001.

Williams, Andrew B., Rosa M. Williams, Ronald Moore, M. McFarlane. "AIDA: a social co-robot to uplift workers with intellectual and developmental disabilities." *2019 14th ACM/IEEE International Conference on Human-Robot Interaction (HRI)*. IEEE, 2019.

Xu, Ling, Julienne Greer, Noelle Fields, Prisila Tamplain, John Bricout, Bonita Sharma, and Kristen Doelling. "Supporting Older Family Caregivers of Young Adults with IDD: A Pilot Program with Socially Assistive Robotics," *Innovation in Aging*, Volume 5, Issue Supplement_1, 2021, Page 807, https://doi.org/10.1093/geroni/igab046.2971.