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Abstract

As virtual and augmented environments become increasingly central to everyday social interaction, supporting emotionally sustainable and effective communication in these spaces has emerged as a critical design challenge. Prior research has predominantly focused on how individuals' own avatars influence behavior, while the role of interaction partners' appearance in shaping emotional experience and performance remains underexplored. Addressing this gap, this dissertation adopts an individual-level experimental approach to examine how adjusting the appearance of others can regulate interaction experiences in mediated contexts.

Two empirical studies form the foundation of this work. Study 1 investigates high-pressure oral communication in video-mediated interviews, examining how different forms of interaction partner appearance—familiar faces, stylized representations, and neutral strangers—affect perceived social presence, state anxiety, attentional engagement, verbal behavior, gaze patterns, and physiological responses. Results show that familiar appearances reduce anxiety and promote deeper engagement, whereas stylized faces disrupt emotional interpretation and offer limited relief from evaluative stress.

Building on these findings, Study 2 extends the investigation to embodied interaction through augmented reality (AR) exercise companions. Across three experiments, the results demonstrate that emotionally resonant AR companions enhance enjoyment, reduce perceived pressure, and improve physical performance. Familiar avatars foster psychological safety through emotional bonding, while stylized companions support motivation and comfort when aligned with users' aesthetic preferences. Qualitative interviews further reveal that users assign distinct social and functional roles to avatars based on appearance, favoring companions that convey supportive presence without surveillance or judgment.

Together, these studies identify appearance (familiarity and liking as affective channels) mediated modulation of social presence as a unifying mechanism linking emotional experience and performance across cognitive and physical tasks. By extending social presence research beyond self-avatar effects to interaction partner appearance, this dissertation contributes theoretical insight into interpersonal regulation in mediated interaction. The findings also offer practical design implications for communication platforms, AR fitness systems, and future AI-driven companions, pointing toward more adaptive, empathetic, and psychologically supportive virtual communities.

Keywords: Avatar appearance; Social presence; Augmented reality; Human–computer interaction; Emotional experience; Performance.