Inclusive Networking with Socially Assistive Robots (SAR): The Role of Proactiveness and Neurodiversity

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Introduction

For many attendees of professional events, networking is the primary reason for participation. Yet numerous individuals struggle to initiate and sustain interactions, particularly those who are neurodiverse. For instance, people with attention deficit hyperactivity disorder (ADHD) often experience social anxiety in professional conference settings (Jakobsson Støre et al., 2024). These challenges highlight the need for supportive tools that facilitate social engagement. Socially assistive robots (SAR), defined as intelligent robotic systems that assist with socially interactive tasks (Umbrico et al., 2020), are emerging as promising solutions. A key inquiry raised by Umbrico is whether SARs should act proactively or wait passively during service encounters. However, little is known about proactive SAR design in professional networking contexts, particularly for neurodiverse participants. To address this gap, this study aims to examines whether proactive versus passive socially assistive robots support influences attendee networking intention with others, mediated by perceived social-emotional support and moderated by ADHD status. The findings provide event planners with insights on leveraging technology to foster inclusive networking, ensuring diverse participants feel supported and empowered to connect.

Literature Review

Service proactivity, defined as voluntary and self-initiated behavior, has been shown to positively influence customer emotions and satisfaction (Xie et al., 2022). In a similar vein, proactive gestures by socially assistive robots, such as greeting or initiating conversation, can enhance perceptions of their intelligence, warmth, and social competence (Zhang et al., 2024). These behaviors can help reduce social anxiety (Lajante et al., 2023) and, in turn, may increase attendees' perceived social-emotional support. Thus, we hypothesize that: H1: Proactive (vs. passive) socially assistive robots will increase attendees' perceived emotional support.

While proactive SAR can reduce the stress of social interactions, this approach may not suit all individuals. For instance, neurodiverse individuals with ADHD, whose inattention, difficulty recognizing emotions, and hyperactivity hinder social skills (Ryan et al., 2022), may find proactive interruptions disruptive, as these may slow down their responses and hinder task completion (Sidlauskaite et al., 2020). In such cases, passive robot behavior may provide greater social-emotional support for individuals with ADHD than for those without. Accordingly, we propose: H2: When socially assistive robots are passive, individuals with ADHD will perceive higher emotional support than non-ADHD individuals.

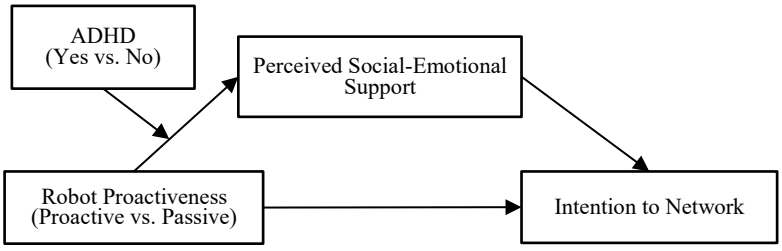

Figure 1. Conceptual Framework

Evidence from health and education contexts shows that the proactive support of socially assistive robots alleviates emotional discomfort and promotes participants' human-to-human social interactions (Chita-Tegmark & Scheutz, 2021). In event tourism, robot proactiveness has also been found to enhance customers' perceived social interactivity, thereby increasing attendees' adoption intentions for networking (Zhang et al., 2024). Extending these findings to professional event settings, we argue that proactive SAR facilitates attendees' networking experiences through perceived social-emotional support, with H3: Perceived social-emotional support mediates the relationship between socially assistive robots' proactiveness and attendees' intention to network. Based on the above discussions and hypotheses, Figure 1 illustrates the research conceptual model.

Methods

To test the effectiveness of robot proactiveness in supporting business event networking, especially for attendees with ADHD, we conducted a 2 (Proactive vs. Passive Robot) × 2 (ADHD: Yes vs. No) experiment with 323 Prolific participants. The sample averaged 40.1 years old; 55% male; 64% married; 46% held a bachelor's degree; and 60% reported incomes above $75,000. Participants were randomly assigned to either a proactive condition, where the robot greeted, suggested connections, and led introductions, or a passive condition, where attendees initiated interactions and the robot waited for instructions.

Analysis

Manipulation and realism checks. A Chi-square test confirmed the effectiveness of the proactiveness manipulation, showing a significant difference between proactive and passive scenarios (χ^2 [1, N=323]=243.36, p<0.001). Participants rated scenario realism (M=4.24), significantly above the midpoint (t [322]=35.28, p<0.001). *Hypotheses testing.* A two-way analysis of covariance (ANCOVA) was conducted to test the hypotheses. Results showed a significant interaction between SAR's proactiveness and ADHD (F=5.97, p=0.02). Specifically, participants in the proactive condition reported higher emotional support than those in the passive condition ($M_{proactive}$=4.37, $M_{passive}$=3.86; F=42.89, p<0.001), supporting H1. In addition, when the SAR was passive, attendees with ADHD reported higher emotional support than those without ADHD (M_{ADHD}=4.01, $M_{non\text{-}ADHD}$=3.70; F=7.79, p<0.01), which confirms the hypothesized moderating effect, supporting H2.

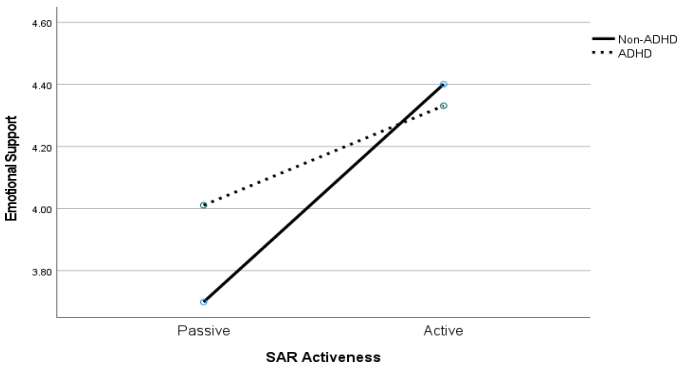

Figure 2. Results of the Two-way Interaction between Robot Proactiveness and ADHD status

To test the moderated mediating role of emotional support, we used PROCESS Model 7 (Hayes, 2017). Results showed a significant effect (index = –0.10, 95% CI=[–0.23, –0.02]). Specifically, when the socially assistive robot was

proactive, the mediating effect of emotional support between ADHD status and networking intention was stronger (index=0.19, 95% CI=[0.08, 0.33]), supporting H3.

Conclusion and Discussion

Our findings show that proactive SARs are generally effective for facilitating networking, but individuals with ADHD may not benefit equally. For these participants, proactive gestures did not significantly enhance perceived social-emotional support compared to passive ones. One possible explanation is that proactive cues may feel intrusive, distracting, or overwhelming due to attentional regulation challenges, whereas passive SARs may afford ADHD participants greater autonomy and control in networking interactions. This finding challenges the assumption that "more proactive is always better" and highlights the importance of nuanced design.

Theoretically, the study extends human-robot interaction research by identifying social-emotional support as the key mechanism linking robots' behavior to networking intentions, while showing that its strength depends on ADHD status. It also contributes to the growing body of neurodiversity-aware design literature in hospitality, events, and professional development. Practically, the findings highlight the importance of inclusive, adaptive robot design. Conference organizers may leverage proactive socially assistive robots to encourage networking among most attendees but should recognize their limitations for ADHD participants. For robot designers, findings suggest embedding user-sensitive adaptability so that robots can adjust their behaviors in real time to meet diverse needs.

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