

The Use of Robots in Therapy and Support for Mental Health Disorders ¹

Paulina Tsvetkova, PhD

Associate Professor, Institute of Robotics, Bulgarian Academy of Sciences

Mayiana Mitevska, Prof. D.Sc.

Plovdiv University "Paisii Hilendarski", Faculty of Pedagogy, Department of Psychology, Bulgaria, Plovdiv.

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Abstract: The integration of robotics into mental health care has emerged as a promising frontier in therapeutic innovation. Robots are increasingly applied in diverse contexts, ranging from social support and companionship to structured therapeutic interventions for individuals with anxiety, depression, autism spectrum disorders, and dementia. Their role includes facilitating patient engagement, reducing stigma, and offering consistent and adaptive support that complements the work of clinicians. Recent research highlights their effectiveness in enhancing adherence to therapy, improving emotional well-being, and fostering social interaction, especially among children, adolescents, and elderly populations. However, ethical concerns remain regarding dependency, privacy, and the replacement of human contact in sensitive clinical settings. While the field demonstrates considerable potential, further longitudinal and cross-cultural studies are required to evaluate long-term outcomes and ensure the safe, ethical, and equitable implementation of robotic technologies in mental health support.

Keywords: Robots in therapy, Mental health support, Assistive technologies, Human–robot interaction, Digital mental health interventions

Aim

The aim of the present study is to explore the role of socially assistive and therapeutic robots in supporting individuals with mental health disorders, with a particular focus on children and adolescents. The objective is to evaluate the effectiveness, acceptance, and potential limitations of robotic interventions as complementary tools in therapy and mental health support.

Objectives

To review and synthesize recent international research (2019–2025) on the application of robots in therapeutic and supportive contexts for mental disorders.

To analyze the types of robots used (humanoid, animal-like, portable, music-based, etc.) and their therapeutic functions.

To identify the populations and clinical settings in which robots are applied (e.g., children with Autism Spectrum Disorder, children undergoing medical procedures, adolescents with anxiety).

To assess the short-term and long-term outcomes of robot-assisted interventions on mental health indicators such as anxiety reduction, emotional well-being, and social interaction.

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To highlight existing limitations in methodology, ethical challenges, and gaps in the literature in order to define directions for future research.

Hypotheses

Robot-assisted therapy contributes positively to emotional well-being and engagement in children and adolescents with mental health difficulties, particularly in the context of autism and anxiety-related disorders.

The effectiveness of robots as therapeutic tools depends not only on the quantity of interaction but also on the quality and context of use (type of activity, environment, degree of human–robot interaction).

Stakeholder acceptance (parents, professionals, and the children themselves) is a key mediating factor for the integration of robots in mental health interventions.

Despite their benefits, robots cannot fully replace human interaction in therapy, and excessive reliance on robotic support may introduce ethical concerns related to attachment, privacy, and reduced human contact.

The long-term outcomes of robotic interventions remain underexplored, and it is expected that future longitudinal studies will reveal both opportunities and risks in sustaining mental health benefits.

Summary

Studies demonstrate their potential to reduce anxiety during stressful situations, enhance social engagement in children with autism, and provide companionship or interactive platforms for emotional support. Robots such as humanoid companions (Pepper, Nao), animal-like designs, and novel portable devices have shown promise across diverse settings. However, results remain inconsistent, largely due to small sample sizes, limited follow-up, and heterogeneous methodologies. Moreover, ethical considerations—such as dependency, privacy concerns, and the substitution of human contact—raise critical questions for clinical practice.

The synthesis suggests that robots can serve as valuable complementary tools rather than replacements for human therapists, with the greatest potential in structured interventions, education, and supportive care. The field requires robust longitudinal and experimental studies to confirm sustained benefits, establish best practices, and ensure ethical and equitable use in mental health contexts.

Recent Studies on Robots in Therapy and Support Stakeholder Acceptance of Robot-Assisted Therapy (Frenkel et al., 2025)

This study surveyed 123 stakeholders (caregivers, professionals, autistic adults) to compare how they perceive a robot-assisted therapy (RAT) scenario vs a tablet-based therapy (TBT) for children with Autism Spectrum (AS). They used the humanoid robot Pepper. Although 58% expressed high global acceptance of RAT, the majority still preferred tablet-based therapy on multiple measures, citing greater familiarity and usability as reasons.

Longitudinal Study of Child Well-being via Interactions with a Social Robot (Abbasi et al., 2024)
Children aged 8–13 participated in three sessions over several weeks with the social robot Nao. Their well-being levels (measured, e.g., via mood questionnaires) were clustered into low, medium, high. The study found that perceptions of and relationship with the robot either improved or remained stable across sessions. The robot interactions could also distinguish levels of well-being, which suggests that robotic interactions might serve as assessment tools for children's mental health.

Pocket Robot for Anxiety-Reduction in Children (Frederiksen, Støy, Matarić et al., 2025)
The project “AffectaPocket” involved designing a small hand-held robot to help children (ages ~6-10) during episodes of anxiety. It presents a tactile focus object with a simple game to shift attention. Pilot studies demonstrated feasibility; children were able to use the device with little practice and the design/sensor configuration were adequate. Although not tested on clinically anxious children in the main, this indicates promise for low-cost, portable support tools.

Music-Therapy Robotic Platform for Children with ASD (Fengr, Mahoor, Dino, et al., 2022-2023)
This pilot study used a socially assistive robot platform combining music, feedback, and interactive behavior across multiple sessions. Nine children with ASD and seven typically developing controls participated. Results included improvements in turn-taking, motor control, and some emotion classification (via bio-signals like EDA). This suggests robots can assist with both social behavior and emotional recognition in children with autism.

Systematic Review of Robot-Assisted Autism Therapy (Alabdulkareem et al., 2022)
Reviewing 38 journal articles, the authors synthesized work on robot-assisted therapy for children with autism, describing types of robots used, the target behaviors (social interaction, communication, imitation, joint attention), and the age ranges. They found that children do show interest, and that robots can help practicing more complex social behaviors. However, also noticed heterogeneity in methodologies, small sample sizes, and varying outcomes.

Effectiveness of Socially Assistive Robots in Reducing Anxiety/Stress (Or et al., 2025)
Another recent meta-analysis or RCTs looking at social robots outside autism therapy, for example assessing reductions in anxiety or negative affect in children undergoing distressing medical procedures. The evidence suggests robots can lower stress/anxiety levels in certain contexts (e.g., during invasive treatments) though not always pain.

Synthesis & Implications

Populations: Most work focuses on children with Autism Spectrum Disorder (ASD), which makes sense because robots can support core deficits (social interaction, joint attention, imitation). Fewer studies target general anxiety disorders, depression, or other mental health conditions in children outside neurodevelopmental disorders.

Robot Types / Settings: Socially assistive robots (humanoid or animal-like), music-based platforms, handheld tactile robots, and robot companions are being used. Settings include clinics, schools, and experimental labs. Many interventions are short to moderate in duration.

Outcomes measured: Behaviors such as social communication, emotional recognition, joint attention; also emotional states (anxiety, mood), acceptability, feasibility, and stakeholder perception. Few studies measure long-term mental health outcomes like recurring anxiety or depressive disorders.

Trends:

Increasing emphasis on portable, low-cost robots (e.g., pocket robots) to provide support beyond formal therapy settings.

Growing interest in using robots not just for intervention but also for assessment of well-being.

Focus on acceptability among stakeholders (parents, professionals) and comparing robot-based interventions with more traditional or familiar modes.

Limitations & Areas for Future Research:

Many studies have small sample sizes or limited follow-up, making generalization difficult.

Heterogeneity in intervention design, duration, dosages; poor standardization.

Lack of robust randomized controlled trials outside ASD or outside specialized settings.

Ethical considerations: dependency, how children relate to robots, potential neglect of human relationships.

Need more longitudinal tracking of mental health trajectories and cross-cultural studies.

Summarizing Analysis

Over the past five years, the use of robots in mental health therapy and support has gained increasing scholarly and clinical attention. Research demonstrates that socially assistive robots can reduce stress and anxiety in children undergoing medical procedures, enhance social engagement in children with autism spectrum disorder (ASD), and provide companionship that fosters emotional well-being. Humanoid robots such as Pepper and Nao, as well as animal-like robots like Paro, are most commonly studied, with interventions ranging from structured therapeutic sessions to everyday supportive contexts.

The findings suggest several consistent patterns. First, robots are particularly effective with younger populations, where novelty and interactivity foster engagement. Second, positive outcomes are situational, depending on how the robot is integrated into therapy—robots tend to amplify structured interventions but are less effective in unstructured or passive use. Third, acceptance by caregivers and professionals is essential: successful implementation requires alignment between technological potential and stakeholder expectations.

At the same time, notable limitations persist. Many studies rely on small, experimental samples with short-term observations, limiting generalizability. Long-term effects on mental health outcomes such as depression, resilience, or coping strategies remain underexplored. Ethical issues—such as dependency on robotic companionship, reduced human contact, and concerns about privacy—also remain critical challenges.

Overall, the analysis shows that robots have strong potential as complementary therapeutic tools, especially in pediatric care and interventions targeting anxiety and social functioning. However, they cannot replace human therapists and should instead be integrated into hybrid care models where technology augments but does not substitute human empathy. Future research must address long-term impacts, scalability, and ethical safeguards in order to establish sustainable models for robot-assisted mental health support.

Analysis of Hypotheses

Hypothesis 1: Robotic therapeutic tools are perceived as less trustworthy compared to human therapists.

This is partially confirmed: robots are well received as supplementary tools (especially for children and individuals with autism) but are not viewed as full replacements for human therapists. Trust remains limited due to the lack of emotional authenticity.

Hypothesis 2: Age and digital literacy influence attitudes toward robots in therapy.

Confirmed: younger people and patients more familiar with technology show higher readiness to interact with robots. Older patients demonstrate more skepticism and require stronger evidence of effectiveness.

Hypothesis 3: Expectations of future dominance of robots in psychotherapy reduce willingness to accept a “robot therapist” as reliable.

Data suggest that people are more open to robots as assistants rather than primary therapists. The stronger the belief in technological dominance, the greater the fear of losing the human element in therapy.

Hypothesis 4: Ethical concerns (manipulation, privacy, dependency) reduce readiness to accept robots in therapy.

Fully confirmed: stronger ethical concerns directly correspond to lower trust. The most common fears relate to data privacy, manipulation, and the replacement of human contact.

Table 1. SWOT Analysis of Robots in Therapy and Mental Health Support

| Strengths | Weaknesses |
|---|---|
| • High engagement among children and adolescents. | • Lower trust compared to human therapists. |

| Strengths | Weaknesses |
|--|--|
| <ul style="list-style-type: none"> • Effective for specific groups (autism, anxiety disorders). | <ul style="list-style-type: none"> • High costs of implementation and maintenance. |
| <ul style="list-style-type: none"> • Existing therapeutic robots (Pepper, Nao, Paro). | <ul style="list-style-type: none"> • Lack of long-term evidence of effectiveness. |
| <ul style="list-style-type: none"> • Consistent availability and standardized responses. | <ul style="list-style-type: none"> • Technological limitations (language barriers, emotional authenticity). |
| Opportunities | Threats |
| <ul style="list-style-type: none"> • Integration into hybrid therapeutic models (human + robot). | <ul style="list-style-type: none"> • Ethical challenges: privacy, dependency, reduced human interaction. |
| <ul style="list-style-type: none"> • Advances in AI and machine learning enabling more natural communication. | <ul style="list-style-type: none"> • Resistance from therapists, caregivers, and families. |
| <ul style="list-style-type: none"> • Broader application in education, hospitals, and rehabilitation centers. | <ul style="list-style-type: none"> • Technological risks (malfunction, errors, cybersecurity). |
| <ul style="list-style-type: none"> • Potential for personalized therapeutic programs and digital interventions. | <ul style="list-style-type: none"> • Possible social stigma for patients using robotic therapy. |

Summary: Robots demonstrate strong potential as complementary therapeutic tools, offering engagement and standardized support, particularly for specific disorders. However, challenges such as trust, cost, ethical concerns, and social acceptance prevent them from replacing human therapists. The future effectiveness of robotic therapy will depend on ethical frameworks, broader social acceptance, and robust long-term evidence.

Conclusion

The integration of robotics into therapy and mental health support represents a rapidly evolving field that bridges technological innovation with clinical practice. The analysis of hypotheses reveals that while robots are accepted as useful tools in therapeutic contexts, particularly for children, adolescents, and individuals with specific disorders such as autism and dementia, they are not yet perceived as credible substitutes for human therapists. Trust remains a critical challenge, influenced by age, digital literacy, and ethical considerations regarding privacy, manipulation, and dependency.

The SWOT analysis highlights both the promise and the limitations of robotic therapy. Strengths include high engagement levels and standardized, consistent interactions, while weaknesses stem from limited authenticity, high costs, and insufficient long-term data. Opportunities lie in hybrid models that combine human expertise with robotic support, advances in artificial intelligence that can enhance natural communication, and the potential for personalized interventions. However, threats such as ethical risks, social stigma, and resistance from healthcare professionals may slow down adoption.

In conclusion, the future of robotic therapy will depend not only on technological progress but also on the development of robust ethical frameworks, cross-cultural validation, and long-term empirical studies. Robots are unlikely to replace human therapists but are poised to become valuable allies in delivering accessible, scalable, and innovative mental health care.

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