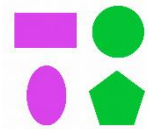
SUPPLEMENTARY MATERIAL

Supplementary Table 1. Initial exploratory survey on robot characteristics

Should the robot be medium-sized, like a stuffed toy? ☐ Yes ☐ No
What color should the robot be? ☐ Blue ☐ Pink
What shape should the robot have? 
What type of eyes do you like? 
Should the robot have legs or wheels? ☐ Legs ☐ Wheels
Should the robot have a voice? ☐ Yes ☐ No
What type of voice should the robot have? ☐ Female ☐ Male
What special functions should the robot have? Multiple-selection question. ☐ Dance ☐ Tell stories ☐ Play ☐ Play videos and music
What type of design do you prefer? ☐ Straight or angular ☐ Rounded
Should the robot have a screen on its face? ☐ Yes ☐ No
Would you prefer the robot to look like an animal or a human? ☐ Animal ☐ Human
Would you prefer the robot to look like a dog or a cat? ☐ Dog ☐ Cat

Supplementary Table 2. Aesthetic validation survey of the prototype

Do you like the robot's shape? ☐ Yes ☐ No
Why do you like or dislike it?
Which options do you prefer? Multiple-selection question (select two). ☐ Light blue ☐ Pink ☐ Dalmatian ☐ Cream and brown ☐ Similar to Scooby-Doo ☐ Rottweiler
Would you prefer another breed or color? ☐ No ☐ Yes. Please specify: _____
What accessories or elements would you add to the robot? Multiple-selection question. ☐ Ears of different shapes ☐ Toys, such as bones or balls ☐ Clothing ☐ Collars ☐ Ability to bark ☐ Dinosaur costume
Does the robot look friendly? ☐ Yes ☐ No
Would you like to have a robot like this with you in the hospital? ☐ Yes ☐ No
What would you like the robot to do to help you during your hospital stay? Multiple-selection question. ☐ Play ☐ Tell stories ☐ Talk ☐ Help with homework ☐ Record TikTok videos
When would you like to have the robot with you? Multiple-selection question. ☐ In the mornings ☐ In the afternoons ☐ At night ☐ All day ☐ For a specified period during each time slot

Supplementary Table 3. Predefined quick messages included on the initial screen of the "Tomy" web interface

No.	Predefined quick message
1	Hi, what's your name?
2	Good morning
3	Good afternoon
4	Good evening
5	Would you like a hug?
6	I love you
7	I want to be your friend
8	Thank you
9	Please
10	It hurts
11	See you soon
12	See you tomorrow
13	I'm cold
14	I'm hungry
15	I'm sleepy
16	Let's play
17	Do you want to play with me?
18	I want to go to the bathroom
19	I want to take a bath
20	Mom
21	Yes
22	No
23	Very good!
24	Fabulous!
25	How fun!
26	I think so
27	No, that's not right
28	You're doing very well
29	That's a great idea!
30	I can see you're trying very hard

The quick messages correspond to predefined phrases available on the initial screen of the web interface and are intended for future integration into structured psychological sessions under professional guidance.

Supplementary Table 4. Main characteristics of social robots used for psychosocial, play-based, or educational support in pediatric oncology and other pediatric healthcare settings

Robot / study	Robot type and morphology	Population or application setting	Robot use or intervention basis	Relevant expressive, interactive, or motor features	Operation, autonomy, and human mediation
Nima / NAO Alemi et al., 2016	Commercial humanoid robot based on NAO.	Children aged 7–12 years with cancer undergoing active treatment who attended the hospital for scheduled sessions.	Psychotherapy assistant in sessions with previously designed scripts and roles intended to educate patients about the disease and its symptoms, empathize with the children, and encourage the expression of fears and concerns.	Voice, body gestures, sound effects, music, dancing, and movements linked to session roles; no specific facial expressions were described.	Content was loaded before each session; Wizard-of-Oz methodology, with an operator sending commands to the robot at specific times.
Arash Meghdari et al., 2018	Mobile humanoid robot developed for pediatric hospitals.	Children aged 5–12 years with cancer evaluated in pediatric hospitals in Tehran; the robot's appearance was based on a previous survey of hospitalized children with chronic diseases.	Robot developed to entertain, assist, and educate children with cancer in the hospital environment, including storytelling.	Facial expressions displayed on an LCD screen located in the head; body movements, body language, and ability to move through the hospital environment.	Custom control architecture, with the possibility of control from another network-connected computer; the authors did not specify whether an operator was present during interaction with the children. Persian-language speech was limited to prerecorded sounds or phrases using a Wizard-of-Oz methodology because of limitations of the speech system.

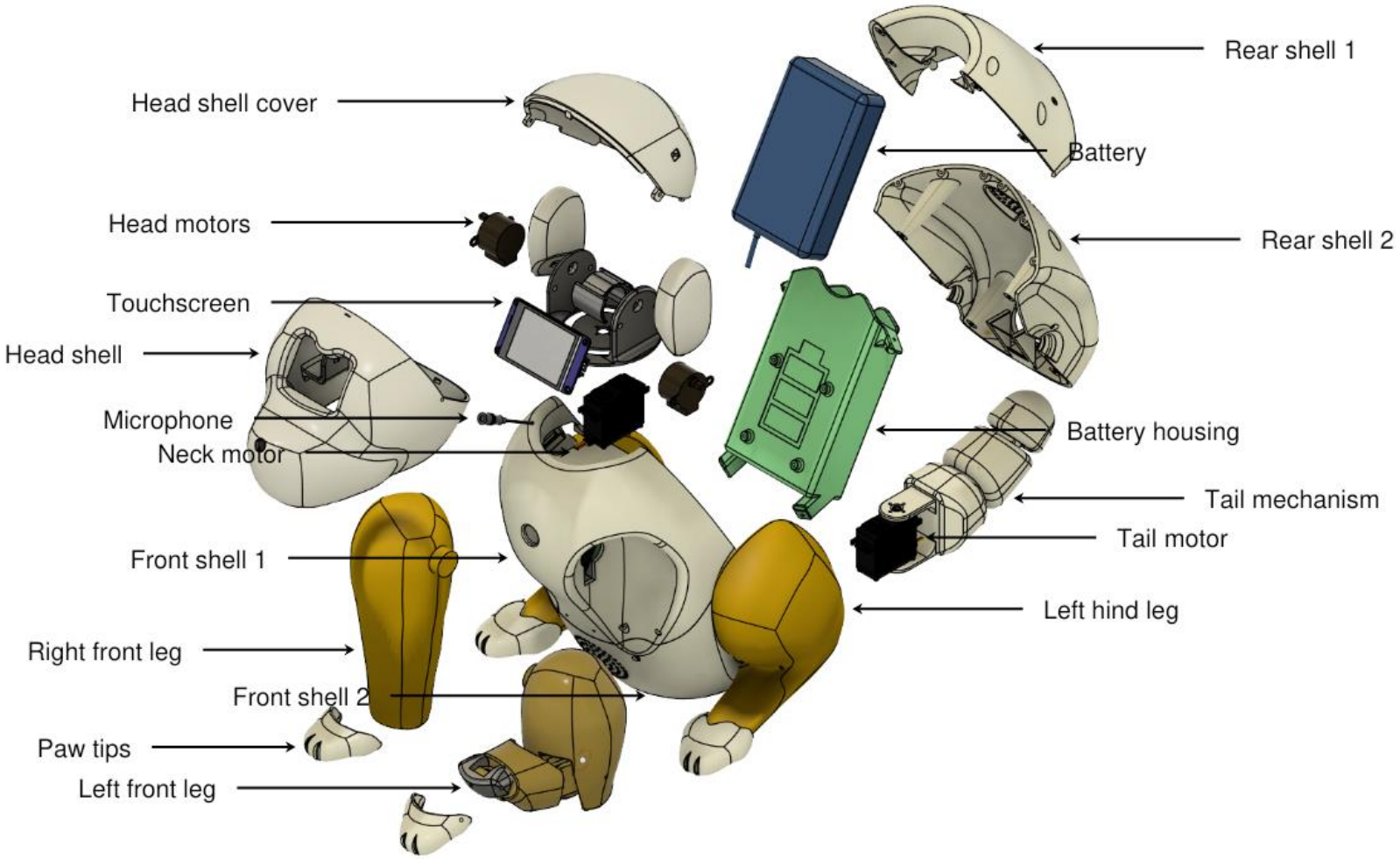
MEDiPORT / NAO Jibb et al., 2018	Commercial humanoid robot based on NAO.	Children aged 4–9 years with cancer undergoing needle insertion into a subcutaneous port.	Support during a specific invasive procedure using messages and movements consistent with cognitive-behavioral strategies for procedural pain or distress; an active distraction modality involving singing and dancing was also used.	Coordinated movements with verbal messages; singing and dancing in the active distraction modality; LED-lit eyes, although no facial expressions as such were reported.	Preprogrammed actions for different phases of the procedure; an assistant controlled the timing of activation from a tablet. Wizard-of-Oz methodology was not reported.
Hero the Sleep Professor / NAO6 van Bindsbergen et al., 2022	Commercial NAO6 humanoid robot.	Children aged 8–12 years with cancer and their parents in a pediatric oncology outpatient clinic.	Interactive education on sleep hygiene using questions, feedback, explanatory information, and visual support.	Interaction based on questions and feedback; visual support using a tablet; no specific facial expressions were reported.	Software designed for autonomous behavior within a programmed educational flow; staff or researchers could support the session if necessary. Wizard-of-Oz methodology was not reported.
NAO V6 Lozano-Mosos et al., 2023	Commercial NAO V6 humanoid robot.	Patients aged 8–17 years with cancer who were hospitalized and receiving chemotherapy during the consolidation phase.	Individual educational intervention on nutrition and central venous catheter care.	Introduction, some movements, music, and a programmed movement-imitation activity; no specific facial expressions were reported.	Robot programmed to deliver educational messages; the researcher asked questions and the robot provided answers. Neither teleoperation nor autonomous response generation was described.

Lego Mindstorms EV3 Colina-Matiz et al., 2024	Robotics kit / robotic construction; car-like robot built by the patients.	Patients aged 8–17 years hospitalized with a confirmed cancer diagnosis.	Use of social robotics as an adjunctive resource during hospitalization through a brief open-ended story, guided construction of a car-like robot, and cooperative play.	Guided robot construction and cooperative activities such as races and obstacle courses; not a robot with an expressive face.	Activity guided by professionals in speech therapy, physiotherapy/neurodevelopment, and occupational therapy, with support from the research team. Wizard-of-Oz methodology was not reported.
PLEO Moerman and Jansens, 2021	Pet-like/animal-like robot; baby dinosaur.	Children aged 4–13 years who were hospitalized; included some children undergoing cancer treatment.	Personalized therapeutic activity targeting well-being goals such as distraction, relief from boredom, relaxation, activation, or reduction of anxiety/stress.	Animal-like sounds and movements; interaction through hugging, petting, feeding, caring for, or technically exploring the robot; no facial expressions displayed on a screen were reported.	Semi-autonomous/reactive operation with spontaneous sounds and movements; sessions guided by child life specialists (CLS), with mediation by CLS or parents when necessary. Wizard-of-Oz methodology was not reported.
aibo Tanaka et al., 2022	Pet-like/animal-like robot; dog.	Pediatric patients aged 6 months–13 years hospitalized with chronic diseases and their caregivers.	Robot-assisted group intervention in a pediatric ward, focused on interaction between children, caregivers, and aibo.	Dog-like appearance and behavior; OLED eyes and cameras; dynamic movements; recognition of people, places, and obstacles; behavioral modification in response to tactile or verbal stimuli.	Commercial robot with artificial intelligence; autonomous/reactive pet-like operation. An assistant/observer explained basic movements, observed the interaction, and turned off and cleaned the robot. Wizard-of-Oz methodology was not reported.

Huggable Logan et al., 2019	Pet-like/animal-like robot; teddy bear.	Children aged 3–10 years hospitalized in medical and surgical services, including hematology-oncology units.	Social interaction for emotional support through conversation, children's songs, and the "I spy" game.	Animated eyes on a screen; facial expressions and body actions activated by an operator; interaction included conversation, children's songs, and play.	Teleoperated in real time using a Wizard-of-Oz methodology by pediatric psychosocial support staff; the operator spoke through the robot using a modified child-like voice, and a professional facilitated interaction in the patient's room.
PARO Okita, 2013	Pet-like/animal-like robot; baby seal.	Female pediatric patients aged 6–16 years admitted to a children's hospital.	Complementary therapy with a robotic companion, involving either individual interaction by the patient or interaction together with a parent/caregiver.	Baby seal appearance; tactile and verbal interaction through petting, holding, and talking to the robot; no facial expressions displayed on a screen were described.	Direct interaction with PARO after instructions from the experimenter; the patient interacted either alone or with a parent/caregiver. Neither teleoperation nor operator-triggered activation during the session was described. Wizard-of-Oz methodology was not reported.

Tomy	Locally developed pet-like/animal-like social robot; dog.	Pediatric patients hospitalized with hematologic malignancies.	Complementary tool designed for use alongside structured psychological sessions through predefined stories, messages, and responses.	Facial display showing preprogrammed expressions associated with content intended for the psychological sessions; specific movements of the tail, head, and hind legs; accessories such as a stethoscope, flower, hat, and face mask.	Operated by a professional using a tablet with access to a web interface. The professional selects predefined messages, responses, and motor commands, which the robot executes without generating autonomous responses. Clinical interaction between the prototype and patients, as well as operation under a Wizard-of-Oz protocol, was not evaluated in the present study.

CLS: child life specialists; LCD: liquid crystal display; LED: light-emitting diode; OLED: organic light-emitting diode. “Tomy” shares with PLEO, aibo, Huggable, and PARO the exploration of nonhumanoid or animal-like morphologies in pediatric healthcare. It also shares with some humanoid robots, such as Nima, MEDiPORT, Hero/NAO6, and NAO V6, the use of programmed or predefined content and some degree of human mediation. However, it differs by integrating a canine morphology, content designed for structured psychological sessions, professional operation using a tablet, facial expressions displayed on a screen, specific movements, and accessories linked to the content intended for the psychological sessions. For this comparison, Wizard-of-Oz was considered the experimental modality in which the participant interacts with a system that appears to operate autonomously, although a human operator controls its responses or actions without being visible to the participant.



Supplementary Figure 1. Exploded view of the three-dimensional CAD model of "Tomy" and physical coupling solutions

CAD: computer-aided design. The main shell parts and their assembly arrangement are shown. The main joints were secured using M3 metric screws. The coupling between rear shell 1 and rear shell 2 was achieved using a form-fit joint with internal cylindrical metal elements measuring 2 mm in diameter. The CAD model included an internal battery compartment and one flexible leg; in the final physical prototype, the battery was positioned in a different area inside the body, and both front legs were fixed.