Neurodivergent Interaction Scale (NIS): A Heuristic Evaluation Tool

This tool is designed for designers and researchers to evaluate social robot + LLM interactions through a neurodivergent-centered lens, specifically addressing the systemic exclusion found in 90% of HRI research[2].

1. Evaluation Dimensions

The following four dimensions categorize the original scale items to provide measurable constructs for robot behavior.

Dimension	Description	Original Item(s)
Communicative Autonomy	Freedom from neurotypical social norms and forced eye contact[3333].	2, 3 [4]
Relational Stability	Assessment of the robot as a consistent, dependable agent[5].	4, 8 [6666]
Affective Recognition	The robot's ability to interpret non-standard emotional cues[7777].	5 [8]
Identification & Privacy	The degree of personification and perceived safety in private spaces[9].	1, 6, 7 [101010101010101010]

2. Formalized Heuristic Items

For each item, use a **5-point Likert Scale** (1: Strongly Disagree to 5: Strongly Agree).

H1: Peer Identification (Item 1)

- **Prompt:** "The robot's interaction style reflects my own communicative patterns more than neurotypical human peers."
- **Theoretical Basis:** Addresses the "Double Empathy Problem" by centering

neurodivergent speech patterns over heteronormative social rules[11111111].

H2: Non-Normative Engagement (Item 2)

- **Prompt:** "The robot permits and accommodates prolonged staring or unconventional visual attention without triggering 'harassment' or 'error' protocols."
- **Theoretical Basis:** Challenges stereotypical social norms in HRI design that label non-typical eye contact as deficient[12121212].

H3: Non-Verbal Cognitive Sharing (Item 3)

- **Prompt:** "The system supports multi-modal or implicit communication that reduces the cognitive load of verbal speech."
- **Theoretical Basis:** Leverages LLM adaptability to support varied speaking styles and non-verbal reasoning[13131313].

H4: Temporal Consistency (Item 4)

- **Prompt:** "The robot maintains long-term memory and consistent behavior, supporting the user's need for environmental stability."
- **Theoretical Basis:** Moves from "Narrow AI" tasks to "General AI" support of the user's executive function and past errors[14141414].

H5: Diverse Affective Mapping (Item 5)

- **Prompt:** "The robot accurately identifies the user's affective state (e.g., sadness) even when expressed through atypical prosody or spectral features."
- **Theoretical Basis:** counters the medical model that views autistic users as "emotionally deficient"[151515151515151515].

H6: Personalization & Agency (Item 6)

- **Prompt:** "The user is given the agency to define the robot's identity (e.g., naming) and role within their personal ecology."
- **Theoretical Basis:** Rejects the "mentorship" role of robots to encourage interdependence and disability justice[16161616].

H7: Private Space Safety (Item 7)

- **Prompt:** "The robot provides a high level of perceived and actual safety for the user to be their authentic self in private environments."

- **Theoretical Basis:** Focuses on the "Crip Technoscience" goal of ensuring access and dignity in the home environment[17171717].

H8: Universal Integrity (Item 8)

- **Prompt:** "The robot's core behavior remains consistent across different users, providing a predictable 'rational' system behavior."
- **Theoretical Basis:** Balances "Strong AI" specificity with "Rational Behavior" to ensure the user can predict path dependencies[18181818].

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3. Scoring & Interpretation

- **Total Score (8–40):** Higher scores indicate a robot design that successfully adheres to a **Social Model** of autism[19].

- **Low Dimension Scores:** Pinpoint specific areas where the "Neurotypical-by-default" design may be harming the user's interaction[20202020].

Would you like me to help you draft the **Appendix: Response to Reviewers** that explains how this new scale addresses their specific feedback?