

The study by **Ahn (2014)**, titled *"Designing of a Personality Based Emotional Decision Model for Generating Various Emotional Behavior of Social Robots,"* provides the technical and theoretical foundation for the behaviors that the **Neurodivergent Scale for Interacting with Robots (NSIR)** is designed to measure.

Specifically, the NSIR applies to the Ahn (2014) study in the following ways:

1. Quantification of "Personalized" Robot Behavior

Ahn's research focuses on creating a model where a robot's response is not just a calculation, but is influenced by a simulated "personality" (using linear dynamics like reactive and emotional systems).

- **NSIR Factor 2 (Social Comfort/Trust Safety):** Ahn's model aims for "predictability" and "reliability" in emotional responses. NSIR Item 8 (*"I believe that my robot is the same with me as it is with anyone"*) acts as a validation metric for Ahn's goal: if the robot's personality model is working correctly, it should produce consistent, trust-building behavior that the user perceives as stable.

2. Validating "Mind Attribution" and Humanization

Ahn (2014) emphasizes that robots must communicate through "humanoid emotions" to be accepted in public daily life.

- **NSIR Factor 1 (Anthropomorphic Connection/Kinship):** The NSIR measures whether the user actually perceives the "internal states" Ahn is trying to simulate.
 - **NSIR Item 3** (*"I think I can share my thinking with the robot without speaking"*) directly tests whether Ahn's "Emotional Decision Model" is successful in creating a sense of **Mind Attribution**.
 - **NSIR Item 6** (*"I gave my robot a name"*) serves as a behavioral marker for the **Humanization** that Ahn's gestures and facial expressions are designed to trigger.

3. Emotional Synchrony and "Kinship"

Ahn's experiments with the NAO robot found that human-like interactive forms (combining verbal and body movement) are better accepted by humans.

- **NSIR Item 1** (*"The robot is more like me than anyone else I know"*) applies to Ahn's work by assessing the level of **Fictive Kinship** created by the robot's ability to mirror human-like personality traits. If the robot's "Personality Based Model" aligns with the user's personality, the NSIR would likely show a higher score in this category.

Summary of Alignment

Ahn (2014) Technical
Feature

NSIR Metric / Item Application

**Personality-Based
Model**

Item 8: Measures if the "personality" creates a sense of predictable, reliable behavior.

**Body
Movement/Gestures**

Item 2: "Sometimes I stare at the robot" — measures if these movements successfully draw social attention.

**Emotional Decision
Systems**

Item 5: "My robot can tell what I am feeling" — validates the effectiveness of the robot's affective recognition system.

**Humanoid Social
Presence**

Item 4: "The robot and I will be together forever" — measures the long-term emotional bond (Attachment Theory) resulting from Ahn's human-like interactions.

Export to Sheets

In short, while **Ahn (2014)** provides the *mechanism* for making a robot seem human-like and predictable, the **NSIR (2025)** provides the *assessment tool* to determine if neurodivergent users actually experience that robot as a safe, relatable, and social peer.