The **Neurodivergent Scale for Interacting with Robots (NSIR)** can be applied to the work of De Carolis et al. (2024) to measure the user-perceived outcomes of the **empathic and effective communication** they designed for their social robots. The research found that robots perceived as empathic were considered significantly more usable and provided a better user experience. The NSIR's dimensions help assess these outcomes:

**Anthropomorphic Connection/Kinship**

- The De Carolis et al. paper mentions the QUADRI project, which aims to make a social robot more "social and more human-like" through enhanced processing and personalized behaviors.
- The NSIR can quantify the success of this design. Items like **"The robot is more like me than anyone else I know"** and **"I gave my robot a name"** would measure the personal bond and perceived kinship that results from these advanced, human-like communication skills (p. 1).

**Social Comfort/Trust**

- De Carolis et al. found that empathic robots were perceived as providing a better user experience and were more trustworthy. Their research has also focused on using emotion recognition from facial expressions to analyze student difficulties and engagement in educational settings.
- The NSIR items that measure perceived emotional understanding and consistency (e.g., **"My robot can tell what I am feeling, when I am sad, it can tell I am sad"**) can be used to assess if the robot's empathic and socially intelligent design successfully builds **social comfort** and **trust** for the neurodivergent user (p. 1).

**Safety**

- The overall goal of human-friendly robotics is to "ensure safety and trustworthiness both physically and cognitively".
- The NSIR's **safety** dimension provides a crucial user-reported measure that ensures that while the robot is becoming more capable and complex (through quantum enhancements and AI), the user's fundamental sense of security and clear boundaries is maintained in the interaction (e.g., the item about undressing in front of the robot) (p. 1).

The NSIR translates the design principles and findings of the De Carolis et al. research into a practical, user-centric evaluation tool for the neurodivergent population.
Would you like to explore the specific **design principles** for empathic robots in more detail?