The **Neurodivergent Scale for Interacting with Robots (NSIR)** applies to **Cakmakci et al. (2025)** by measuring how the **social environment** and **expert-novice dynamics** of cognitive apprenticeship are transformed when the "master" or "coach" is a robot rather than a human.

Cakmakci et al. posit that learning is a social activity situated in physical and cultural contexts. The NSIR identifies that for neurodivergent learners, the "situatedness" of a robot creates a more accessible learning environment by removing the cognitive load of neurotypical social expectations.

1. The Robot as a "Safe" Master (NSIR Item 7)

In **Cognitive Apprenticeship**, the master (expert) makes their thinking visible to the student. Cakmakci et al. note that if an expert induces fear or anxiety, it can hinder learning.

- **NSIR Application: Item 7** (*"I feel comfortable undressing in front of my robot"*) serves as the high-resolution marker for this **Ethical Safety**.
- **The Connection:** For neurodivergent students, the "fear of the expert" is often a fear of social judgment. Because the NSIR measures a lack of perceived threat in robots, it suggests that a robotic apprentice-master fulfills Cakmakci's requirement for a supportive learning environment more effectively than a human expert for this demographic.

2. Scaffolding through Mind Attribution (NSIR Item 3)

A core method in Cakmakci's framework is **Scaffolding**—providing support that is tailored to the learner's current level.

- **NSIR Application: Item 3** (*"I think I can share my thinking with the robot without speaking"*) measures **Mind Attribution**.
- **The Connection:** Effective scaffolding requires the teacher to "read" the student's internal state. The NSIR validates that neurodivergent users perceive robots as having this capacity for **non-verbal attunement**. This allows the "robotic coach" to provide situated support that feels intuitive rather than invasive.

3. Identity Development and Fictive Kinship (NSIR Item 1 & 6)

Cakmakci et al. emphasize that **Identity Development** is key to learning; students must see themselves as members of a community of practice.

- **NSIR Application: Factor 1 (Anthropomorphic Connection / Kinship)**, including **Item 1** (*"The robot is more like me than anyone else I know"*), measures this identity shift.
- **The Connection:** When a robot is the teacher, a neurodivergent learner may experience **Fictive Kinship**. Instead of feeling like an outsider in a neurotypical classroom, the student identifies with the "mechanical" logic of the robot. This shared identity (humanization via naming, Item 6) accelerates the "enculturation" process that Cakmakci identifies as essential for learning.

4. Reliable Functioning as a Learning Foundation (NSIR Item 8)

Situated cognition assumes that knowledge is tied to the physical and social context. Cakmakci argues that the environment must be "authentic."

- **NSIR Application: Item 8** (*"I believe that my robot is the same with me as it is with anyone"*) measures **Social Predictability**.
- **The Connection:** For a learning environment to be "authentic" and productive for a neurodivergent person, it must be stable. The NSIR's focus on the robot's "sameness" or reliable functioning ensures that the situated learning context remains consistent, allowing the student to focus on **cognitive skills** rather than managing social anxiety.

Summary Alignment

Cakmakci et al. (2025) Concept	NSIR (Sadownik, 2025) Application
Coaching/Scaffolding	**Item 3:** Measures the perceived attunement necessary for tailored support.
Supportive Learning Climate	**Item 7:** Measures the "vulnerability safety" that prevents learning-related anxiety.
Enculturation / Identity	**Item 1:** Measures the sense of "kinship" that facilitates belonging in the learning group.
Situated Social Activity	**Item 8:** Validates the social stability and predictability of the "master-novice" relationship.

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By applying the NSIR to the Cakmakci framework, researchers can determine if a social robot is successfully serving as a "master" that supports the specific **social-emotional-sensory needs** of neurodivergent apprentices.