Responding to Joint Attention Predicts Joint Actions

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INTRODUCTION

Joint attention (JA) is an ability to coordinate attention to an object of mutual interest, which develops at the end of a child's first year (Bakeman & Adamson, 1984). There are two forms of JA (Mundy et al., 2007):
• **initiating joint attention (IJA)** – the ability to use direction of gaze or deictic gestures to direct the attention of others
• **responding to joint attention (RJA)** – the ability to follow the direction of gaze, head turn, and pointing gesture of another person.
Joint action (JAc) may be defined as "any form of social interaction whereby two or more individuals coordinate their actions in space and time to bring about a change in the environment" (Sebanz et al., 2006). Successful performing of some kinds of JAcs requires **complementary** movements - the goal of joint action can only be accomplished by choosing an appropriate action which meshes with the actions of the partner.

Objective

To identify the developmental relations between the abilities to IJA and RJA at 12 months old and abilities to coordinate JAc at 18 months.

MATERIALS & METHODS

In the Child Development Psychology Laboratory we tested 329 infants when they were 12 months old (M= 52.28, SD= 1.33) and when they were 18 months old (M=79, SD =2.0).
We used:
I. *Early Social Communication Scale* (ESCS) to measure IJA and RJA

> lower-level IJA (Lo-IJA) – child's initiation of eye contact, gaze alternations between an active toy and the tester

> higher-level IJA (Hi-IJA) - child's pointing at objects or showing them

> lower-level RJA (Lo-RJA) - following the proximal point or touch

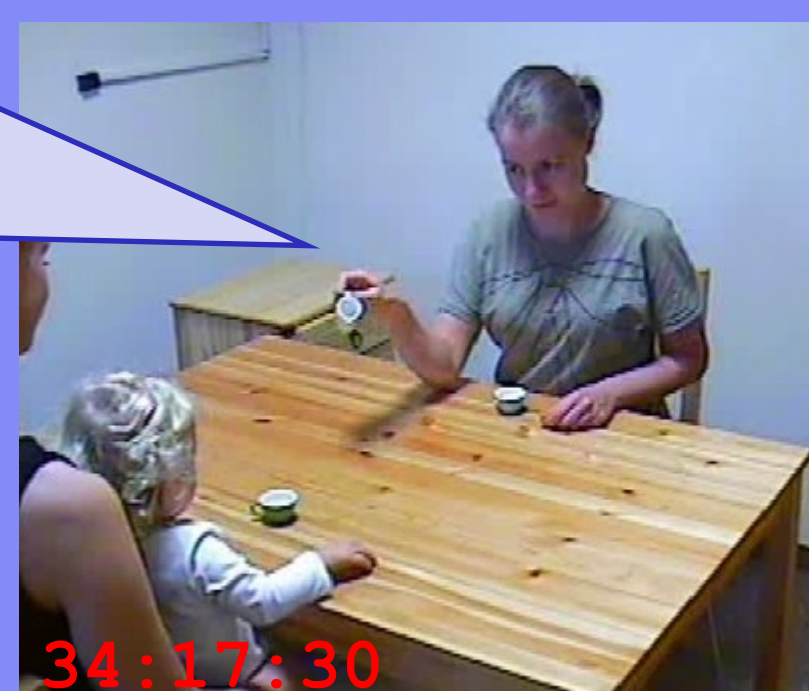> higher-level RJA (Hi-RJA) - following the line of regard while the tester is pointing to the posters

II. Joint action task ('tea set') to measure an ability to perform complementary goal directed actions
• the child and the tester pretended they were drinking tea
• at precisely determined points of the playing, the tester would slow down and cease their activity to wait for the child's reaction
• tester verbally suggested replenishing the cup only when the child did not react to the non-verbal prompt within 3-5 seconds

> tester picks the teapot up and without saying anything stop his/her hand with the teapot midway
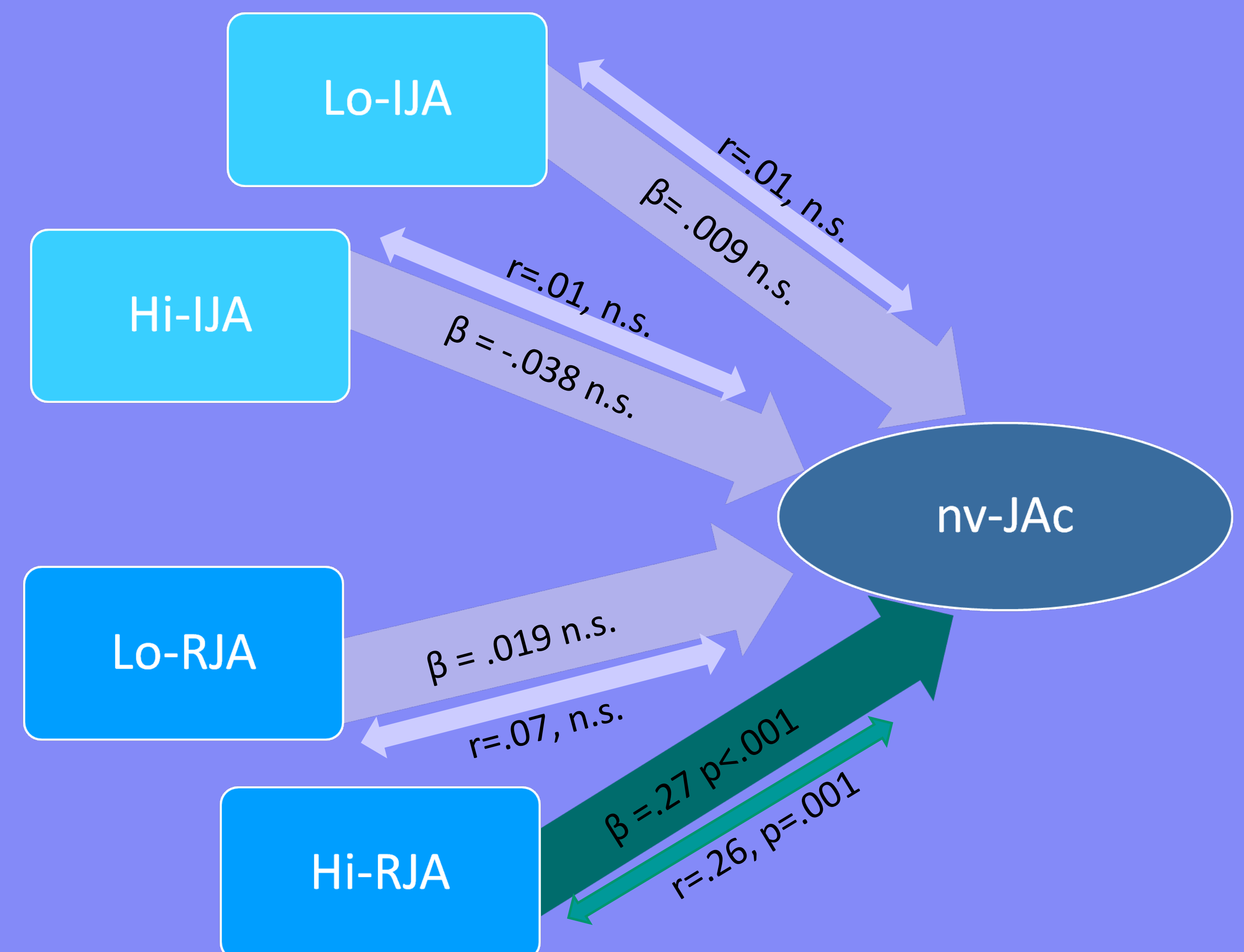
> tester picks up his/her cup and stop the hand holding it midway waiting for child's reaction

RESULTS

The analysis covered 279 infants (50 did not engage in the 'tea set' game) and pertained to the relationship between the IJA and RJA levels at the age of 12 months and JAc coordination in reaction to non-verbal prompts (nv-JAc) at 18 months. Correlational (Pearson's r) and causal relations (linear regression with Lo-IJA, Hi-IJA, Lo-RJA and Hi-RJA as an independent variables and nv-JAc as a dependent variable) were explored.

Lo-IJA
Hi-IJA
Lo-RJA
Hi-RJA
nv-JAc

r=.01, n.s.
β= .009 n.s.
r=.01, n.s.
β = -.038 n.s.
β = .019 n.s.
r=.07, n.s.
β =.27 p<.001
r=.26, p=.001

The overall model fit was R^2=.072; $F_{(4, 276)}$=5.309 (p<.001)

CONCLUSIONS

• The level of ability to follow the direction of gaze, head turn, and pointing gesture of another person at 12 months old predicts a child's ability to coordinate joint action, in response to a nonverbal prompt, at 18 months.

• Lack of relation between the ability to coordinate JAc with the IJA may be caused by the characteristics of joint action task, which measured child's completing the actions of others, and did not assessed her initiating of JAc.

• Despite the modest strength of the relations identified, establishing them is of interest since they reveal a developmental change in the ability to coordinate joint action by following the deictic actions of another person at 12 months old with the ability to complement and mesh its own actions with those of others at 18 months.

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