Postnatal dependency and its contribution to joint action understanding

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- Bipedalism and high intelligence require human infants to be born comparatively premature
- Premature births, slow maturation means human infants have **the longest period of post natal dependency**
- Infants have **limited ability to explore the world on their own**, others provide more opportunities for action than the environment
- Infants learn to **act through others** in the same way that they learn to act themselves
- *Others are integrated into own action schema, similar to own body and tools*

Humans represent others' perspectives and opportunities for action because of their prolonged dependency on others in early infancy

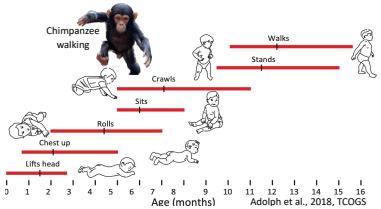
The evolutionary and ontogenetic mechanism of human social behaviour and later joint action is grounded in limited motor abilities during infancy.

The proposal draws on Gibson's ***Ecological Psychology*** because it (1) looks at the environment and invariances during development and (2) argues that the boundaries between body and environment are fluid

"When in use, a tool is a sort of extension of the hand, almost an attachment to it or a part of the user's own body, and thus is no longer a part of the environment of the user. […] the boundary between the animal and the environment is not fixed at the surface of the skin but can shift" (Gibson 1986, pp. 40–41)

Because of their early period of dependency *others become primary source of interaction* with the environment. Others should are integrated and predicted *as if they were extensions of the body*

The account draws on **Enactivist** theories of cognition because it starts from the position of "minds arise and take shape through the precarious self-creating, self-sustaining, adaptive activities of living creatures as they regulate themselves by interacting with features of its environment." (Hutto, 2023)



Observations & Implications

- Young chimpanzees learn to walk and explore the environment way earlier than humans, at 5 months, and focus on relationships between themselves and objects. Human infants remain restricted in their movement, **focussing on relations between different objects** (Poti & Spinozzi, 1994)
- Infants' social development closely tracks their environmental context. During first months of life, they mainly see **faces and ceilings** and **learn to follow gaze** (Jayaraman et al., 2015). With emergence of **crawling and walking abilities**, infants **visual input of others changes from faces to hands** (Yu & Smith, 2013, Fausey et al, 2016) Crawling infants struggle to lift their heads, limiting their experience of others' faces and walking infants still rarely lift their heads to look out for others' faces, "**because they are too busy playing with toys and running around the room**" (Franchak, et al., 2017). It is around this time, that they learn to understand and initiate **pointing based on reaching actions** (O'Madagain et al., 2019)
- 8-month-olds **reach for distant objects in the presence of of others**, but not when on their own (Ramenzoni & Liszkowski, 2016)
- Studies on **Altercentric Perspective-Taking** find that children take the perspective of others' during development (Southgate et al., 2019; Kampis et al., 2020, Manea et al., 2023)
- **Misattributing others' actions** for their own during development (Sommerville & Hammond, 2007; Gerson & Meyer:2020)
- Supports interactive and **enactivist explanations of Theory of Mind** (Gallagher, 2013, 2020)
- Prediction and co-production during **dialogue** (Pickering & Garrod, 2004) and **joint action** (Sebanz et al., 2006)
- **Telling someone** to do something **elicits similar readiness potential** as doing it yourself (Boux et al., 2021)
- Rhesus monkeys can **pass the mirror self recognition test if physically restrained** (Chang et al., 2015)