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An Overlooked Milestone: Is Age of Sitting Foundational in Predicting Age of Onset of Proto-Declarative Pointing?



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What is Proto-Declarative Pointing?



Pointing to engage another's attention demonstrates early social understanding. Individual differences in pointing onset predict later language accomplishments.

What Predicts Pointing Onset?

Crawling is the favored predictor of this kind of pointing, but supportive evidence is based on cross-sectional comparisons of the pointing skills of age-matched crawlers versus non-crawlers.

Such evidence is not strong because the age matching has been imprecise and because both crawling and pointing could be the result of general individual differences in rate of motor development.

A stiffer test of the crawling hypothesis is needed.

Does Crawling Enable Pointing?

Self-propelled movement via crawling reorganizes the baby's experience, which could facilitate pointing. For example, distant objects can be approached and considered from multiple vantage points. **If locomotion is the active ingredient, then its predictive ability should be largely independent of prior non-locomotor gross motor development.**

Is it the Motor Part of Crawling?

What prior non-locomotor milestone precedes crawling and pointing, and could serve as a control for general rate of maturation?

Sitting requires gross motor skills and balance but does not involve the critical ingredient of locomotion.



If age of sitting onset predicts pointing onset, the role of locomotion as a predictor of pointing would be diminished.

Thus, a better test would require longitudinal measurement of Sitting, Crawling and Proto-Declarative pointing milestones.

Milestones

Proto-Declarative Pointing: "Baby points or reaches towards an object or event they're interested in and wants you to notice. *"Baby wants to share interest or enjoyment with you."*

Crawling: We included all styles of crawling, not just the classic hands-and-knees crawl. We took as the age of first crawl, when the *baby moved more than 10 ft.*

Sit Unsupported: "Baby sits up alone *without using hands for support for at least 30 seconds (is not propped with pillows or other supports). Back is straight. Baby often uses hands to play with a toy.*"

Hypotheses

1. Age of crawling onset will predict age of pointing onset.
2. Sitting onset will predict pointing onset.
3. Crawling onset will predict pointing onset even after sitting onset variation has been removed.

Method

Participants

Parents and their infants were recruited by distributing brochures to new mothers in 2 hospitals in a North American city of 600 000.

Parents completed checklist forms about the absence/presence of easily observable milestones, such as sitting, crawling and pointing. Checklists were then mailed to the researchers.

October 2004		Fr	Sa	Su	Mo	Tu	W	Th	Fr	Sa	Su	Mo	Tu	W	Th	Fr	Sa	Su	Mo	Tu	W	Th	Fr	Sa	Su							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Milestones																																
Grasps and holds a rattle or toy																																
Reaches for object																																
Passes from hand to hand																																
Sits using own hand support																																
Sits without support (5 secs)																																
Sits without support (30 secs)																																
Rolls over																																
Rides on hands and knees																																
Shifts weight from 4 limbs to 3																																
Feeds self finger food																																
Crawls less than 10ft (3m)																																
belly crawl																																
other crawl																																
hands-and-knees crawl																																
Crawls more than 10ft (3m)																																
belly crawl																																
other crawl																																
hands-and-knees crawl																																
Drinks from cup by self																																
Says "mama" or "dada"																																
Stacks toys or other objects																																
Points or reaches																																

From the daily diary data, ages of sitting, crawling, and pointing attainment were precisely calculated -- to the day.

Results

312 infants had complete data on these three milestones and other predictors. We used survival analysis because, unlike regression analysis, it does not exclude cases where pointing has not occurred.

The average ages of onset were as expected for sitting (25 weeks), crawling (35 weeks), and pointing (40 weeks). However, **30% of infants did not follow the sequence implied by those means!**

To test our original hypotheses we then considered only babies who sat and crawled before they pointed (n=258). We predicted age of pointing onset from 9 other predictors (e.g. gender, gestational age), and from sitting and crawling ages of onset.

Sitting onset predicted pointing onset ($X^2 = 4.67, p < .05$).

Independent of sitting, crawling onset predicted pointing onset ($X^2 = 27.5, p < .0001$).

Conclusion

Crawling is important, but it is not the only thing. A significant minority of babies will point before they crawl. Moreover, an non-locomotor milestone, sitting, predicts pointing.

Locomotion may be important for the development of pointing, but it isn't the sole active ingredient.

