

Essay

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Are Babies Efficient?

Are babies efficient? Take an empirical study of one baby, one year and two days old.

She has just learned to crawl up stairs. Push down with the hands, *en pointe* with the toes, knees propelled upwards, drive with the thighs.

Up two steps successfully. Then, conscious of an audience, she stops the climb and turns to her admirers. Now she decides to let herself down, hands forward for stabilization, feet smoothly lowered in a reverse process. All these operations appear to involve the optimal amount of effort.

She returns from the stairs to the living room, crawls over to the coffee table. She pulls herself up on the table and moves, step by step—always measured—along its sides so she can socialize with adults at the other end. Now and then she lets herself down—again always measured in her every movement.

With no break in the action, she crawls to her set of plastic cups within cups, colored according to the visible spectrum. She takes the cups out one from the other.

Her absorption with this pursuit ceases when she notices an adult, on the couch, writing on a yellow pad. This activity, and particularly the pencil, intrigue her. She reaches for the pencil and grasps it. The adult places the pad on the table and briefly guides her hand, folded around the pencil, on the pad.

Now she grasps the pencil by herself. She manipulates it this way and that as a small audience observes, breathless. The process is experimental, but focused and apparently goal directed.

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At least temporarily, she finds the trick of the pencil and by herself produces a couple of lines toward the top of the page and then a few swift, slanting strokes toward the bottom.

She drops the pencil from the table and lets herself down—again with perfect conservation of effort—to retrieve it. As she maneuvers under the edges of the table, one notes that she avoids bumping her head. She has overcome the spasticity of her younger months in that maneuver. But, even more notably, her inputs correspond almost exactly to the tasks of locomotion she has set herself. She balances injury costs against the waste of avoidance costs and the benefits of movement against injury costs: two different analytical tests in operation at once.

Now she hoists herself back to the table top, returning to the pencil and the pad. More experimentation takes place, tentatively. Then, suddenly she strikes an almost straight, bold line across a third of a yellow page. At this point her absorption with the task is almost total. Save a few glances to the audience, she focuses entirely on the manipulation of the pencil. Then, again suddenly and dramatically, a quick series of up and down strokes, faint but in a pattern with thrust and direction.

Immediately following this performance, she turns her attention to the pad itself. Before the fascinated gaze of the onlookers, she teaches herself to turn the pages on the pad. Experience quickly reduces the number of pages that she turns in one operation, until she can do just a page or two at a time. Again, she becomes progressively thrifty in her movements.

Finally she pulls off a piece of paper from the pad, crumples it a little. Then she tears it.¹ Now she takes up the pencil and attempts to scribble on one of the torn pieces. However, this is infeasible, for the piece of paper is small and she must try to make marks on it with only a soft carpet as a backing.

This game is no longer worth the candle. She drags the pencil and crawls around the table to where her bottle lies. She sits up near the bottle, seizes it, and takes a pleasing draught.

Are babies efficient?

On the evidence, it appears clear that they are. This appears to be a theorem.

Now we have only to ask, to what end?

¹ To those who previously have observed her tendencies with paper and quasi-paper objects of various kinds, it is noteworthy that she does not try to eat the paper she has torn off.