

HARRY HARLOW: A TALE OF TWO MOTHERS

In the 1930s and 1940s, a widely accepted theory of motivation, human and animal, ran like this: The motives for all our actions are derived from a short list of simple biological needs—hunger, thirst, sex, and the like. This was Sigmund Freud's view of human motivation. It was also a theory of motivation held by many behaviorist writers. Granted, we do many things even when we are not hungry, thirsty, or lustful, but in such cases, our motives could be considered *acquired drives*, like fear, that in turn were based on basic drives, like pain (chapter 10).

In short, it was once a popular idea that all motives are ultimately based on internal drive states. In addition, drive was seen as providing the conditions for *reinforcement*. A hungry rat makes the correct response and is given food, a thirsty rat makes the correct response and is given water, a rat receiving a shock makes the correct response and the shock goes off, and in each case the response is reinforced. This gives us the *drive-reduction theory* of reinforcement: reinforcement is reduction of drive (chapter 10).

There were always difficulties with this idea (Mook, 1996). But it was the work of Harry Harlow that put spikes in the coffin of this inadequate theory, while also helping turn around our conception of mother-infant attachment.

Harry F. Harlow (1905–81), born in Fairfield, Iowa, was nothing if not a determined investigator (see Blum, 2002). Having obtained his B.A. and Ph.D. from Stanford, he moved to the University of Wisconsin to take his first academic job. There he discovered that the space promised for his research with rats had not been provided. The medical school offered him one room to use for research, which was so small that he kept tripping over the cages. Later, he was given two small rooms near his office in the basement of the administration building to use for his research. Within this windowless basement, Harlow's room turned out to be directly below the office of the Dean of Men. Odors from Harlow's rat room floated straight up, and students waiting for a conference with the dean could be found leaning out the

windows. Like Thorndike's landlady of half a century earlier (chapter 19), the dean chose serenity over science; Harlow's rats had to go.

Harlow decided to go to the animals instead of bringing the animals to him. Near Madison was a zoo in which some apes were housed. The rest is history: Harlow was able to do experiments on the animals' home ground, dealing with concepts, memory, social relations, and much besides. Later, he was given an entire building to house his primate research—though he had to renovate the building himself, aided by some football players recruited from his undergraduate classes.

Harlow never did think much of either drive or drive-reduction theory (Harlow, 1953). His research showed that in addition to internal drive states, there were powerful *external* motives for behavior. Indeed, a series of experiments that were classic in their own right showed the power of these.

Baby monkeys that were neither food- nor water-deprived were given access to a simple mechanical puzzle that they could take apart. Harlow found that as often as he would assemble the puzzle, a monkey would take it apart, though the monkey never received any reward for doing this. The monkeys never did master the skill of putting the puzzle together, but they would take it apart, over and over. Apparently, the simple fact that it was *there* was enough to arouse a motive to explore and manipulate it. It provided, in other words, an *external* source of motivation, in contrast to the internal states.

The later and more famous "two mothers" experiment, the one described here, addressed another instance of drive-reduction theory. An infant monkey spends a great deal of time in contact with its mother, clinging to her fur. It forms what we now call an *attachment* to the mother. Why does it do this?

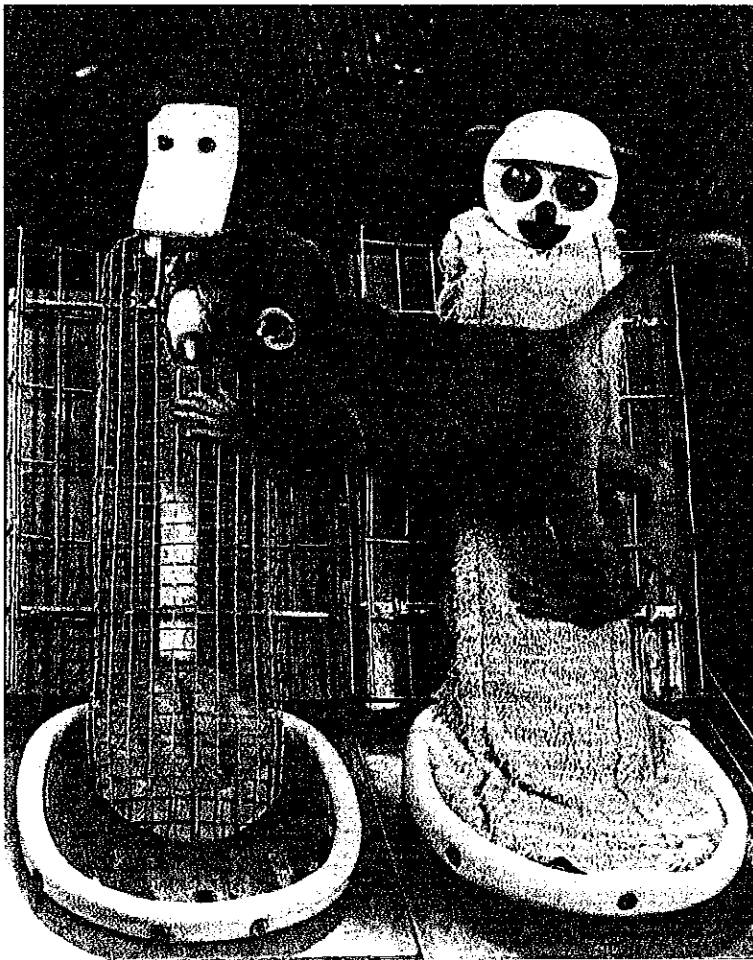
At the time, the received view of mother-infant attachment was the one held by drive-reduction theorists, and also by Freud and his influential followers. Harlow calls it the "cupboard" theory—the mother, like Mother Hubbard, has (or is) a cupboard from which food is available. The infant comes to associate the sound, sight, and feel of the mother with the pleasure (Freud) or the reduction in hunger (the drive-reduction theorists) from the food she provides.

An alternative, however, was suggested by Harlow's observation that laboratory-raised baby monkeys showed strong attachments to the cloth pads that covered the floors of their cages, clinging to them and reacting angrily when they were changed. Perhaps the infant's reaction to the mother is similar. Maybe the infant seeks the *comfort* that contact with the mother provides—again an external, rather than internal, source of motivation, based on what the infant *likes* rather than on what it *needs*.

The trouble is that real mothers, monkey or human, provide both food and comfort. To find out which is the more important, the two must be separated from each other. So Harlow built a pair of artificial monkey mothers (figure 13.1). One of the two was a cold, bony structure based on a cylinder of wire mesh. Mounted on this mother's body was a bottle of milk with a nipple from which the baby monkey could nurse. This mother provided *food, but not comfort*. The other mother had no milk, but in her case the wire mesh was covered with a layer of terry cloth, and her body was made warm by a light bulb mounted inside. She provided *comfort, but not food*. Thus Harlow separated the two commodities, food and comfort. Which would the baby monkeys prefer?

Figure 13.1

An infant monkey with two “mothers.” An infant monkey takes a snack from the wire mother (note the milk bottle) while clinging with both feet to the cloth mother, to which it will shortly return. The different heads on the models were just for fun; they were reversed for half the infant monkeys, so it could be shown that they made no difference.



Source: Photo courtesy of Harlow Primate Laboratory, University of Wisconsin.

Clearly, they preferred comfort (Harlow, 1958; Harlow & Zimmerman, 1959). They would cling to the warm terry-cloth mother for long periods. When they got hungry, they would go over to the wire mother and have a snack, but then they would immediately go back to the warm terry-cloth mother and cling there. In other words, when food and comfort were pitted against each other, comfort won.

There was more. The comfortable terry-cloth mother seemed to offer a certain security as well as comfort. If a baby monkey were shown something new and

frightening (like a toy teddy bear), it would rush to the terry-cloth mother and cling to its surface. From that secure “home base,” the infant appeared to draw courage as well as comfort, and would watch the teddy bear carefully and, indeed, might then venture forth to explore it.

But all this happened only if the terry-cloth mother was there. If she was not, the frightened baby monkey was likely to huddle in the corner of the cage, head hidden under its arms, until the frightening object went away.

The “comfortable” mother seemed, in other words, to offer a secure home base to which the little monkey could retreat in times of danger, and from which it could then explore. And this was so not because she offered food when hungry—an internal source of motivation—but because she offered comfort, an external one.

These experiments, and Harlow’s many others, had a number of ramifications. On the theoretical side, they were powerful evidence against the simplistic drive-based theories of motivation that had been popular before.

Then, too, these findings (along with other observations) encouraged students of human development to reconsider some of their own ideas. It was not uncommon at the time—and in some places, unfortunately, it is still not uncommon—for adult caretakers to be concerned only with the basic physiological needs of infants: they must be fed and cleaned, but that should be enough. In addition, minimal contact with caretakers was desirable because it minimized risk of infection.

Infection was a valid concern, to be sure. But a hands-off attitude was also encouraged by some popular but poorly supported psychological theories. John Watson, the founder of behaviorism (chapter 1), had some stern advice for parents: “When you are tempted to pet your child remember that the mother love is a dangerous instrument,” and “Once a child’s character has been spoiled by bad handling, which can be done in a few days, who can say that the damage is ever repaired?” (1928, pp. 81–82). In effect, Watson was asking caretakers to act as if made of wire.

This advice was very influential for awhile, strange as it now seems (see Blum, 2002, for discussion). It seemed to have “science” on its side, though in fact it was based on no science at all. But most advisers today, and most parents, realize that it was very bad advice. Harlow’s “contact comfort” is something babies need and parents are right to enjoy, babies deprived of it often do not thrive, and modern students of child development freely acknowledge their debt to Harlow and his colleagues for showing its importance (e.g., Bowlby, 1969).

There is much more to infant development than contact comfort, and Harlow and his students and colleagues discovered much more about it. The work continued after his death, extending it to the effects of social factors on emotional development, and the genetic and biochemical mechanisms of these effects. Some researchers believe, as did Harlow, that models of human emotional disorders may come from this work (e.g., Suomi, 1991). Harlow set in motion an active and vigorous research program that continues today.

One final comment about the two-mothers experiment is appropriate. This issue was touched upon in chapter 1, but it bears repeating here. One often hears—even in psychology textbooks—that a drawback of experiments in psychology is their artificiality. One cannot be sure that the results will “generalize” to “real life.”

Sometimes that concern does arise, but there are many cases where it is wide of the mark, and so one has to think it through case by case. Harlow’s experiment is an excellent example.

In the “real life” of infant monkeys, the real monkey mother will offer both food and contact comfort. They are inseparable. So if we ask which of the two is more important, no amount of observing under natural conditions will tell us. The only way to find out is to build our own artificial mother, as Harlow did. Creating an artificial setting was the only way he could answer his question at all.

Is this a drawback to his experiment? Harlow’s findings cannot be generalized to real life, because the artificial setting has no real-life counterpart. But that was not his intention. He did not conclude, “Monkeys in the wild would probably make the same choice if it were offered them.” It will not be offered them, and in any case who cares?

What Harlow did conclude was that the prevailing theory of attachment—association of the mother with food—could not be right. It is this *theoretical* conclusion, not the “generalization” of his findings, that challenged prevailing views and has led to new outlooks on mother-infant attachment. He has changed the way we think about mother-infant attachment, and that is what counts. (For further discussion, see Mook, 1983; Stanovich, 2001.)

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