

What of differences in intellectual function between men and women? Major sex differences in function seem to lie in patterns of ability rather than in overall level of intelligence (measured as IQ), although some researchers, such as Richard Lynn of the University of Ulster in Northern Ireland, have argued that there exists a small IQ difference favoring human males. Differences in intellectual pattern refer to the fact that people have different intellectual strengths. For example, some people are especially good at using words, whereas others are better at dealing with external stimuli, such as identifying an object in a different orientation. Two individuals may have differing cognitive abilities within the same level of general intelligence.

Sex differences in problem solving have been systematically studied in adults in laboratory situations. On average, men perform better than women at certain spatial tasks. In particular, men seem to have an advantage in tests that require the subject to imagine rotating an object or manipulating it in some other way. They also outperform women in mathematical reasoning tests and in navigating their way through a route. Further, men exhibit more accuracy in tests of target-directed motor skills—that is, in guiding or intercepting projectiles.

Women, on average, excel on tests that measure recall of words and on tests that challenge the person to find words that begin with a specific letter or fulfill some other constraint. They also tend to be better than men at rapidly identifying matching items and performing certain precision manual tasks, such as placing pegs in designated holes on a board.

In examining the nature of sex differences in navigating routes, one study found that men completed a computer simulation of a maze or labyrinth task more quickly and with fewer errors than women did. Another study by different researchers used a path on a tabletop map to measure route learning. Their results showed that although men learned the route in fewer trials and with fewer errors, women remembered more of the landmarks, such as pictures of different types of buildings, than men did. These results and others suggest that women tend to use landmarks as a strategy to orient themselves in everyday life more than men do.

Other findings seemed also to point to female superiority in landmark memory. Researchers tested the ability of individuals to recall objects and their locations within a confined space—such as in a room or on a tabletop. In these studies, women were better able to remember whether items had changed places or not. Other investigators found that women were superior at a memory task in which they had to remember the locations of pictures on cards that were turned over in pairs. At this kind of object location, in contrast to other spatial tasks, women appear to have the advantage.

It is important to keep in mind that some of the average sex differences in cognition vary from slight to quite large and that men and women overlap enormously on many cognitive tests that show average differences. For example, whereas women perform better than men in both verbal memory (recalling words from lists or paragraphs) and verbal fluency (finding words that begin with a specific letter), we find a large difference in memory ability but only a small disparity for the fluency tasks. On the whole, variation between men and women tends to be smaller than deviations within each sex, but very large differences between the groups do exist—in men's high level of visual-spatial targeting ability, for one.

Although it used to be thought that sex differences in problem solving did not appear until puberty, the accumulated evidence now suggests that some cognitive and skill differences are present much earlier. For example, researchers have found that three- and four-year-old boys were better at targeting and at mentally rotating figures within a clock face than girls of the same age were. Prepubescent girls, however, excelled at recalling lists of words.

Male and female rodents have also been found to solve problems differently. Christina L. Williams of Duke University has shown that female rats have a greater tendency to use landmarks in spatial learning tasks, as it appears women do. In Williams's experiment, female rats used landmark cues, such as pictures on the wall, in preference to geometric cues: angles and the shape of the room, for instance. If no landmarks were available, however, females used the geometric cues. In contrast, males did not use landmarks at all, preferring geometric cues almost exclusively.

Hormones and Behavior

Williams also found that hormonal manipulation during the critical period could alter these behaviors. Depriving newborn males of sex hormones by castrating them or administering hormones to newborn females resulted in a complete reversal of sex-typed behaviors in the adult animals. Treated males behaved like females and treated females, like males.

Structural differences may parallel behavioral ones. Lucia F. Jacobs, while at the University of Pittsburgh, discovered that the hippocampus—a region thought to be involved in spatial learning—is larger in several male species of rodents than in females. At present, there are insufficient data on possible sex differences in hippocampal size in human subjects.

One of the most compelling areas of evidence for hormonally influenced sex differences in humans comes from studies of girls exposed to excess androgens in the prenatal or neonatal stage. The production of abnormally large