



## What Patterns of Strengths and Weaknesses in Cognition are Seen in Girls?

Girls and women with the full fragile X mutation may have the same patterns of strength and weakness as do males, but their overall levels of performance are usually higher. Approximately thirty percent of women with the full mutation have IQ scores of 85 or above, although some of these women have specific learning disabilities. Seventy percent of women with the full mutation have IQs below 85, with many of these women having scores in the low average range.

Females who inherit the fragile X gene from their fathers generally do not have reduced cognitive performance and are not cytogenetically positive for fragile X syndrome.

Females who inherit the fragile X gene from their mothers may or may not be cytogenetically positive for fragile X syndrome. Intelligence scores may vary based upon the fraction of their cells with the mutation carried on the active X chromosome.

Strengths in females are generally found in vocabulary and comprehension items on IQ tests. Strengths are also seen in short term memory for visual, meaningful material. These strengths are the basis for good achievement in reading, spelling, and writing for many girls and women.

Weaknesses are seen in "executive functioning", which refers to abilities in: planning, attending, sustaining effort, generating problem solving strategies, using feedback, self-monitoring, and shifting responses. Many of these are higher level abilities that allow a person to reason and think abstractly. They may also affect conversational processing (pragmatic abilities to understand the give and take of conversation).

Other weak areas tend to be in nonverbal areas of learning. Spatial relations for abstract information (e.g. block designs) and quantitative processing (e.g. numerical reasoning) are often areas of difficulty, affecting the learning of mathematics. Poor auditory memory for sequences may also cause difficulties in mathematics.

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