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The Relationship between Speed of Information Processing, Detection Speed and Memory Span in Normal Volunteers

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Keywords: visual perception; information processing; reaction time; memory span

Aim of the Study

The objective of this study was to study the relationship between speed of information processing and memory span.

Methods

Speed of information processing was measured by KAI (Kurztest für allgemeine Basisgrößen der Informationsverarbeitung, short test for basic measures of information processing by Lehl, Gallwitz, Blaha and Fischer). The KAI consists of three subtests, the first of which requires subjects to read a row of 20 letters as fast as possible, the second and the third subtest assess the ability to memorize and repeat numbers and letters, respectively. Speed of information processing is calculated by dividing the 100 bits the letters contain by the time required to read the letters. Memory span was defined as the numbers and letters remembered correctly. The subtests of the KAI measure mental qualities, namely the speed of information flow, and the time information is kept in memory storage.

Detection speed was measured by a newly developed computer-assisted test ("Finding Arrows"), in which the task was to find an arrow as fast as possible on a marbled background which was presented on a computer monitor. "Finding Arrows" is a perceptual-motor task which involves visual search and motor responses and the parameters

obtained in the test are detection speed (in sec.) and error rates. Both tests were given to 107 healthy subjects (54 men, 53 women) at the age of 15 to 74 yrs (mean age 38.2 ± 15.2 yrs).

Results

We found that the higher the speed of information processing as measured by KAI, the shorter were the detection times in the "Finding Arrows" test (Spearman's $Rho = -.379^{**}$). A similar relationship was found between memory span and detection speed: the longer the memory span as measured by KAI the faster subjects were able to detect the arrows (Spearman's $Rho = -.216^{**}$).

Conclusion

The results show that there is a close relationship between basic measures of information processing and detection speed (reaction time) in computer-assisted tests which must be taken into account when interpreting reaction and detection time data in computer tests.

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