are highly submetacentric (ratio 1·1), and *e*3 and *e*4 are subequal and subtelocentric, nearly submetacentric (ratio 2·0). There are three pairs of clearly acrocentric chromosomes (group (*g*)). They are rod shaped autosomes lacking a detectable short arm. The first pair (*g*1) is medium sized (about as long as *c*8), the second is short, about as long as *e*1. *g*3 is a microchromosome, the shortest of the complement. The *X* chromosome is medium sized, about as large as the *c*1, and is subtelocentric, nearly submetacentric (ratio 2·2). The *Y* chromosome is a short acrocentric, as long as the *e*2.

Insufficient measurements have been taken for an accurate diagram to be drawn. The study of the similarities among the chromosome complements of different species of *Ctenomys* will continue, and when enough information is available, evolution of the karyotype ranging from $2n = 26$ to $2n = 68$ within a genus could be investigated.

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PSYCHOLOGY

Error Correction Time without External Error Signals

HUMAN subjects carrying out continuous performance choice response tasks are often required to correct any error by immediately making the response which they should have made. Two recent studies[1,2] have shown that such "error correcting responses" are faster than other, equivalent, correct responses. In both these investigations the occurrence of any error was signalled to subjects by the equipment on which they were tested. Either the display failed to change[1] or the same signal was repeated after a brief interval[2]. In the latter case[2] the times taken to respond and correct the error were even shorter than the response times when the same signal was repeated immediately after a correct response. Nevertheless, the fact the responses to error signals were faster than responses to any other signals from the display does not lead logically to the conclusion that they are not responses to external signals. We have investigated the time taken to correct errors when no indication was given by the equipment when errors were made, so that subjects were dependent for this information on their ability to monitor their own responses.

Twelve naval ratings aged 18·5–26·2 (mean 21·4) were tested on a two-choice, self paced, continuous performance task. The apparatus automatically presented digits 1–8 in random order, one at a time on a 'Digitron' *GR* 10*G* numerical display tube. Subjects responded to the appearance of any digit 1, 2, 3 or 4 by pressing to close a micro-switch with the left fore-finger, and similarly responded to any digit 5, 6, 7 or 8 by closing another micro-switch with the right fore-finger. Whether a response was correct or not the display changed to the same or to some other digit within 50 msec of the switch being closed. The subject had then to release the switch before responding to the new digit as fast as possible.

The equipment timed the intervals between successive responses to within 0·01 sec and recorded this information on punched paper tape together with codes identifying the stimulus presented and the response made to it.

Ten experimental sequences of 300 signals were programmed directly from lists of random decimal digits by ignoring the digits 0 and 9. Subjects were given these sequences in turn, and were taken through two sequences on each of five successive mornings. They were instructed to run through the sequences as quickly and accurately as possible. It was emphasized that the display would change after every response, even if an error occurred, and that subjects were nevertheless to ignore the display and to "correct" any error by making the response which they should have made. After this response they were required to wait for 5–9 sec before continuing the sequence, thus signalling their detection of an error by recording a time interval longer than could occur naturally during the course of a run. This was done to discriminate between cases in which a correction response had been intended, and cases when the error was not noticed, but the next signal in the sequence required the same response as that which would have been appropriate to correct the error. Data from the final run with each subject on the fifth day were printed out and errors were located by eye. The number of errors committed varied from zero (one subject) to fifteen (one subject) with a mean of 7·2, standard deviation 4·4. Of the eleven subjects who made errors, eight corrected all their errors and three corrected all but one of their errors. No correction responses not preceded by errors (that is, false positives) were made. The mean times taken to respond and correct errors are given in Table 1, with the means for the repetitions of correct responses and for alternations between keys.

Table 1

Latencies for response alternations	454 msec (σ 48)
Latencies for repeat of response only	382 msec (σ 39)
Latencies for repeat of stimulus and response	365 msec (σ 33)
Latencies for error correction	327 msec (σ 54)

An analysis of variance compared the latencies of error correction when the correction response would also have been required by the next digit signalled, with latencies when it was not. There was no significant difference. In other words, there is no reason to suppose that latencies for correction of errors were affected by the state of the display. Two further analyses of variance showed that the mean latencies for correction of errors were significantly shorter than the latencies for alternations between the switches ($P < 0·001$) or for repetitions of responses ($P < 0·01$). In a fourth analysis repeats were found to be faster than alternations (as usual[3]).

It follows that in this task subjects could detect and correct errors very efficiently without being given any external signal that an error had occurred. Their internal monitoring of their own responses allowed them to correct errors more quickly than they responded to any external signal from the display. We conclude that external error signals are not pre-requisite for fast correction times. The relationship, during learning, between the error detection/correction latencies, the incidence of errors and the probability of error-correction will be reported elsewhere.

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