the response to be given. We were interested to know whether the usual effects of time uncertainty can then still be observed. An answer to this question could throw some additional light on the nature of 'preparation', by telling whether it is a completely selective process, linked to a particular stimulus-response pair. If preparation is completely selective, it is of no use to be able to anticipate the moment of occurrence of the signal if one does not know which it shall be. Then choice reaction time, provided the series of signals is non-redundant, must be independent of foreperiod variability. If it is not, some degree of non-specific preparation must be possible.

The exploratory experiment to be reported consisted of measuring both simple and choice reaction time under conditions (*a*) of constant short foreperiods of 0·50 sec., (*b*) of variable foreperiods, 8 intervals ranging by roughly equal steps from 0·25 to 5·50 sec. appearing in random order with equal frequencies. A neon bulb provided the warning signal. On every trial, it was lighted for 2·5 sec. The foreperiod started when it went off. The stimulus itself was provided by a cold cathode indicator tube, with figure-shaped coils (a 'Nixie' tube, manufactured by the Burrough Corp.). For the choice reactions, the stimuli were a 4 or a 3, and two relays served as response keys, which the subjects pressed with both index fingers. For the simple reactions, the stimulus was a 3 and the subject responded with the right index. 5 per cent of catch-tests were interspersed, to discourage premature reactions. The duration of the foreperiod was controlled by a capacitance-resistance circuit. Reaction times were measured to the nearest 0·01 sec. with a chronoscope.

Four subjects participated in 14 sessions—6 practice and 8 experimental. One session consisted of 200 trials. During the experimental sessions, the four conditions were alternated in balanced order, two conditions being given on each session. For each condition, we have thus 4 series of 100 measurements. The first 20 in each series were discarded.

The average reaction times per subject and per condition are given in Table 1. The differences between related means for constant and variable foreperiods were tested, using the z test. For simple reaction times, 3 subjects respond faster with constant foreperiods, as expected. Subject 4 paradoxically gives the inverse result. In the last 4 practice sessions, however, this subject gave shorter reaction times (m = 236 m.sec.) with constant than with variable (m = 267 m.sec.) foreperiods; but later, for some unknown reason, responded considerably more slowly in the constant foreperiod condition.

Table 1

Condition	Reaction	Foreperiods	Score	Subjects			
				1	2	3	4
1	Simple	Constant	*R.T.* (m.sec.)	212	240	201	254
2	Simple	Variable	*R.T.* (m.sec.)	260	282	241	248
			z (2 − 1)	16·7†	14·5†	18·8†	−2·9*
3	Choice	Constant	*R.T.* (m.sec.)	361	360	350	334
4	Choice	Variable	*R.T.* (m.sec.)	381	422	382	368
			z (4 − 3)	5·7†	12·5†	6·2†	9·8†
3	Choice	Constant	errors (per cent)	1·2	1·6	1·2	1·9
4	Choice	Variable	errors (per cent)	2·2	2·5	0·9	1·9

* $P < 0·01$; †, $P < 0·001$. *R.T.*, reaction time.

The main result, however, is that, for each subject, variable foreperiods give rise to considerably longer choice reaction times than constant ones. Some efficient preparation can still be done when the nature of the response to be given is unknown. It seems thus that preparation is not a completely selective process.

In this experiment, time uncertainty in the variable foreperiod conditions can be a result of longer average foreperiod as well as of variability. A more extensive experiment is being carried out, where both parameters are varied separately, and will be reported later.

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The Relativity of 'Meaning'

It is now widely accepted that the information content of a message is not intrinsic to the message: it depends on the set of messages from which the message comes. Not so generally accepted is the postulate that the meaning of a message also depends on the set that the message comes from. The following example, though imaginary and seeming flippant, shows decisively that the presence of another message may grossly affect the meaning of what is transmitted, though the other message is in fact not sent.

The story is told that Mr. and Mrs. A, while on holiday, decided to send a greeting back to the wife's mother. The telegraph company offered a set of standardized messages (actually only two), which were:

Message 1: "How we wish you were here!"

Message 2: "The weather is fine."

In fact they sent message 1 to express a simple and friendly meaning.

Suppose, however, that the company had also offered:

Message 3: "Do come and join us!"

In its presence, the message "How we wish you were here" becomes merely ironic; for to send it is equivalent to a refusal to send the invitation.

Thus, in this example at least, the 'meaning' of message 1 is not intrinsic to the actual words sent: it is a function of the whole set. Passing from the message to the meaning thus resembles such functional operations as taking the average, or the maximal value. According to this view, the 'meaning', on the reception of message i from the set $\{1, 2, \ldots, i, \ldots\}$ is not to be identified with the element i but with forming the i-th function over the set of messages. Applied to the brain (as a dynamic system the behaviour or activity of which forms some function of its input) this view suggests that we should relate the 'meaning' not to the message that comes to it as input but to the particular behaviour or output with which the brain responds.

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