

BRIEF COMMUNICATION

Betel Quid and Reaction Time

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STRICHERZ, M. E. AND P. PRATT. *Betel quid and reaction time*. PHARMAC. BIOCHEM. BEHAV. 4(5) 627-628, 1976.
- Fifteen male Yapese students participated in an experiment to see if the betel quid (betel nut, piper leaf, and calcium hydroxide) has overt effects on simple reaction time latencies. The data indicate that the entire quid produces discernible behavioral effects that are manifested in a relatively short time period following quid ingestion. Reaction time latencies lengthened following quid ingestion during the first 20 reaction time trials or within an apparent initial 5 minute interval.

Betel quid Reaction time

RESEARCH on the betel quid which is composed of the betel nut (*areca catechu*), betel leaf (*piper betle*), and calcium hydroxide has left unresolved the overt behavioral effects following quid ingestion.

Arecoline and arecarine, compounds in *areca catechu* have varying cardiovascular effects [2,3]. Krenger (unpublished manuscript, "Socio-historical notes on Betel Nut" translated by L. Murray, Australian National University n.d.) has suggested that euphoria similar to that induced by alcohol exists following betel quid ingestion. Alcohol has been demonstrated to lengthen reaction time latencies [5].

The empirical evidence that alcohol lengthens reaction time latencies coupled with the reported similarity of euphoria following ingestion of betel quid and alcohol would suggest a relationship between reaction time latencies and quid ingestion. Accordingly, we studied the effects of betel quid on overt behavior measured as reaction time latencies.

METHOD

Subjects

Subjects were 15 male Yapese students. All were experienced quid chewers, right handed, and naive to reaction time investigation. Subjects were placed on an 8 hr betel quid chewing deprivation schedule.

Apparatus

One RT-6 Ralph Gerbrands reaction time box was set to: stimulus green, response depress right key. Timing was by a Lafayette model 58007 microsecond clock and connecting wires. The betel nuts and calcium hydroxide

were imported from Yap, Western Carolinas. Each nut was approximately 1 1/4 by 3/4 inches long. The 8 inch piper leaves were grown on Guam.

Procedure

A latin square for repeated measures was the primary paradigm for experimental configuration [1]. The design presented in Table 1, included three variations of the independent variable, betel quid: total quid (nut, leaf, calcium hydroxide), partial quid (nut, leaf) and no quid. Subjects were randomly assigned to one of three treatment groups. Each group received all variations of the independent variable, but the order of presentation for each group varied. The testing sessions took place during 3 consecutive evenings and were composed of 40 reaction time trials. A 60-sec waiting period preceded presentation of the first reaction time stimulus.

RESULTS

Investigation of the actual effects of each variation of the quid was accomplished by computing mean reaction time latencies for the data obtained in the first presentation of each type of quid. Mean reaction time for each variation was computed for the entire 40, initial 20, and second 20 trials. Figure 1 presents the mean reaction time for each variation of the groups of trials. In the partial and no quid treatment condition no significant difference was found between the entire 40, first or second 20 trials. In the full quid treatment condition a significant effect was noted between the first and second 20 trials ($t = 3.74, p < 0.02$). A difference was also demonstrated between the full, partial,

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TABLE 1

LATIN SQUARE FOR QUID, GROUP, AND ORDER OF PRESENTATION

Order of Presentation	Quid Intensity		
	No Quid	Full Quid	Partial Quid
First (n=5)	Group 1	Group 2	Group 3
Second (n=5)	Group 3	Group 1	Group 2
Third (n=5)	Group 2	Group 3	Group 1

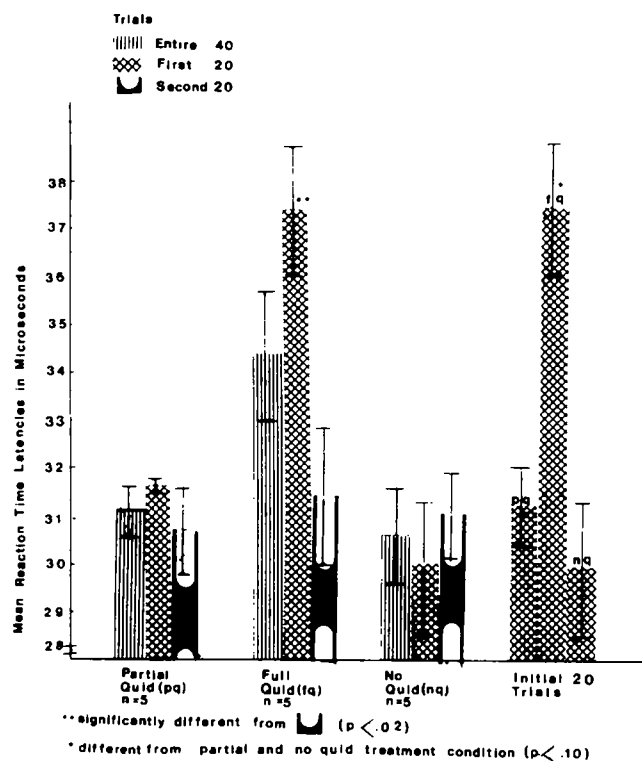


FIG. 1. Quid effect in first presentation cells of latin square.

and no quid conditions for the initial 20 trials (full: partial, $t = 2.01$, $p < 0.1$; full: no quid = $t = 2.00$, $p < 0.1$). Although the alpha level of 0.1 is higher than conventional levels, this difference obtained with an n of 5 suggests very strongly that the drug effect does indeed exist.

Analyses of variance were computed over the mean

reaction time latencies for each variation of the quid and order of presentation. Noted for the initial 20 trials was a significant treatment effect, $F(2,22) = 9.28$, $p < 0.01$, and a significant order effect, $F(2,22) = 7.29$, $p < 0.01$. Elapsed time from the beginning of the procedure to the end of the 20th trial was approximately 4 min and 50 sec. Tukey's HSD [4] was computed between the means of the three treatment conditions. A significant difference existed between the full and both the partial and no quid treatment conditions. The third order of presentation (see Table 1) accounted for a significant difference from the other orders.

No significant differences for order or treatment were demonstrated for the second 20 trials. However when the data were pooled, an ANOVA for the entire 40 trials revealed a significant order effect, $F(2,22) = 4.20$, $p < 0.05$. Tukey's HSD indicated that the third order of presentation, as in the initial 20 trials, accounted for a significant difference from the other orders. Although mean reaction time latencies lengthened after quid ingestion and approached significance in this analysis, no systematic treatment effect was demonstrated.

DISCUSSION

Since a significant treatment effect was demonstrated only in the initial 20 trials, this may indicate that the behavior effects following quid ingestion are manifested in an initial relatively short time span not exceeding an initial 5 min interval. The data also suggest that the entire quid is needed to produce discernible behavioral effects. This is indicated by the t -test between the variations of the quid in the initial 20 trials and by Tukey's HSD in the analysis of treatment effects in the initial 20 trials which indicate a difference exists only between the entire quid and both other quid variations.

Moreover, the results show a prerequisite of the order of presentation to yield a measurable effect. Tukey's HSD in analysis of the initial 20 trials and entire 40 trials indicated that when the full quid was presented first, reaction time latencies remained greater for this group in the entire analysis. This would seem to indicate that the quid effect in the initial testing session inhibited a familiarity with the reaction time task that may have been manifested during the other orders of presentation.

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