UCS intensity in eyelid conditioning¹

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Results are presented which contradict Burstein's (1965, 1967) contention that UCS intensity determines whether or not an S conditions rather than his asymptotic performance. Unbiased elimination of nonconditioners led to an increased rather than a decreased level of significance for UCS intensity.

Burstein (1965) has suggested that "UCS intensity is a determinant of whether individual Ss will or will not condition rather than a determinant of the level of conditioning attained" (p. 303). Burstein's proposal was the subject of a detailed reply by Spence & Platt (1966), which has recently been answered by Burstein (1967). The main criticism by Burstein of the Spence and Platt results was that the criterion used for elimination of nonconditioners differed from that of Burstein's (1965) report. The present analysis used, among others, the criterion described by Burstein (1965).

Method

A detailed description of the method and results can be found in Suboski (1967). The additional analyses reported here are for the three groups that simply received 80 classical conditioning trials at UCS intensities of 40, 80, or 160 mm of mercury (.77, 1.55, and 3.09 psi, respectively). Each group contained 10 male and 10 female volunteers from introductory psychology classes at Indiana University. They were conditioned in well illuminated rooms and without a ready signal to a visual CS of 575 msec. duration, with the last 100 msec. overlapping the air puff. Eyelid closures producing recording pen deflections of at least 1 mm from the baseline within the latency range of 150 to 500 msec. after CS onset were scored as CRs.

Results and Discussion

Table 1 shows aspects of the data with different criteria for elimination of Ss. At each criterion an analysis of variance was conducted on the arc sine transform of individual percentages of CRs on the last 40 trials with UCS intensity as the single dimension. Performance across these trials was essentially asymptotic for all groups. Analysis including all Ss yielded a significant UCS intensity effect, $F=5.69$, $df=2/57$, $p<.01$, which accounted for 13.5% of the variance. Elimination of only those Ss giving 10% CRs or less during the first 50 trials (Burstein's criterion) had virtually no effect on the F ratio, $F=5.41$, $df=2/53$, the significance level, $p<.01$, or the percentage of the variance accounted for, 13.6%. As shown in Table 1, this apparently occurred because the error mean

square of the analysis of variance was reduced by one-half while the between-group differences were reduced by only one-third.

However, as Spence and Platt pointed out, eliminating only nonconditioners introduces bias by differential selection of Ss, a bias which renders the analysis uninterpretable. Following Spence and Platt's suggestion, a more appropriate procedure is to drop a number of Ss from the low end of each group equal to the largest number of nonconditioners in any group. This procedure increased both the F value, $F=10.08$, $df=2/48$, the significance level, $p<.001$, and the variance accounted for, 26.3%.

In order to determine the pervasiveness of the UCS intensity effect, equal numbers of Ss were eliminated as the criterion was made progressively more strict. This had little effect on F ratios, $F=10.89$, $df=2/45$ at a 20% criterion, $F=9.03$, $df=2/42$ at 30%, and $F=10.59$, $df=2/33$ at 40% (all $ps<.001$), with the percentage of variance attributable to UCS intensity remaining above 26%. Examination of Table 1 shows that increasing the strictness of the criterion continued to have a proportionately greater effect on the error mean square than on the between-group difference. Finally, only Ss failing to exceed the 40% criterion were eliminated, yielding an F ratio, $F=4.71$, $df=2/41$, significance level, $p<.025$, and accountable variance, 14.4%, little changed from the 10% criterion.

The analyses indicate a UCS intensity effect relatively insensitive even to biased selection of Ss and a very strict definition of conditioners. A possible source of Burstein's (1965) failure to obtain a robust effect of UCS intensity is his procedure of scoring as CRs only those responses with latencies greater than 650 msec. when using a 1 sec. interstimulus interval. Since one effect of increasing UCS intensity

Table 1. Mean per cent CRs, between group differences, and error mean squares for different criteria for elimination of Ss.

Criterion	40MM % CRs	N	80MM % CRs	N	160MM % CRs	N	largest difference	EMS
All Ss	69.8	20	66.9	20	87.7	20	20.8	328.2
≤ 10% CRs	73.0	19	77.7	17	87.7	20	14.7	168.4
= N, ≤ 10%	75.9	17	77.7	17	92.8	17	16.9	116.0
= N, ≤ 20%	76.9	16	80.3	16	93.1	16	16.2	95.3
= N, ≤ 30%	78.9	15	81.6	15	93.1	15	14.2	93.7
= N, ≤ 40%	82.8	12	85.2	12	95.8	12	13.0	66.8
≤ 40% CRs	82.8	12	83.8	13	91.4	19	8.6	84.0

is to reduce CR latency (Suboski, 1967), a good many CRs given by Burstein's high UCS intensity group may simply not have been scored.

References

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Note

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