each level of π , Δ EV correctly rank orders the values of $P(A_1)$, but the fact that all .80 groups are above .60 groups is not consistent with the Δ EV values of Table 1.

In one respect, the present findings differ from those of Katz. While Katz found that the variances due to cost and gain were similar, and that the two variables did not interact, in the present study gain has a greater effect than cost, and the variables do interact in the manner noted above. The single and joint effects of the two payoff variables are apparently different at a π value of .5 than at π values of .6 and .8.

The relationships among values of $P(A_1)$ for the four payoff conditions at .8 are quite different after 300 trials than after 100 or 150 trials, as evidenced by the significant $T \times \pi$ ($df = 5, 920$; $F = 15.44$; $P < .001$) and $T \times G \times \pi$ ($df = 5, 920$; $F = 7.40$; $P < .001$) interactions. This provides some explanation of why the earlier studies (Taub & Myers, 1961; Myers et al., 1961) resulted in somewhat different trends, particularly with respect to

Δ EV, than Katz's study or the present one.

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Comment

The paper by Longo, Klempay and Bitterman, "Classical Appetitive Conditioning in the Pigeon" (*Psychon. Sci.*, 1964, 1, 19-20) raises a basic question: What criteria must a conditioning situation meet to qualify as *classical* conditioning? Is the lack of contingency between response and administration of reinforcement adequate to identify a classical conditioning experiment? For reasons developed elsewhere (Kimble, G. A. *Hilgard and Marquis' Conditioning and Learning*, Appleton-Century-Crofts, 1961) I believe that the answer to this question is *no* and that classical conditioning applies only to responses of the sort which Skinner called elicited and the layman calls involuntary.

On this basis it seems unlikely that the study by Longo et al., involved a classical conditioning experiment. The responses conditioned were not described in detail, but the authors themselves note that "much of the activity that develops in the appetitive situation may be instrumental in character—a product of adventitious reinforcement." This point is convincing. Indeed it cannot be ruled out that everything *recorded* in the experiment

was behavior of this "superstitious" variety.

This interpretation raises a second basic question: Do experiments on instrumental conditioning have any relevance to the CS-US interval function which was the object of investigation in the study in question? It seems to me that there is probably no connection except indirectly. A two process theory of such learning would posit the development of (largely unmeasured) classical CRs simultaneously with the establishment of the superstitious instrumental responses actually observed. Even if one chooses to make this assumption, however, there is no evidence that the instrumental behavior measured in such experiments provides a good index of the measured classical CR.

These considerations urge caution in referring to an experiment as classical conditioning just because there is a non-contingent relationship between CR and reinforcement. Especially in the titles of articles it seems to be important to reserve the expression, "classical conditioning" for experiments where that designation is less open to question.

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