Ask the Experts

Response to Ahrendt, Houlihan, and Buchanan

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This paper reports some puzzling results from a token economy in an inpatient behavioral treatment facility. A seemingly insignificant change from poker chip tokens to sticker tokens produced substantial increases in problem behavior—as measured by frequency of time-outs for problem behavior. The results are puzzling because it is generally assumed that qualitative aspects of the tokens—such as whether or not they are handled—should not matter.

What should matter is simply the correlation between tokens and other reinforcers for which they are exchanged. Indeed, the successful use of check marks, stickers, and stars in scores of token systems over the years shows pretty clearly that stickers and other nonhandled tokens are up to the job.

Why, then, did behavior deteriorate in this case? Without additional information on other aspects of the program, it is hard to know for sure. Laboratory research may provide a few clues, however. To begin with, the findings seem relevant to the literature on *incentive contrast*—behavioral changes due to shifts in reinforcer value. Dozens of studies with a range of species have shown that downward shifts in reinforcer value induce predictable changes in behavior, including aggression and other behavior incidental to the reinforcement contingencies (Flaherty, 1982; Pellegrini et al., 2008). What is notable about these findings is that a reinforcer capable of sustaining behavior in its own right loses its value when contrasted with a higher-valued reinforcer. In the present case, the value of the stickers may have been degraded by contrast with the higher-valued poker chip tokens.

This raises another question, namely, why should poker chips work better than sticker tokens as conditioned reinforcers? Looking again to laboratory research, classic experiments by Kelleher (1958) and Malagodi (1967), with chimpanzees and rats, respectively, have shown that animals frequently engage in various forms of token-directed behavior (e.g., handling and manual contact), arising from the frequent token-food pairings. While such handling does not seem necessary for tokens to function as effective reinforcers—as other research with pigeons has shown functional control by visual nonmanipulable tokens—it is certainly possible that manual contact enhances the reinforcing efficacy of tokens. Such handling may also heighten the discriminative functions of the tokens, clearly delineating the token-earning responses (an effect sometimes called *marking*), as well as bridging the gap between tokens

and exchange periods. Based on these findings, it is not unreasonable to think that handling the poker chip tokens, if even briefly upon earning and then again upon exchange, enhances their reinforcing efficacy.

To properly evaluate this hypothesis, it would be helpful to know more about the token-production and exchange schedules, both of which have been shown to be critical determinants of behavior in token economies. In a classroom-wide token economy with fourth and fifth grade students, for example, McLaughlin and Malaby (1972) showed that a subtle change in the exchange schedule—moving exchange opportunities from fixed times once per week to variable times once per week—produced marked improvements in completion of academic assignments. Such effects have also been seen in several laboratory experiments as well (see review by Hackenberg, 2009), and helps make the point that even small changes in the scheduling of tokens and exchanges can have large and lasting effects on token-producing behavior (in the present case, academic and pro-social behavior).

The authors seem to appreciate the need to collect additional data on such positive behavior on which tokens depend. It might also be useful to consider the use of response-cost (token loss) procedures to reduce inappropriate behavior. Such token-loss procedures have proven highly effective in both laboratory (Pietras & Hackenberg, 2005) and applied settings (Conyers et al., 2004; Iwata & Bailey, 1974). A simple fine or penalty may be more effective in dealing with misbehavior on the spot than the escalation of misconduct that eventually results in a time-out. Moreover, unlike time-out seclusion procedures, token-loss procedures do not involve removal of the client from the classroom, thereby permitting additional opportunities to earn tokens for positive behavior.

I encourage the authors to pursue additional work along these lines. Despite widespread and successful use of token economies in a range of therapeutic and educational settings over the years, we still know surprisingly little about *why* such procedures work as well as they do. In fact, it's a testament to the efficacy of token systems

that only when they stop working—as in the present case—do we pause to reflect on what might be going on. Puzzling effects, like those reported here, provide important opportunities to better understand how token systems work, and applied researchers are in the best possible position to do so. If done carefully, with attention to basic mechanisms, such work can advance the science as well as the application of token reinforcement.

References

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