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Abstracts

MPR and concurrent choice

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Killeen's theory of mathematical principles of reinforcement has not yet been applied to concurrent schedules of reinforcement. This paper describes a first attempt at doing that, and assesses MPR's success at predicting well-known results in concurrent choice.

Detection and reinforcer magnitude.

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University of Otago

Pigeons were trained in a signal-detection procedure. Four levels of stimulus disparity were arranged. Relative reinforcer magnitude was varied across conditions at each disparity level. A Davison and Tustin (1978) analysis of the results found that the sensitivity of behaviour to changes in reinforcer magnitude decreased as stimulus disparity increased.

Generalisation of latency to choice in DMTS

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6 hens were trained in a delayed matching-to-sample procedure at delays of 2 and 4 s. The probability of reinforcement for correct responses was initially 0.9 at both delays until performance stabilised. A generalisation probe was then carried out by inserting unreinforced trials at delays of 0, 1, 1.5, 2.5, 3, 3.5, 4.5, 5 and 6 s in a session amongst normal training delay trials. The generalisation functions of latency to choice were basically flat. The probability of reinforcement at the 2-s delay was then dropped to 0.1, so that in the terms of the classical generalisation/peak shift paradigm, 2-s delay trials became S^- and 4-s delay trials became S^+ . Another generalisation probe was then conducted. This resulted in a mean maximum latency over all hens, at the 1.5 s delay. Further conditions and generalisation tests showed strong evidence of a maximum latency at a delay between 0 s and S^- (negative peak shift) and some evidence of a minimum latency at 4.5 or 5.0 s (positive peak shift). The latency functions for each condition were simpler and smoother than, and did not coincide with, the contemporaneously obtained discriminative performance functions.

Re-conceptualising the contingencies of reinforcement in matching-to-sample tasks

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This paper describes, discusses, and extends the conceptual model of matching-to-sample (MTS) performance that was proposed by Jones (2003). Unlike the models proposed by Davison and Tustin (1978), Alsop (1991) and Davison (1991), this new approach involves a distinction between signal-detection-type tasks where two topographically different responses are required to two samples, and matching-to-sample tasks where discriminations between samples and discriminations between comparisons are required. I argue that the former tasks involve three-term contingencies of reinforcement whereas the latter involve four-term contingencies, and consider the converging evidence for these conceptualizations. The implications of this approach for understanding conditional discriminations involving asymmetric events, and reinforcement effects in MTS and delayed MTS tasks, will also be discussed.

Hens' social preferences: A preliminary examination of social hierarchy.

Amy Tannahill, Cath Sumpter, and Mary Foster

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The results of previous experiments examining the social preferences of hens using a concurrent-chains procedure, have indicated that hens tend to prefer to be in the presence of a hen rather than no hen, and that the magnitude of the bias appears to be greater if the subject hen is subordinate to the stimulus hen. My Masters' thesis will explore the social preferences of six hens, using the concurrent-chains procedure in which the subject hens will choose to wait in the presence of one of two stimulus hens; one higher and one lower than the subject hen in terms of dominance hierarchy. As a preliminary experiment, the dominance hierarchy of 10 hens was assessed over four observation sessions, with and without a small amount of food available. The results of this preliminary study will be presented and discussed.

Prefeeding, Ambient Temperature, and the Inferior-Good Effect

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Inferior goods differ from normal or superior goods in that the former are lower in cost (response requirement) and lower in some aspect of "value" such as taste while the latter are higher in cost and higher in this value. In low-income conditions (low number of reinforcers per session), the consumption of an inferior good is relatively high compared to consumption of a superior or normal good. In high-income conditions (high number of reinforcers per session), the consumption of an inferior good is relatively low. Data from the current experiment and from previous experiments with hens suggest that ambient temperature and the amount of food in hens' crops before sessions may be important for the effect to occur or not occur.

Consumption Rate or Total Consumption? Which is the “better” measure of demand?

Catherine Sumpter, Mary Foster, William Temple, Michelle Thompson & Jennifer Chandler

The University of Waikato

Most “demand” studies end sessions after a fixed duration (usu. 12 or 24 hrs) and measure total consumption, while some researchers limit total reinforcers in order to control intake and report consumption rate. However, consumption rate and total consumption are not always equivalent demand measures. In the present experiment, six hens pecked a key for 3-s access to wheat under increasing FR schedules and total consumption and consumption rate measures were compared across four conditions that differed in terms of how the session was terminated (i.e., after 30 reinforcers, 60 reinforcers, 40 mins and 3 hours). It aimed to provide data that may help answer the following questions: Is total consumption (TC) or consumption rate (CR) the “better” measure of demand? Does the “better” measure of demand depend on the method of session termination? Is it best to terminate experimental sessions after a fixed amount of time or a fixed number of reinforcers? If fixed lengths sessions are best, how long should the sessions be? The resulting data will be discussed in light of these questions.

Selective attention in the cow

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In an attempt to assess what aspects of simple stimuli would come to control cow discrimination, two cows were trained to push through a gate with a red cross and not push through one with a yellow triangle. A series of probes trials suggested that control was by the colour of the negative stimulus. A second discrimination between orange and green showed apparent control by the shape of the negative stimulus. The data will be presented and discussed in terms of their implications for training cattle to move through an automated milking system.

A Procedure to Teach a Boy With Asperger’s Syndrome to Put on His Socks

Susan McGregor, Eric Messick, Kris Coontz, & Mary Foster

University of Waikato, New Zealand

A seven-year-old boy with Asperger’s syndrome had difficulty putting on his socks independently (sock-ons) during his morning routine. In the morning, parents implemented a prompt hierarchy for each component of the boy’s morning routine, including the sock-on component; in the afternoon, two teachers taught sock-ons using a discrete-trial procedure. Afternoon sessions began with oversized socks, progressed to medium, small, and finally to normal-sized socks over the course of approximately six weeks. The programme established and maintained independent sock-ons during the boy’s morning routine reduced morning-routine duration.

Psychological Time: The Effect of Task Complexity on the Human Estimation of Duration.

Simon Webber, T. Mary Foster, James McEwan, and Catherine Sumpter

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This research topic investigates the human perception of time, the overestimation or underestimation of duration or what has commonly been called 'psychological time' as a function of task complexity. Researchers have suggested that time passes slower when doing a simple task, e.g., tapping a pencil, and passes faster when doing a complex task, e.g., solving a math problem (Axel, 1924; DeWolf & Duncan, 1959; Loehlin, 1959; Smith, 1969; Craik & Hay, 1999). In a within-subjects design, participants had to do computer-generated jigsaw puzzles that varied in terms of the number of pieces in the puzzle. In the first series of experiments, the simple task condition was where there were fewer pieces and in the complex task condition was where there were more pieces. It was predicted that participants would estimate time as passing slower in the simple condition and faster in the complex condition. Results did not confirm the hypothesis. In a second series of experiments, reinforcement rate was manipulated. It was predicted that participants would estimate time as passing slower when the reinforcement rate was decreased and estimate time as passing faster when the reinforcement rate was increased, as predicted by the behavioural theory of timing (Killeen and Fetterman, 1988). Results did not confirm the hypothesis.

Currently, a third series of experiments using jigsaw puzzles are being designed where reinforcement rate is again being manipulated. Results from these series of experiments will be presented (if available).

Shadowing: Does it benefit our recognition of familiar objects?

Richard, J. M. Etheredge, James McEwan, Mary Foster; and John Perrone.

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Shadowing provides strong depth and movement cues, but its role in object recognition is less certain. Forty-two University of Waikato undergraduate students participated in a word-picture verification task. The pictures were of six familiar objects rendered against a white background. The presence versus absence of shadows was manipulated, as was the exposure (level of ambient lighting) of the pictures. In the most over-exposed conditions, the presence of shadows enabled the participants to maintain the same accuracy and response latencies as under normal viewing conditions. In the equivalent conditions with shadows absent, accuracy decreased, and response latencies increased, with respect to some of the objects. The results suggest that the information provided by attached and cast shadows is used by the recognition system, but that any benefit is only evident in the absence of other more salient cues to recognition, such as general outline.

Assessing relative sensitivity of human behaviour to control by rules and consequences

Tania Signal, James McEwan & Catherine Sumpter

Waikato University

Human operant performance has been found in previous research to be closely related to verbalised rules and is often found to be insensitive to underlying contingencies of reinforcement. In Svartdal (1995) verbal rules for responding (e.g., experimenter specified force or speed of response) were put into direct conflict with the underlying contingencies of reinforcement. According to Svartdal although participants began an experimental session responding as per the instructions given, contingency appropriate responding emerged as the session continued. However, when asked to identify their pattern of responding following the experiment they were unable to verbalise the shift in their responding. This experiment was an attempt to replicate Svartdal's findings using a computer presented JigSaw task. The failure of this attempt and possible reasons for the failure will be discussed.

Soft Commitment: The Effects of 'Temptation'

Tia Neha, Randolph Grace & Anthony McLean

University of Canterbury

Our first experiment partially replicated Siegel and Rachlin's (1995) study of soft commitment. "Soft commitment" refers to a situation in which self-control is increased by requiring an extended behavioural pattern produce either the shorter-sooner (SS) or larger-later (LL) outcome. Results showed that the effect of 'soft commitment' was greater with fixed-ratio (FR) 31 schedules compared with fixed-interval (FI) 30 s, consistent with Siegel and Rachlin's findings. In Experiment 2, we explored the effect of a manipulation analogous to 'temptation' in humans. FR 31 choice trials were interrupted with a temptation cue (i.e., a red centre key that signalled immediate availability of the SS outcome. Temptation cues were presented at different programmed response locations during the trials. Results showed that the probability of pecking the temptation key and the latency to respond ('succumb') changed systematically depending on response location, suggesting that pigeons were better able to 'resist temptation' when the cue was presented later rather than earlier during the FR 31.

Behaviour analysis and ontology

Christian Krägeloh

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I will adopt a perspective of behavioural pragmatism to argue that behaviour analysts will be better off abstaining from making ontological assumptions. Since such statements are essentially only prescriptions on how behaviour analysis is to be conducted, we can reformulate and refine these prescription to avoid misconceptions about behaviour analysis in the wider community of psychology and avoid discussion that distracts from the main purpose of a science of behaviour – prediction and control of behaviour. One of the main arguments Skinner presented against mentalistic accounts was their lack of power compared to behavioural explanations – an argument which can be resolved by empirical investigation irrespective of any underlying ontological assumptions.

Professional Behaviour Analyst Training for New Zealand Universities

Oliver C. Mudford

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The Behavior Analysis Certification Board® (BACB) coursework requirements are changing now. New Zealand Universities will be standardizing their degree structures and student workload definitions soon. These developments will be reviewed, and some preliminary models for educating and training applied behaviour analysts to high academic and professional standards are presented.

Are we just plain 'Dotty'?

Mickey Keenan

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Behaviour analysts has made significant contributions to the study of human behaviour. However, 'we happy few', as Skinner once described us, continually meet with misrepresentation of our work. One solution is to blame those who 'get it wrong'. Another solution is to look at how we present the findings of our science and its philosophical position as a natural science. In this paper I raise some questions about our use of dots as discriminative stimuli in our educational material. Dots on a graph may hold some intrinsic value to the trained eye, but surely there is more we can do to portray the sophistication of our work. Using some animations and other multimedia material I offer some suggestions for how we can move beyond the confines of the printing press.

Does a stimulus equivalence task result in derived relationships between samples and targets?

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Stimulus equivalence refers to the emergence of derived relationships between stimuli employed as targets and samples in a matching to sample task which show the characteristic features of equivalence (identity, symmetry and transitivity). Two competing accounts for its explanation are provided by Sidman's contingency analysis and relational frame theory. A critical feature of relational frame theory is that it allows for the emergence of classes based upon relationships other than equivalence. In the experiments described here stimulus equivalence was obtained in a two-level, three-item, matching to sample task. We then examined whether there was evidence for the availability of a second set of classes consisting of "targets" and "samples". Some participants did seem to exhibit consistent with such "collateral" matching behaviour. These data seem to be difficult to explain in terms of Sidman's principles, and are thus more easily accommodated within relational frame theory. We speculate that this behaviour may be related to the kinds of processes which, for example, allow foreign language listeners to identify the language in which words are spoken without any knowledge of their meaning.

Independence of Terminal-Link Entry Rate and Immediacy Ratio in Concurrent Chains

Mark Berg & Randolph Grace

University of Canterbury

Four pigeons were trained on a three-component concurrent-chains procedure in which components differed only in terms of relative terminal-link entry rate. The initial links were independent concurrent VI 22.5 s VI 45 s in the Red component, VI 45 s VI 22.5 s in the Green component, and VI 30 s VI 30 s in the White component. The terminal links were VI schedules, were always the same between components, and were varied across conditions to produce immediacy ratios of 4:1, 1:4, 2:1 and 1:2. Regression analyses were conducted to determine sensitivity to immediacy for each component. Averaged across birds, sensitivity to immediacy was 0.92, 0.97, and 0.96 in the Red, Green, and White components, respectively, and within subjects there were no systematic differences between components. Average sensitivity to relative terminal-link entry rate was 0.86. These sensitivity values are consistent with prior research, and support the generalized-matching assumption that sensitivity to immediacy should be independent of relative terminal-link entry rate.

Rapid Acquisition of Preference in Concurrent Chains: Effect of Number of Delays

Randolph Grace

University of Canterbury

Rate of acquisition in choice and discrimination procedures depends on the frequency of alternation. Although 'lab lore' suggests that preference in concurrent chains shifts slowly when the terminal-link schedules are changed, Grace, Bragason, and McLean (in press) found that pigeons' relative initial-link response rate was sensitive to the immediacy ratio in the current session when one of the terminal-link fixed-interval (FI) schedules was changed daily according to a pseudorandom binary sequence (e.g., Schofield & Davison, 1997). The present experiment tested whether the number of different delays used across sessions had any effect on acquisition in the rapid-alternation procedure. In one condition ('minimal variation'), the left terminal link was always FI 8 s and the right terminal link was either FI 4 s or FI 16 s. In the other condition ('maximal variation'), a unique pair of FI values was used in each session. Responding was sensitive to the current session immediacy ratio in both conditions, and across birds there was no systematic difference in sensitivity. These results challenge the view that initial-link responding in the rapid-alternation procedure reflects the relative value of the terminal-link stimuli, and suggests instead that the pigeons may have learned a rule-based categorical discrimination (e.g., 'choose short').

Rapid acquisition of preference when terminal-link schedules follow either an ascending or descending pattern.

Darren Christensen and Randolph Grace

University of Canterbury

Grace, Bragason, and McLean (in press) used a concurrent-chains procedure in which one terminal-link was a fixed-interval of 8 seconds, while the alternative schedule changed randomly from day to day. They found that initial link responses were most sensitive to the schedules arranged in the current session, although there was some evidence of control by prior sessions. An intriguing result from their study was that some pigeons exhibited clustering of response allocation into two groups, possibly indicating that these subjects were using some sort of categorical discrimination. In this experiment, the same concurrent-chains procedure was used but this time the alternative schedule consisted of either an ascending or descending pattern of reinforcement immediacy. The purpose was to test if the apparent categorical discrimination found in the previous study was also evident when changes to reinforcement immediacy were more systematic. The results were similar to the previous study, with two subjects exhibiting a clustering of response allocation. This experiment provides further evidence that pigeons are able to rapidly change response allocation when reinforcement immediacy changes, and suggests that categorical discrimination may sometimes determine initial-link responses.

Some local effects of “conditioned” reinforcers

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University of Auckland and University of California, Davis

Recent research has documented order in measures of preference following reinforcers that consists of a brief pulse in preference lasting around 15-20 s. Pulse heights and durations are greater for larger and more-frequent reinforcers, and smaller for more delayed reinforcers. These pulses are the frequency representation of high-probability, longer-duration, visits following reinforcers. The present experiment used a within-sessions variation of reinforcer ratios across components, and arranged to replace some proportion of food reinforcers with a magazine light. Pulses following magazine light were smaller and shorter than those following food, but neither was affected by the magazine-light to food ratio. Parallel results were found for visit durations. We conclude that “conditioned” reinforcers do not decrease the value of the food reinforcers on which they depend, and we discuss the predictive nature of magazine lights.

Preference in concurrent chains: the value of signals for reward

Karla Mattson

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Pigeons were given the choice between two alternatives with identical-duration initial and terminal links. Choice of one alternative (uncertain) led to one of two possible outcomes, reinforcement (3.5 sec) or non-reinforcement ($p = 0.5$). Choice of the other alternative (certain) always resulted in food (3.5 sec) at the end of the delay. Each outcome was signalled with coloured key lights, in the terminal link, either differentially or non-differentially. When the scheduled outcome on the uncertain side was differentially signalled, we found a moderate to strong preference for the certain side. However, when the scheduled outcome on the uncertain side was not differentially signalled, preference for the certain side became more extreme. This result was interpreted as replicating the signalling effect reported by Mazur (1993). With a similar design, another three conditions manipulated the magnitude of primary reinforcement, rather than its probability. When primary reinforcement was arranged like this, there was no significant difference between the differentially and non-differentially signalled conditions. This result was surprising and we are investigating it further.

Resistance to contingency suspension with and without reinforcement change

Anthony McLean, University of Canterbury

In this experiment, some of the reinforcers arranged in two components of a multiple schedule were non-contingent and others were contingent on pecking. Resistance to change was assessed by 1) cancelling all reinforcers, 2) cancelling only contingent reinforcers, and 3) by making all reinforcers non-contingent. Each of these disruptors completely suspends the response-reinforcer contingency, but only some of them changes reinforcement. Additional tests used VT food presented in blackouts between components or prefeeding. In the baseline conditions for Part 1 of the study, 80% of reinforcement was response-contingent in one component and only 20% was in the other, and overall rates of reinforcement were the same in the two components. In Part 2, there were equal rates of response-contingent reinforcement in the two components, but one component had in addition a high rate of non-contingent reinforcement and the other component had none. Results showed that overall, reinforcement in a component increases resistance to change in that component, whether it is contingent on the measured response or not. There were also differences in resistance to change depending on the type of test used. However, these differences did not support the idea that measured resistance to change is lower when the change in reinforcement rate in a component is large, as suggested by the generalization decrement hypothesis.

Molar and Molecular Views of Choice

William M. Baum

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The molar and molecular views are not different theories or levels of analysis, they are different paradigms. The molecular paradigm views behavior as composed of discrete units (responses) occurring at moments in time and strung together in chains to make up complex performances. The discrete pieces are held together as a result of association by contiguity. The molar paradigm views behavior as inherently extended in time and composed of activities that have integrated parts. In the molar paradigm, levels of analysis differ as to whether they are local or extended, and behavior may be controlled sometimes by short-term relations and sometimes by long-term relations. Applied to choice, the molar paradigm rests on two simple principles: (a) All behavior constitutes choice; and (b) All activities take time. Equivalence between choice and behavior occurs because every situation contains more than one alternative activity. That behavior takes time refers not simply to any notion of response duration, but to the necessity that identifying one action or another requires a sample extended in time. The molecular paradigm's momentary responses must be inferred in retrospect from extended samples. In this sense, momentary responses constitute abstractions, whereas extended activities constitute concrete particulars. Explanations conceived within the molecular paradigm invariably involve hypothetical constructs, because they require causes to be contiguous with responses. Explanations conceived within the molar paradigm retain direct contact with observable variables.