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DRIVE AS A UNIFYING CONCEPT IN LEARNED HELPLESSNESS: THEORY AND EXPERIMENTS

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DRIVE AS A UNIFYING CONCEPT IN LEARNED HELPLESSNESS: THEORY AND EXPERIMENTS

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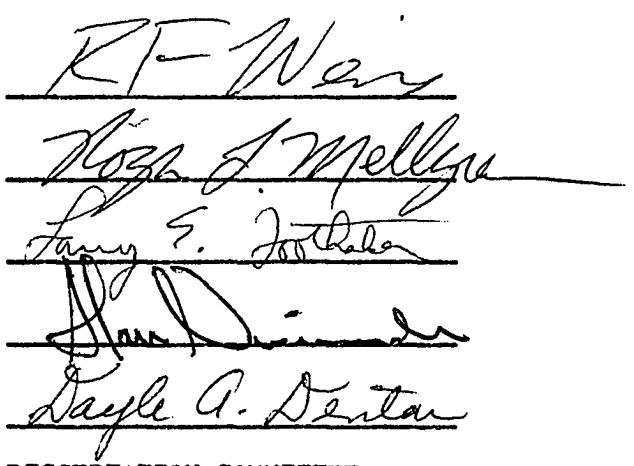

DISSERTATION COMMITTEE

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Abstract

While learned helplessness theory has successfully explained a broad range of learned helplessness phenomena, a range of incongruous data exists. A drive theory of learned helplessness is advanced to resolve these incongruities. According to drive theory, learned helplessness results from the drive energization of responses inappropriate for subsequent tasks: the drive is induced as a function of the prior uncontrollable aversive events. Implications of drive theory were investigated in a series of five experiments in which Internal and External locus of control individuals experienced uncontrollable or controllable pretreatments differing in intensity of drive induction prior to instrumental escape conditioning. As predicted from drive theory, learned helplessness in Externals and response facilitation in Internals: (a) was a function of the intensity of drive induced by uncontrollable aversive events (Experiments 1 and 2); (b) was independent of prior uncontrollability (Experiments 3 and 5); and (c) resulted only when the prior uncontrollable events were a source of drive (Experiment 4). In light of these findings distinct predictive and explanatory power is gained by the drive theory of learned helplessness.

Drive as a Unifying Concept in Learned Helplessness: Theory and Experiments

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The learned helplessness phenomenon has been empirically demonstrated across a variety of species and experimental situations and is viewed as having behavioral similarity to human depression (e.g., Seligman, 1975). Theoretical accounts of learned helplessness, therefore, not only provide fascinating illumination of the learned helplessness phenomenon, but also can be extended to provide theoretical explanation of the development, alleviation, and prevention of human depression. However, the general acceptance of Seligman's learned helplessness theory as the theoretical explanation, in light of telling animal and human empirical paradoxes, has served to limit human research to empirical demonstrations. The overshadowing of the equivocal nature of this theory of learned helplessness by the unquestioned excellence of the animal experiments has prevented necessary development and refinement of theory. The focus of the present paper is to explore areas of theoretical - empirical incongruity, propose a more comprehensive theoretical explanation, and test implications of this new approach in five experiments.

Learned helplessness has been defined as impaired instrumental responding following exposure to inescapable aversive events and has been found in man and animals across a variety of species and aversive conditions (for an excellent review of the animal

literature see Seligman, Maier, and Solomon, 1971). With humans, finger shock (Thornton & Jacobs, 1971; Thornton & Powell, 1974), loud noise (Hiroto & Seligman, 1975), withdrawal of entertaining material (Koch & Moffat, 1974; Williams & Moffat, 1974), and insolvable cognitive tasks (Hiroto & Seligman, 1975) have all been used in the successful demonstration of the learned helplessness phenomenon. Thus, when presented with inescapable aversive events, humans like animals, showed impaired instrumental responding on subsequent tasks.

Seligman et al. (1971) attribute these interfering effects of prior inescapable aversive events to the learning of a contingency of independence between responding and reinforcements which is inherent in the uncontrollability of the aversive events. As a result, individuals learn the independence of responding to reinforcement (offset of the aversive stimulation). Consequently, the motivation to make active instrumental responses is lowered, resulting in impaired responding in situations in which naive groups or groups experiencing prior escapable-controllable aversive events show adequate responding (e.g., Seligman & Maier, 1967).

While Seligman's learned helplessness theory has been used as the theoretical guide for human research, serious questions concerning this approach exist (e.g., Anisman & Waller, 1973). In both human and animal research there appear striking empirical dichotomies, where inescapable aversive events can lead to opposite outcomes. Animal research has revealed that prior inescapable aversive events impair instrumental responding on two-way escape/

avoidance and manipulandum escape/avoidance tasks, yet facilitates responding on one-way escape/avoidance and passive avoidance tasks. In human research a conceptually similar dichotomy has been reported and is defined by both locus of control (Dweck & Reppucci, 1973; Hiroto, 1974) task importance (Roth & Kubal, 1975), and intellectual performance (Thornton & Jacobs, 1972).

Learned helplessness theory offers reconciliation of the animal dichotomy by viewing initial uncontrollability as resulting in a lowered motivation for active instrumental responding. Response facilitation in passive avoidance tasks follows directly from such lowered motivation; as does the impairment found in both manipulandum escape/avoidance and two-way shuttle escape/avoidance tasks. Explanation of the response facilitation found in the one-way shuttle however, is dependent upon Seligman's interpretation of the one-way shuttle as an example of place learning not requiring active instrumental responses and therefore not affected by uncontrollability.

Recognizing the tenuous nature of this interpretation, Anisman and Waller (1973) offered a response competition hypothesis. Their explanation rests upon assumptions concerning the compatibility of the responses elicited by the fear associated with the prior inescapable aversive events with those required on the subsequent escape/avoidance task. If responses elicited by the fear are compatible with later escape/avoidance learning, responding will be facilitated; if incompatible responding will be impaired. Thus, fear-induced freezing impairs responding in two-way shuttle

escape/avoidance, and manipulandum escape/avoidance tasks, and facilitates responding on passive avoidance tasks; fear-induced fleeing is responsible for facilitation of one-way escape/avoidance. Anisman & Waller's activity hypothesis suffers, as do similar response competition theories (e.g., Weiss, Krieckhous, & Conte, 1968), from dependence upon explanations using responses specifically elicited as a result of fear induced by aversive events. As these explanations are extended to explain equivalent human phenomenon, the tenuous nature of notions employing typical fear elicited responses of humans becomes increasingly pronounced.

The dichotomy in the human research has been explained by Seligman by imposing in effect a conceptual boundary condition to learned helplessness theory. Internal locus of control individuals will not develop learned helplessness while External locus of control individuals will, following inescapable aversive events (Dweck & Reppucci, 1973; Hiroto, 1974). Explanation of this finding is achieved by stating that locus of control, by definition, indicates in which individuals learned helplessness will and will not develop. Thus Internals, defined as individuals possessing expectancies of personal control, will not learn the independence of responding to reinforcement necessary for the development of learned helplessness, while externals will. Locus of control becomes in essence, a severely limiting boundary condition for learned helplessness theory; for this empirical relationship together with the previous finding of impairment/facilitation dichotomies undefined by locus of control (Roth & Kubal, 1975; Thornton & Jacobs, 1972) indicate

that learned helplessness develops not solely as a function of uncontrollable aversive events, but as a function of the characteristic expectations formed by individuals. Thus, locus of control may define only one of many potential conditions forming the boundaries of learned helplessness theory's extension to human behavior.

Striking empirical dichotomies, then, define the effects of prior inescapable aversive events. While the two dichotomies need not necessarily be explained by a theory proposed to account for part of the data, the power of any theory is a function of its ability to integrate and relate disparate findings. The ability of Anisman & Waller's activity hypothesis to give comprehensive explanation of the animal dichotomy is apparent. However, any similar explanation of the human research is fatally flawed by theoretical dependence upon responses elicited by fear associated with the aversive events. Seligman's learned helplessness theory explains both the animal and human dichotomies, not by theoretical constructs incorporated within the body of the theory, but by definitional statements describing parameters outside the theory's range. Thus, when the nature of the task leads to response facilitation, the task by definition describes a theoretical boundary; similarly, as locus of control describes when learned helplessness will or will not develop, locus of control by definition defines a boundary. Learned helplessness theory becomes acceptable only as far as we are willing to accept severely limiting boundary conditions.

The theoretical account presented here uses the previous boundaries of learned helplessness theory as integral parts of

its explanatory system and relies on a single construct to explain both the animal and human empirical dichotomies. This approach not only attempts to integrate all the major findings from learned helplessness research, but based on well researched and understood findings and constructs of learning theory, allows learned helplessness to be tied to a much larger body of knowledge: a general approach which has benefited other psychological areas (e.g., Weiss & Miller, 1971; Zajonc, 1965).

NeoHullian learning theory states that generalized drive differentially energizes responses as a function of their response strengths. Accordingly, drive energizes all response tendencies with the greatest benefit accorded those responses highest in the habit hierarchy. If for a given task, the dominant response is correct, drive will facilitate responding; if the dominant response is incorrect for the task, drive will impair responding.

The typical learned helplessness experiment is conducted such that research participants are exposed to traditional drive induction procedures (e.g., experience with inescapable aversive events) prior to instrumental escape conditioning. If responses correct for that escape/avoidance task are dominant in the organisms habit hierarchy, the prior drive will facilitate responding. If the dominant responses are incorrect, the prior drive will impair responding. Facilitation of one-way escape/avoidance and passive avoidance, and impairment of two-way shuttle escape/avoidance and manipulandum escape/avoidance may be explained in terms of the hierarchy of habits elicited by aversive stimulation. As

infrahuman organisms tend to freeze and flee (e.g., Bolles, 1970) in response to aversive stimulation, and these are inappropriate for either the two-way shuttle escape/avoidance or manipulandum escape/avoidance tasks, prior drive leads to impaired responding (learned helplessness). Since freezing is appropriate for passive avoidance and fleeing for one-way shuttle escape/avoidance, prior drive facilitates responding.

In addition to explaining the animal empirical dichotomy, a drive theory of learned helplessness explains the human research by incorporating the previous boundary condition of Seligman's learned helplessness theory within its explanatory scheme. In addition to representing a personality dimension, Rotter's (1966) locus of control may be viewed as an index of generalized habit hierarchies. The wealth of research available on locus of control reveals the possibility of viewing that dimension in terms of dominant response tendencies in interpersonal situations (Joe, 1971; Lefcourt, 1966; Rotter, 1966). Externals may be conceived as having passive responding in interpersonal situations as their dominant response tendency; leading to slower instrumental learning and performance, less effectiveness in interpersonal interactions and social dependence. On the otherhand Internals may be conceived as having active responses in interpersonal interactions as dominant responses in interpersonal interactions; leading to better instrumental learning and performance, and indicative of an ability and desire to control interpersonal interactions. From this view, drive induced as a result of prior inescapable aversive events would be expected

to enhance the passive responding of Externals leading to learned helplessness in tasks involving interpersonal interactions. In addition, drive as a result of inescapable aversive events is expected to energize the active responding of Internals, leading to response facilitation.

In the present experiments, theoretical implications of learned helplessness theory and drive theory are investigated using interpersonal attitudes as social variables in an instrumental escape conditioning analog to an interpersonal conversation.

General Method

The present studies are modeled on typical learned helplessness studies in which individuals are exposed to some pretreatment prior to instrumental escape conditioning. This prior manipulation was different for each experiment and will be described in detail in the sections of each specific experiment. Instrumental escape conditioning was identical for all groups and consisted of 8 trials using a procedure shown to be analogous to traditional animal instrumental escape procedures (see Weiss, Lombardo, Warren, & Kelley, 1971). On each trial research participants could escape an aversive disagreeing stranger by pressing a switch (the instrumental response), the reinforcement for which was the opportunity to reply to that stranger. This procedure has been shown to be functionally equivalent to traditional escape conditioning procedures, where subjects escape an aversive event (e.g., shock) by making an instrumental response which terminates the aversive stimulus (e.g., Trapold & Fowler, 1960), in a series of experiments demonstrating

instrumental escape conditioning analogues of acquisition, extinction, partial reinforcement, delay of reinforcement, correlated reinforcement, drive, and intermittent shock effects (Weiss, Beck, & Stich, 1972; Weiss, Boyer, Colwick, & Moran, 1971; Weiss, Lombardo, Warren, & Kelley, 1971; Weiss, Williams, & Miller, 1972). The use of a procedure known to be functionally equivalent to escape conditioning as well as one which closely approximates typical interpersonal social interactions may hold advantages to those escape procedures specifically designed for learned helplessness experiments. As this procedure was identical for all experiments it will be described in detail below.

Subjects and Design

The research participants were 224 students (112 male and 112 female) from the introductory psychology pool at the University of Oklahoma. All experiments were blocked for sex. Except for a marginally significant sex effect in Experiment 1 there were no main or interactive effects for sex and all analyses were collapsed over that variable. Locus of control was determined by Rotter's locus of control scale (Rotter, 1966) which was administered along with a 35 item opinion survey prior to the experiments. Internality and Externality were determined on the basis of a median split with a score of 10 and above defined as External and 9 or below as Internal. Experiments 2-5 were independent experiments conducted simultaneously.

Deception and Masking Task

To mask the specific nature of the present studies the experiment was presented to research participants as a study of opinion change:

"We are interested in how your opinions may be affected by what someone else says; and how what you say may affect the opinions of another person." As a masking task, after each statement and reply (in the second phase of the experiment) the research participants indicated the degree to which their opinions changed.

The stranger to which individuals replied was a confederate of the experimenter. The confederate was always the same sex as the research participant and was said to be in another room. The research participant was told that this was to insure confidentiality of their candid opinions on controversial issues.

Apparatus

The research participant's room and experimenter's control room were separated. The research participant was seated at a table which included a rectangular console with four opaque windows. When illuminated from behind instructional signals appeared. The signals were the large printed words (a) "listen", (b) "throw switch if you wish to comment", (c) "talk" and (d) "final opinion". A panel mounted on the console contained the research participant's "comment switch" (a telephone toggle switch with a spring return). Also, on the left hand side of the console under the final opinion signal were the "final opinion" buttons. The buttons were marked from one to seven; five - seven indicating the opinion got stronger; one-three indicating a weakened opinion; and four indicating no change. Upon entering the room, the individual was presented with a set of headphones (microphone attached) with which that individual communicated with the experimenter and the stranger (confederate).

On the experimenter's side of the wall were the controls for operating the various signals, and headphones (with microphones) to monitor the experiment. A 1/100 sec. digital stop clock (Haydon #k 15140) automatically measured the research participant's latency (the time between the onset of the "comment" signal and the time that circuit was broken by the toggle switch being thrown). The research participants opinion change buttons were attached to corresponding lights in the control room enabling the experimenter to determine when the individual had finished and was ready for a new trial to begin.

Procedure

The research participant and the other person (addressed as Subject Green and Subject Blue, respectively) received the deceptive rationale over the intercom. The premanipulation was then presented to the research participant as an opportunity for Subject Blue to state his (her) opinion on a number of topics. The operating instructions and explanation of the experiment were then provided. It was explained that the other person had been provided with a list of topics. The other person would begin with the first topic on his (her) list, stating the topic to the research participant and then offering his (her) opinion. The research participant would then have the opportunity to comment on the other person's statement.

An experimental trial began with the "listen" signal being presented to Subject Green and the confederate reading the topic. These topics always consisted of one high interest, one low interest, and six moderate interest items. Item interest was determined

by a form asking individuals to indicate the ten items they were most and least interested in, which accompanied the 35 item opinion survey. The order of these items was selected via one of 10 randomly chosen schedules. After reading and commenting on the topic contrary to the opinion held by the research participant, the confederate operated a switch which both (a) presented the CS, the signal "throw switch if you wish to comment."; and (b) started the latency timer. When the research participant threw the "comment switch" the latency timer stopped. Latencies were recorded and converted to speed (100/latency). If the individual did not respond by throwing the switch within 20 sec., latency was considered infinite and speed counted as zero. After the research participant indicated the completion of his comment (pressing a finish button) the "final opinion" signal was activated giving that individual an opportunity to press one of the seven buttons to indicate the degree, if any, to which his (her) opinion had changed. Upon pressing one of the buttons the equipment would reset and another trial would begin.

Experiment 1

In attributing learned helplessness to the energization of dominant response patterns inappropriate for later escape responding, the drive theory of learned helplessness allows predictions which diverge from and expand upon learned helplessness theory (Seligman et al., 1971). If drive energizes the dominant passive responding of Externals then a positive relationship between the intensity of prior drive induced by inescapable aversive events and the magnitude of response impairment (learned helplessness) is predicted.

Similarly, if drive energizes the dominant active responding of Internals a positive relationship between the intensity of prior drive and response facilitation is predicted.

Experiment 1 examined these predictions in a design where Internal and External individuals were exposed to either of three intensities of drive induction prior to instrumental escape conditioning: inescapable disagreements on high interest attitudinal items (high drive); inescapable disagreements on low interest attitudes (low drive); or no prior treatment (no drive). Disagreements have been shown to be functionally equivalent to traditional aversive sources of drive induction (e.g., shock) in both discrimination learning studies (Byrne, Griffitt, & Clore, 1968) and discrete trials instrumental escape conditioning studies (Lombardo, Weiss, & Buchanan, 1972). Varying the interest of the attitudinal disagreement has been shown to be functionally equivalent to a drive magnitude manipulation where disagreements on high interest attitudes represent a greater magnitude of drive induction than disagreements on low interest items (Clore & Baldridge, 1968; Lombardo, Weiss, & Buchanan, 1972). Thus, inescapable disagreements on high interest items should lead to greater subsequent instrumental response impairment (learned helplessness) in Externals and response facilitation in Internals than inescapable disagreements on low interest attitudes. Seligman's learned helplessness theory attributes learned helplessness only to the uncontrollability of the prior aversive events (e.g., Maier, Albin, & Testa, 1973). Inasmuch as individuals experienced equivalent numbers of inescapable aversive disagreements, Seligman's learned helplessness theory can only yield predictions of equal

development of learned helplessness in both pretreated External groups. Furthermore, no specific predictions of differential responding of Internal locus of control individuals can be made as internality lies beyond the bounds of Seligman's learned helplessness theory.

Method

Forty-eight Internal and 48 External locus of control research participants were randomly assigned to one of three pretreatments prior to identical escape conditioning procedures. These pretreatments listed in descending order of intensity of drive induction were: 5 inescapable disagreements on high interest attitudinal items (high drive); 5 inescapable disagreements on low interest attitudes (low drive), or no pretreatment (no drive). Inescapability is defined as having individuals listen to a stranger disagree on five consecutive attitudes without the opportunity to escape by replying (or other means). All groups then received 8 trials of instrumental escape conditioning in which individuals could escape aversive disagreements by replying to the disagreer; the reply made contingent upon an instrumental response.

Results and Discussion

Insert Figure 1 about here

Figure 1-External and 1-Internal show the differential effects of prior inescapable aversive events as a function of locus of control. For Externals, as predicted from drive theory, learned helplessness or instrumental response impairment was clearly a function of the intensity of drive induced by prior inescapable

aversive events (disagreements) (see Figure 1-External); where mean instrumental responding for the no drive group was faster than the low drive group which was faster than the high drive group. A Jonckheere test (Jonckheere, 1954; Kirk, 1968; Nelson & Toothaker, 1975; Siegel, 1956) an elegant k-sample generalization of the Mann-Whitney test and a statistical technique designed specifically to assess the significance of rank orderings and differences between groups showed External groups to be significantly different in the order predicted by drive theory, z=2.79, p = .003. Thus, the intensity of prior drive as a result of inescapable aversive events, not uncontrollability per se defined the level of development of learned helplessness.

Instrumental response impairment did not occur following inescapable disagreements for Internals. Indeed as seen in Figure 1-Internal, mean instrumental response speeds over the first block of 4 trials showed both the low drive and high drive groups to be faster than the no drive group. t tests indicated that only the low drive group was significantly faster than the no drive group (only at marginal levels), $t(30) = 1.31$, $p = .10$. Congruent with previous studies (e.g., Hiroto, 1974) Internals did not develop learned helplessness and as predicted from drive theory showed some evidence of response facilitation due to drive-energized active responding.

In interpreting these results it is important to consider not only instrumental response speeds but the course of acquisition of the instrumental response. A significant trials effect in a repeated measures analysis of variance (over the 8 discrete trials) indicated

that all External groups acquired the instrumental response, $F(7,315) = 4.28$, $p = .0003$. Although clearly impaired in their instrumental performance, External groups were not impaired in acquisition of the response. The analysis of variance also supported the magnitude of learned helplessness effect by yielding a significant pretreatments effect, $F(2,45) = 3.48$, $p = .038$. Tukey's HSD statistic (Kirk, 1968) showed all three External groups to be significantly different from each other (all p's $< .05$).

Contrary to previous studies (e.g., Hiroto, 1974), Internals showed impaired instrumental response acquisition following inescapable disagreements. Simple main effects tests following a repeated measures analysis of variance over the 8 discrete trials with a significant trials effect, $F(7,315) = 2.55$, $p = .01$, and pretreatment X trials interaction, $F(14,315) = 1.79$, $p = .039$, indicated that only the no drive group acquired the instrumental response, $F(7,315) = 4.74$, $p < .025$.

The results clearly support a drive interpretation of the effects of prior uncontrollable aversive events. Differential development of learned helplessness in Externals occurred as a function of the intensity of drive induced by equal numbers of uncontrollable aversive events. Drive theory was further strengthened by the apparent response facilitation of Internals. Thus, the energization of dominant active response tendencies in Internals and dominant passive response tendencies in Externals by drive induced as a function of inescapable aversive events define the development of response facilitation and learned helplessness.

Experiment 2

If learned helplessness in Externals and response facilitation in Internals develop as a function of the strength of drive induced by equal numbers of inescapable events of differing intensity (Experiment 1), then the development of learned helplessness in Externals and response facilitation in Internals, should also be a function of the intensity of drive induced by differing numbers of exposures to inescapable events of equal intensity. Varying the intensity of prior drive induced by varying the number of inescapable disagreements (of equal attitudinal interest) should result in magnitudes of learned helplessness in Externals and response facilitation in Internals. Inescapable disagreements on 8 high interest attitudes would therefore be expected to lead to greater learned helplessness (in Externals) and responses facilitation (in Internals) than 5 inescapable disagreements on high interest items. While differential predictions can be derived from a drive theory of learned helplessness, the dependence of learned helplessness theory only on a minimal exposure to uncontrollability per se (e.g., Maier, Albin, & Testa, 1973) limits predictions only to the development of equivalent learned helplessness in the External groups.

Method

Forty eight Internal and 48 External locus of control research participants were randomly assigned to one of three pretreatments prior to identical instrumental escape conditioning. These pretreatments, listed in descending order of intensity of drive induction, were:

8 inescapable disagreements on high interest attitudinal items (very high drive); 5 inescapable disagreements on high interest attitudes (high drive); or no pretreatment (no drive). Thus, prior to 8 trials of instrumental escape conditioning in which subjects could escape the aversive disagreements of a stranger by replying to the disagreer (the reply made contingent upon an instrumental response), research participants listened to a stranger disagree on either 8 or 5 high interest items without the opportunity to escape by replying.

Results and Discussion

Insert Figure 2 about here

Varying the strength of drive resulted in the differential development of learned helplessness in Externals: as predicted from the drive theory of learned helplessness, the greater intensity of drive induced by 8 disagreements on high interest attitudes resulted in greater response impairment than drive as a function of 5 disagreements (see Figure 2-External). A Jonckheere test indicated External groups to order and be significantly different as predicted by drive theory, $z = 2.09$, $p = .018$, with the no drive group having faster mean instrumental responding than the high drive group which was faster than the very high drive group. In accordance with predictions from drive theory, and replicating the results of Experiment 1, learned helplessness was a function of the magnitude of drive-energized passive responding and not the result of uncontrollability. Additionally, learned helplessness

developed not only as impaired response speeds but as impaired instrumental response acquisition. Simple main effects tests following a significant trials effect, $F(7,315) = 4.05$, $p = .0005$, and pretreatment-group interaction, $F(14,315) = 1.93$, $p = .023$, in a repeated measures analysis of variance over the 8 discrete trials indicated that only the no drive group acquired the instrumental response, $F(7,315) = 4.96$, $p < .05$.

Internals clearly show the facilitating effects of prior inescapable disagreements (see Figure 2-Internal). Both the high drive and very high drive groups had superior instrumental responding to the no drive group. A Jonckheere test indicated that the groups were significantly ordered and different as predicted from drive theory where the very high drive group had faster mean instrumental response speed than the high drive group which was faster than the no drive group, $z = 1.61$, $p = .054$. Unlike the previous findings the repeated measures analysis of variance over the 8 discrete trials indicated that all Internal groups acquired the instrumental response, $F(7,315) = 3.56$, $p = .001$. Thus as predicted by drive theory prior inescapable disagreements did not lead to learned helplessness but clearly resulted in response facilitation.

Experiment 2 supports and reemphasizes the results and implications of Experiment 1. Learned helplessness in Externals and response facilitation in Internals developed as a function of the intensity of drive which energized dominant passive and dominant active responses of Externals and Internals, respectively.

Experiment 3

Learned helplessness theory attributes learned helplessness to the uncontrollability of prior aversive events. However, Experiments 1 and 2 provide evidence to indicate that uncontrollability per se cannot fully account for the effects of prior inescapable aversive events: learned helplessness and facilitation of instrumental responding was found to be a function of the intensity of drive induced by exposure to prior inescapable aversive events. The drive analysis can be further extended. If learned helplessness and response facilitation are a function of the intensity of drive induced by prior events, [redacted] controllable events should also result in learn[redacted]onse facilitation.

In the triadi[redacted]lessness experiment uncontrollabilit[redacted]escapable aversive events and contro[redacted]e events (e.g., Hiroto & Seligman, [redacted]). Simultaneously, these inescapable av[redacted]ed the induction of drive while the escapable [redacted]cts have defined the reduction of drive. This analysis not only provides a drive interpretation of the typical learned helplessness manipulation and its subsequent inhibition when events are controllable but also suggests the possibility of examination of possible independence between learned helplessness and uncontrollability. Thus the typical control group in the triadic design artifactually controls for variables that might contribute to learned helplessness: e.g., drive. However, as Control does not define the complete reduction of drive in the present

Experiment 3

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In the triadic design of the learned helplessness experiment uncontrollability is operationally defined by inescapable aversive events and controllability by escapable aversive events (e.g., Hiroto & Seligman, 1975; Seligman & Maier, 1967). Simultaneously, these inescapable aversive events have defined the induction of drive while the escapable aversive events have defined the reduction of drive. This analysis not only provides a drive interpretation of the typical learned helplessness manipulation and its subsequent inhibition when events are controllable but also suggests the possibility of examination of possible independence between learned helplessness and uncontrollability. Thus the typical control group in the triadic design artifactually controls for variables that might contribute to learned helplessness: e.g., drive. However, as Control does not define the complete reduction of drive in the present

experimental procedure, the investigation of the independence of controllability and the development of learned helplessness is possible. Lombardo, Weiss, and Buchanan (1972) found that although replying to an initial disagreement provides sufficient drive reduction to reinforce an instrumental response, such an escape procedure does not reduce drive to zero. Since replying does provide control (as defined by Seligman as escapability) but does not effectively eliminate all drive induced, External locus of control individuals who experience initial disagreements and are given an opportunity to reply should show evidence of learned helplessness despite the fact that they can escape and thus control the aversive stimuli. Similarly, Internal locus of control individuals given the opportunity to escape, should show drive-energized instrumental response facilitation.

Seligman's learned helplessness theory and drive theory diverge in deriving the results of experimental manipulations of controllability within the standard learned helplessness triadic design that do not result in complete drive reduction. Learned helplessness theory yields the prediction that instrumental responding following control by replying would not differ from the control group given no prior aversive treatment. Drive theory yields the prediction that the residual drive in such a reply group should result in intermediate drive energization of dominant habits (intermediate groups experiencing inescapable aversive events and no pretreatment); passive responding in Externals and active responding in Internals.

Method

Sixty-four Internal and 64 External locus of control research participants were randomly assigned to one of four pretreatments: (a) five inescapable disagreements on high interest attitudinal items (high drive); (b) five disagreements on high interest attitudes to which research participants were instructed that they could reply if they wished (control); (c) five disagreements on high interest attitudes to which research participants were instructed they must reply (instructed control); or (d) no pretreatment (no drive). Two groups having initial control over aversive stimuli were used because it was thought that subtle instructional cues might affect the induction of controllability and that any differences between them might illuminate operational distinctions between drive and controllability manipulations. In order to avoid confounding pretreatment responses with later instrumental responses, the escape response made by both of these Control groups during the pretreatment was different from the escape response in the second phase. Following the appropriate pretreatment all groups received 8 trials of instrumental escape conditioning.

Results and Discussion

Insert Figure 3 about here

As predicted from drive theory, learned helplessness in Externals developed as a function of the intensity of drive induced by uncontrollable and controllable aversive events. This is particularly clear over the last two trial blocks where instrumental response speeds

of the groups experiencing prior controllable aversive events were intermediate to those of a group experiencing full drive induction and no prior drive induction (see Figure 1-External): mean instrumental responding for the instructed control and control groups falling intermediate the no drive and high drive groups. Jonckheere tests indicated that the External groups were significantly different and ordered as predicted from drive theory, both when the instructed control group was considered, $z = 3.20$, $p = .0007$, when the control group was considered, $z = 2.97$, $p = .0015$. Additionally, simple main effects tests following a repeated measures analysis of variance over the 8 discrete trials which yielded a significant trials effect, $F(7,420) = 2.96$, $p = .005$, and a group X trials interaction, $F(21, 420) = 1.88$, $p = .011$, showed that only the no drive group acquired the instrumental response, $F(7,420) = 4.84$, $p < .01$. Thus, contrary to learned helplessness theory where prior controllable aversive events should not lead to learned helplessness, learned helplessness did develop. Previous demonstrations of the equivalent instrumental performance between a group experiencing prior controllable aversive events and a group experiencing no prior treatment can now be seen as due to complete drive reduction inherent in those initial controllable phases (e.g., Seligman & Maier, 1967). Controllability then, does not appear to be the crucial dimension in the development of learned helplessness.

Figure 1-Internal shows that as predicted from drive theory both prior uncontrollable and controllable drive-inducing aversive

events led to facilitated instrumental responding in Internals. *t* tests on mean instrumental response speeds (collapsed over trials) indicated that all three pretreated groups were significantly faster than the no drive group: the instructed control group significantly faster than the no drive group, $t(30) = 1.77$, $p < .05$; the control group significantly faster than the no drive group, $t(30) = 2.04$, $p < .05$; and the high drive group marginally faster than the no drive group, $t(30) = 1.33$, $p < .10$. While facilitated Internal responding is in accordance with predictions from drive theory, the fact that the responding of the two groups experiencing controllable aversive events is not intermediate the groups experiencing uncontrollable aversive events and no pretreatment is surprising. In addition a repeated measures analysis of variance indicated that all Internal groups acquired the instrumental response, $F(7,420)=3.53$, $p < .001$.

The findings of Experiment 3 yield further support for the drive explanation of learned helplessness. Learned helplessness appears to be defined by the intensity of drive inductions resulting from prior aversive events, not their uncontrollability.

Experiment 4

Learned helplessness theory was originally advanced to explain the effects of prior inescapable aversive events on subsequent instrumental responding. However, as uncontrollability is its fundamental theoretical construct, the nature of the uncontrollable events should logically be secondary: it should not matter whether these initial events are aversive or non-aversive. The degree

of uncontrollability should define the sole parameter for development of learned helplessness. If uncontrollability is to explain a broad range of learned helplessness phenomena, learned helplessness should result from both uncontrollable aversive events and uncontrollable non-aversive events.

While many studies have been directed at the effects of prior aversive events, the effects of prior inescapable non-aversive events on escape/avoidance responding has attracted little research attention. Roth and Bootzin (1974) reported no development of learned helplessness as a result of uncontrollable non-aversive events. However, their use of non-aversive stimuli appears to have been inadvertent. Recently, Seligman (1975) reported unpublished research in which learned helplessness resulted from inescapable non-aversive events. However, the learned helplessness found may have been a result of drive induced by insolvable discrimination tasks although defined as non-aversive events.

Drive theory yields a different prediction: only in so far as prior inescapable events result in drive induction will learned helplessness develop. Thus, inescapable non-aversive events would be expected to produce learned helplessness and facilitation only if they are drive inducing. The use of interpersonal attitudes in the present procedure allows the use of the logical if not functional opposite of aversive disagreements; interpersonal agreements. While disagreements have been shown to be functionally equivalent to traditional aversive stimuli (e.g., shock), interpersonal agreements have been shown to be functionally equivalent to traditional reinforcers

in both discrimination learning studies (e.g., Byrne, Griffitt & Clore, 1968) and instrumental reward conditioning tasks (Lamberth, Gouaux, & Davis, 1972; Lombardo, Tator, & Weiss, 1972; Lombardo, Weiss, & Buchanan, 1972). Since interpersonal agreements do not induce drive, the drive theory yields a prediction of no effect for uncontrollable agreements. This is expected for both Internals and Externals. Seligman's learned helplessness theory which stresses uncontrollability, would predict the development of learned helplessness in Externals.

Method

Forty-eight Internal and 48 External locus of control research participants were randomly assigned to one of three pretreatments prior to identical instrumental escape conditioning procedures. These three pretreatments were: 5 inescapable disagreements on high interest attitudinal items (disagree high drive); 5 inescapable agreements on high interest attitudes (agree no drive); or no pretreatment (no drive). Inescapability for both the disagree and agree groups consisted of subjects listening to a stranger disagree or agree on five consecutive attitudes without the opportunity to escape by replying. All groups then received 8 trials of instrumental escape conditioning where individuals could escape aversive disagreements by replying to the disagreer: the reply made contingent upon an instrumental response.

Results and Discussion

Insert Figure 4 about here

Inescapable non-aversive events (agreements) led to instrumental responding equivalent to a group experiencing no prior treatment. This is especially clear over the last block of three trials (see Figure 4-External) where both the no drive and agree no drive groups had equivalent asymptotic response speeds: both greater than the high drive group. *t* tests completed on mean instrumental response speed over that block indicated that both the no drive, $t(30) = 2.21$, $p < .05$, and agree no drive groups, $t(30) = 1.67$, $p < .05$, had significantly faster instrumental responding than the high drive group while not significantly different from each other, $t<1$. In addition both the no drive and agree no drive groups acquired the instrumental response. Simple main effects tests following a significant trials effect, $F(7,315) = 3.72$, $p = .001$, and pretreatment X trials interaction, $F(14,315) = 2.63$, $p = .002$, in a repeated measures analysis of variance (over the 8 discrete trials) showed both the no drive, $F(7,315) = 4.93$, $p < .05$, and agree no drive groups, $F(7,315) = 3.04$, $p < .05$, acquired the instrumental response while the high drive group did not, $F<1$.

Thus, while learned helplessness (impaired responding and acquisition) occurred following inescapable or uncontrollable aversive events (disagreements), learned helplessness did not develop as a function of prior uncontrollable non-aversive events (agreements). Prior uncontrollable non-aversive events led to instrumental responding superior to that of a learned helplessness group while being equivalent to a group experiencing no pretreatment. Although the present results are understandable within the original

scope of learned helplessness theory (as an explanation of the effects only of uncontrollable aversive events) distinct theoretical power is achieved by its inclusion as part of drive theory's predictive power.

Figure 4-Internal shows that inescapable disagreements and agreements led to differential responding in Internals. Inescapable agreements surprisingly led to superior responding over that hypothesized to occur following inescapable disagreements. Tukey's HSD statistic following a significant pretreatments effect, $F(2,45) = 3.22$, $p < .05$, in a repeated measures analysis of variance (over 8 discrete trials) indicated that the agree no drive group had significantly faster mean response speeds than the high drive group, which was faster than the no drive group (all p's $< .05$). While the facilitated responding of the high drive group was predicted as a result of drive energized active responding, the greater facilitation following inescapable agreements is surprising. Interpretations of the surprising portion of the results for Internal individuals are feasible, but they should not be accorded the same status as the clear portions of other results of this experiment and of other experiments in this paper, but would appeal to such familiar conditioning principles as drive contrast (e.g., Nation, Wrather, & Mellgren, 1974), conflict induced drive (e.g., Brown & Farber, 1951), or frustration induced drive (e.g., Amsel & Roussel, 1952; Daly, 1974).

The findings of Experiment 4, particularly for Externals, supports the drive theory and reemphasizes the limitations of learned helplessness theory. Non-aversive events did not lead

to learned helplessness although they were uncontrollable. While learned helplessness theory can be said not to include explanation of the effects of non-aversive events, this limitation is certainly not intended either by the theory's central conception of the effects of uncontrollability per se or by Seligman (Seligman, 1975, pgs. 33-34). On the other hand, drive theory specifies the effects of prior aversive and non-aversive events within its major theoretical construct (drive), transforming a potential theoretical boundary into a theoretical prediction.

Experiment 5

The drive theory of learned helplessness may be viewed as providing an explanation of the mechanism or process whereby uncontrollable events effect subsequent instrumental responding. From this perspective it may be seen as partially complimentary to Seligman's learned helplessness theory. However, particularly as evidenced by findings in Experiments 3 and 4, drive theory diverges from Seligman's learned helplessness theory in attributing learned helplessness to drive manipulations beyond drive artifactually resulting from uncontrollability.

The drive-arousing properties of unpredictability have been identified within a broad range of research associated with Byrne's attraction paradigm (Byrne, 1971, p. 344-356; Dollard & Miller, 1950). While Seligman (1975) has pointed to interrelationships of uncontrollability and unpredictability, unpredictability has not been investigated as a potential source of learned helplessness in instrumental responding.

Since unpredictability arouses drive, a drive interpretation leads to the expectation that drive as a result of unpredictability will combine with drive induced by inescapable aversive events in affecting subsequent instrumental responding. Unpredictable and inescapable aversive events are therefore expected to yield a greater magnitude of learned helplessness in Externals and response facilitation in Internals than predictable inescapable aversive events.

Method

Forty-eight Internal and 48 External locus of control research participants were randomly assigned to one of three pretreatments prior to identical escape conditioning procedures. These pretreatments are listed in descending order of drive intensity: 5 inescapable disagreements and agreements on high interest attitudes (unpredictable); 5 inescapable disagreements on high interest attitudes (predictable); or no pretreatment (no drive). Both the unpredictable and predictable groups experience uncontrollable prior events. Predictability is achieved by having the stranger consistently disagree throughout the pretreatment. Unpreditability is defined as a mixture of agreements and disagreements such that the opinion of the stranger was unpredictable. Random orders of the agreements and disagreements within balanced 3 agreement-2 disagreement and 2 agreement-3 disagreement schedules were used. Unpredicability was thus achieved equating the number of prior events experienced; a conservative manipulation biased against the hypothesis.

Results and Discussion

Insert Figure 5 about here

Unpredictable inescapable aversive events led to a greater magnitude of learned helplessness than predictable inescapable aversive events (see Figure 5-External). Congruent with predictions from drive theory, drive induced from two sources, inescapable aversive events and unpredictability, combined to yield a greater magnitude of prior drive than drive from only inescapable aversive events: this greater drive leading to a greater magnitude of learned helplessness. This is particularly striking as the conservative unpredictability manipulation necessitated the loss of drive induced by inescapable disagreements: equating the number of prior events experienced required that everytime there was agreeement, drive that would have been induced from a disagreement was sacrificed. In light of this, the greater magnitude of response impairment as a result of unpredictability attests to its power as a source of learned helplessness. A Jonckheere test showed the External groups to be significantly ordered and different as predicted from drive theory, $z=1.89$, $p=.029$; the no drive group being faster than the predictable group which was significantly faster than the unpredictable group. In addition, simple main effects tests following a significant trials effect, $F(7,315)=2.61$, $p < .01$, and pretreatment X trials interaction, $F(14,315)=2.32$, $p < .005$, in a repeated measures analysis of variance (over 8 discrete trials) indicated that only the no drive group acquired the instrumental response, $F(7,315)=4.63$, $p < .01$.

Thus, learned helplessness developed as a function of the intensity of drive induced by events prior to instrumental escape conditioning. That unpredictability, a source of drive independent of uncontrollability and not viewed as the primary source of learned helplessness in learned helplessness theory, led to learned helplessness, is supportive of drive theory.

Prior unpredictable inescapable aversive events led to greater response facilitation in Internals than predictable inescapable aversive events (see Figure 5-Internal). Once again not only doesn't learned helplessness develop, but responding is facilitated as a function of the magnitude of drive energized active responding. A Jonckheere test indicated that Internal groups to be significantly different and ordered as predicted from drive theory, $z=2.01$, $p=.0211$ with the unpredictable group having faster mean response speeds than the predictable group (67.6) which was faster than the no drive group. In addition, a significant trials effect in a repeated measures analysis of variance (over the 8 discrete trials) showed all groups to acquire the instrumental response, $F(7,315) = 3.54$, $p = .001$.

Experiment 5 provides further validation for a drive theory of learned helplessness by: (a) showing the independence between learned helplessness and uncontrollability per se; and (b) by showing learned helplessness and facilitation to develop as a result of drive sources independent of inescapable-uncontrollable aversive events.

General Discussion

The thrust of past human learned helplessness research has been determined by theoretical notions advanced by Seligman et al. (1971) in which the effects of inescapable aversive events on later escape/avoidance learning are viewed as due to a lowering of the motivation for active instrumental responding. This lowered motivation is thought to result from the learning of a contingency of independence between responding and reinforcement from that uncontrollable pretreatment. The now familiar impairment of instrumental responding following inescapable aversive events, or learned helplessness, has been demonstrated under a variety of conditions and over a variety of species. As learned helplessness theory has successfully explained these demonstrations of learned helplessness, weaknesses of learned helplessness theory within the animal and human research areas have been minimized. As a result learned helplessness theory has become the theoretical guide for the study of human learned helplessness despite serious theoretical limitations.

In the animal literature there appears a paradox surrounding the dependence of the learned helplessness phenomenon on the type of task used in escape/avoidance conditioning. In the two-way shuttle escape/avoidance and manipulandum escape/avoidance tasks, instrumental responding is impaired as a result of inescapable aversive events. On the otherhand both the one-way shuttle escape/avoidance and passive avoidance tasks appear to be facilitated as a result of prior inescapable aversive events. Thus, Seligman's label of learned helplessness is a misnomer referring only to the impairing

effects of inescapable aversive events. While Seligman and his associates have addressed this paradox, their explanation has been viewed sceptically (see Anisman & Waller, 1973).

Another empirical dichotomy appears in human research where after equivalent treatment with inescapable aversive events, learned helplessness will develop in External but not in Internal locus of control individuals. Hiroto (1974) reconciled this dichotomy by emphasizing that by definition Externality defines a form of learned helplessness-like behavior while Internality defines what could be considered non-learned helplessness behavior. The differential effects of prior inescapable aversive events on Internality-Externality is explained in effect by characterizing the contradictory data as a boundary condition of the theory.

While boundary conditions are a necessary and essential element of any theory, theoretical depth is achieved by transforming boundaries into explanations. Thus, as the facilitation effects of prior inescapable aversive events in animals, and the inability for the formation of learned helplessness in Internals constitute separate constraining boundaries of the learned helplessness theory, a theory which incorporates these as essential components of its explanatory scheme may be considered more powerful. The drive theory is advanced to not only incorporate both empirical dichotomies within a single theoretical assumption, but uses these dichotomies to provide empirical evidence regarding the suitability of the theoretical assumptions. While learned helplessness theory considers both as separate paradoxes each requiring differential theoretical

treatments, drive theory explains both within its basic assumption. In other words, the nature of the task does not limit the applicability of drive theory (as does the facilitation effect within the animal literature) but illuminates the assumption concerning the effects of drive on later instrumental responding. Similarly, locus of control does not limit the breadth of the theory as it applies to human behavior, but also sheds light on the underlying drive assumption.

The drive theory of learned helplessness states that the primary effect of prior inescapable aversive events is of drive induction. According to Hull-Spence learning theory, drive will energize all response tendencies, with the greatest benefit accorded those responses highest in the habit hierarchy. Thus, if drive energizes an organism's responses prior to some instrumental escape/avoidance task, the effect of drive on that organism's subsequent performance will be a function of the appropriateness of those energized responses for the task. If the responses highest in the habit hierarchy are correct, then prior drive facilitates performance: if the responses are incorrect, drive impairs instrumental performance. The question, then, of predicting the effects of inescapable aversive events on subsequent escape/avoidance responding depends upon specification of the organism's habit hierarchies. For most infrahuman organisms, freezing and fleeing appear to be dominant and thus highest in the habit hierarchies to cues of aversive stimulation. Since fleeing and freezing are appropriate responses in passive avoidance and one-way shuttle escape avoidance

situations, prior drive induced by inescapable aversive events facilitates instrumental performance. By the same token, the inappropriateness of these responses in the two-way shuttle and manipulandum situations leads to impairment of instrumental responding (learned helplessness) when drive is induced as a result of inescapable aversive events. For humans, the mapping of habit hierarchies is difficult. However, as locus of control can be viewed as a personality dimension describing general habit hierarchies, predictions can be made. Externality defines individuals characterized by passive responding as dominant as opposed to Internality which is characterized by dominant active responding. As prior drive inductions energize the passivity and activity of Externals and Internals, respectively, learned helplessness and facilitation will develop. The findings of learned helplessness for Externals and not for Internals in the previous research is thus understandable.

The present experiments capitalized on major implications of the drive theory of learned helplessness. As the drive energized prior to instrumental escape conditioning varies, so will the degree of energized active and passive responding of Internals and Externals. As the conversational paradigm used as an analog to instrumental escape conditioning requires active instrumental responding; the energization of active responding (Internals) will facilitate performance, and the energization of passive responding (Externals) will lead to learned helplessness. Learned helplessness theory relates instrumental escape responding to prior inescapable events as these events only lower the motivation for instrumental

responding which leads to learned helplessness. The findings in Experiments 1 and 2 that instrumental escape responding is impaired for Externals and facilitated for Internals as a function of the intensity of prior drive inductions is strong support for drive theory. Prior drive intensity manipulations yielded the expected greater External impairment and Internal facilitation as drive was increased by raising the intensity of an equal number of aversive events (Experiment 1) and by raising the number of aversive events of equal intensity (Experiment 2). Learned helplessness theory with its sole reliance on the uncontrollability of the prior events cannot predict a magnitude of learned helplessness effect (e.g., Maier, Albin, & Testa, 1973) nor can it explain the corresponding response facilitation for Internals. The divergence of the two theories was further tested in Experiment 3 where, although Seligman's requirement of control over initial aversive events was satisfied, learned helplessness developed in Externals as a function of the degree of residual drive present after the controlling (escape from aversive events) responses. Thus, the crucial factor in the development of learned helplessness and facilitation does not appear to be the degree of uncontrollability, but rather the intensity of drive available to energize responses. External individuals given control over initial events showed impaired instrumental responding at an intermediate level to both a group experiencing no pretreatment and a group receiving a greater degree of prior drive induction. This finding while not expected from learned helplessness theory was predicted via the drive theory

in that initial escape from aversive events has been found to lead to incomplete drive reduction. This residual drive being available for energizing the passive External responding, leading to learned helplessness. Experiments 1, 2, and 3 yield strong support for the drive theory of learned helplessness. In all experiments differential degrees of drive induced prior to instrumental escape conditioning led to differential impairment and facilitation in Externals and Internals. Learned helplessness theory's dependence upon the uncontrollability of those initial aversive events cannot be viewed as adequate in light of these results.

Knowing the relationship between learned helplessness and the intensity of prior drive inductions, Experiment 4 explored an unexamined implication of learned helplessness theory. That if uncontrollability is to be the corner stone to explain the development of learned helplessness it should not matter whether that uncontrollability be as a result of aversive or nonaversive events. Drive theory on the other hand expects learned helplessness and facilitation for non-aversive events only to the degree that those events contain drive inducing components. The finding that no learned helplessness developed in Externals as a result of inescapable non-aversive events supports these drive interpretations. Experiment 5 further explored the divergence of the two theories by considering the effects of sources of drive induction independent of uncontrollable aversive events that may combine with inescapable aversive events. As learned helplessness theory states that only uncontrollability contributes to the development of learned helplessness,

the findings in experiment 5 of greater response impairment and facilitation following the addition of drive induced from unpredictability are enlightening. Especially as learned helplessness theory has specifically stated the mutual exclusivity of uncontrollability and unpredictability as determinants of learned helplessness. The finding that unpredictability leads to learned helplessness constitutes significant support for a drive theory.

The experiments designed to test divergent predictions from Seligman's learned helplessness theory and drive theory, support drive theory. Learned helplessness in Externals was found in all instances to develop relative to the intensity of drive induced prior to the instrumental escape conditioning task and not as a direct function of uncontrollability. Possibly more significant was the confirmation of drive theory predictions of instrumental response facilitation in Internals corresponding to the drive induced prior to escape conditioning.

Beyond the specific findings of the present experiments supporting a drive theory of learned helplessness a number of other implications exist. Foremost among these is the fact that by tieing the effects of prior events to traditional learning variables, the independent variables affecting learned helplessness are understandable within broadly significant learning principles. Uncontrollability exerts therefore, not a magical influence on instrumental responding but one which has its effect through the well understood process of drive energization.

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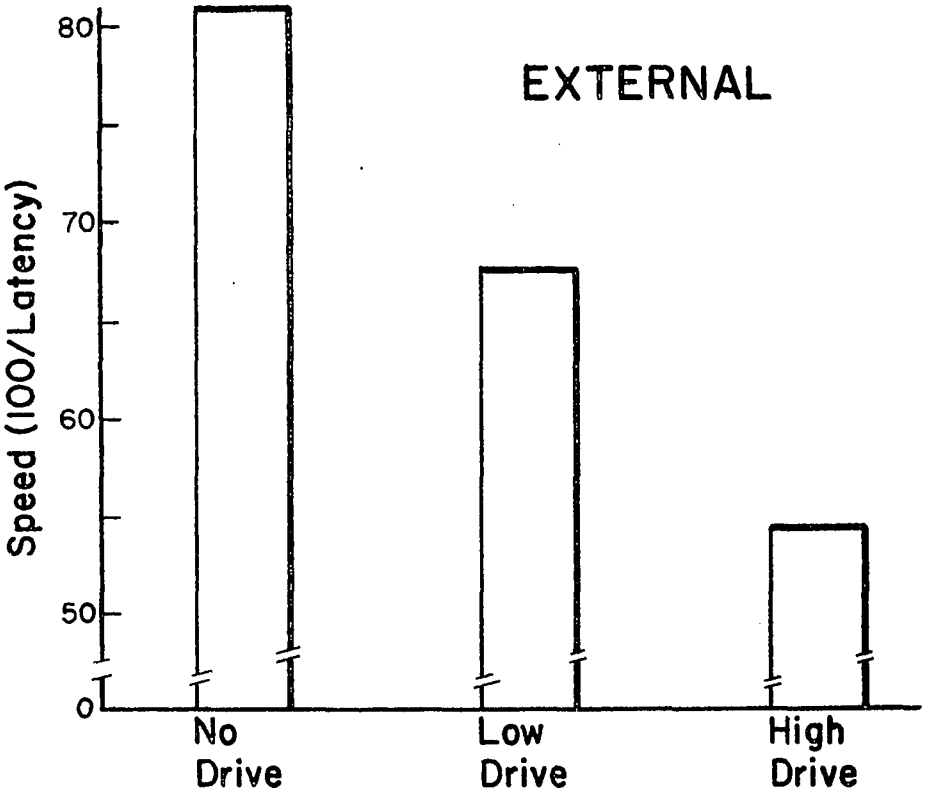
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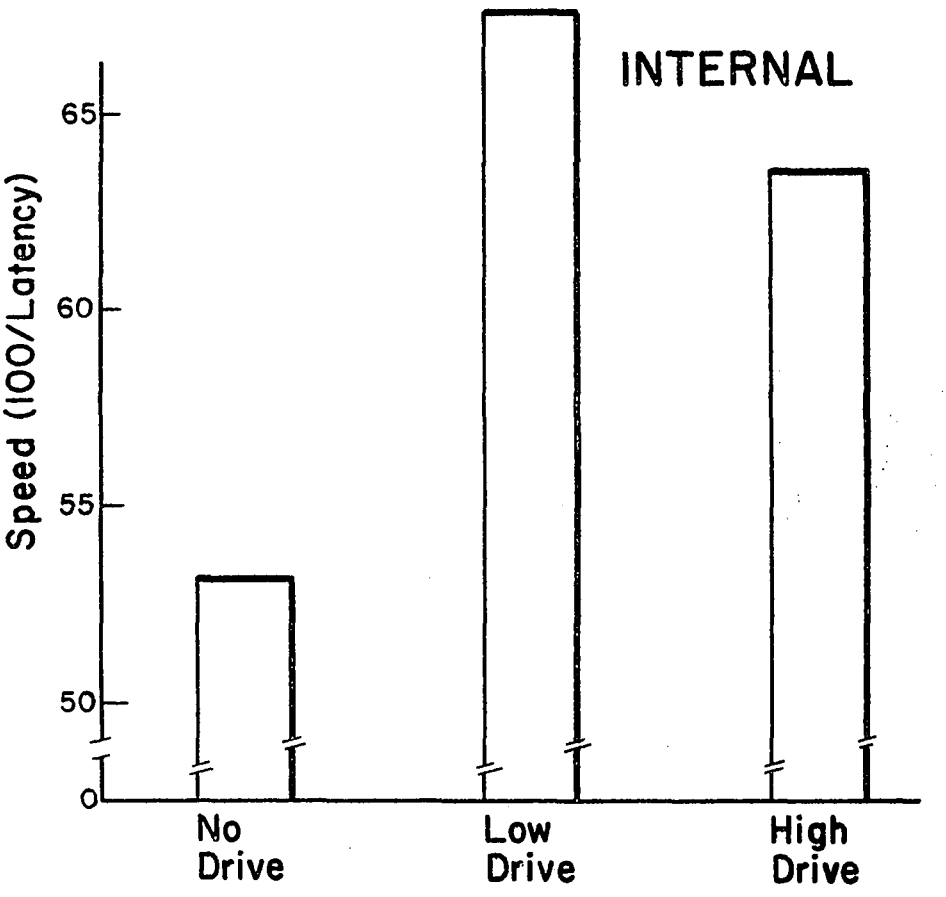
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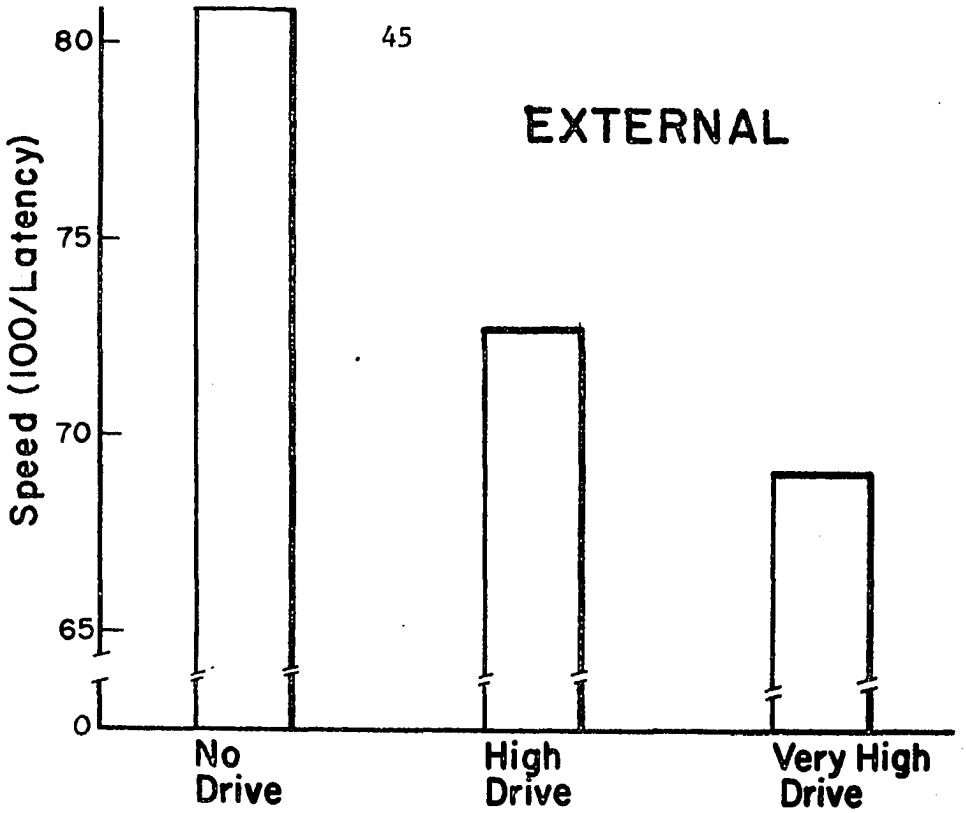
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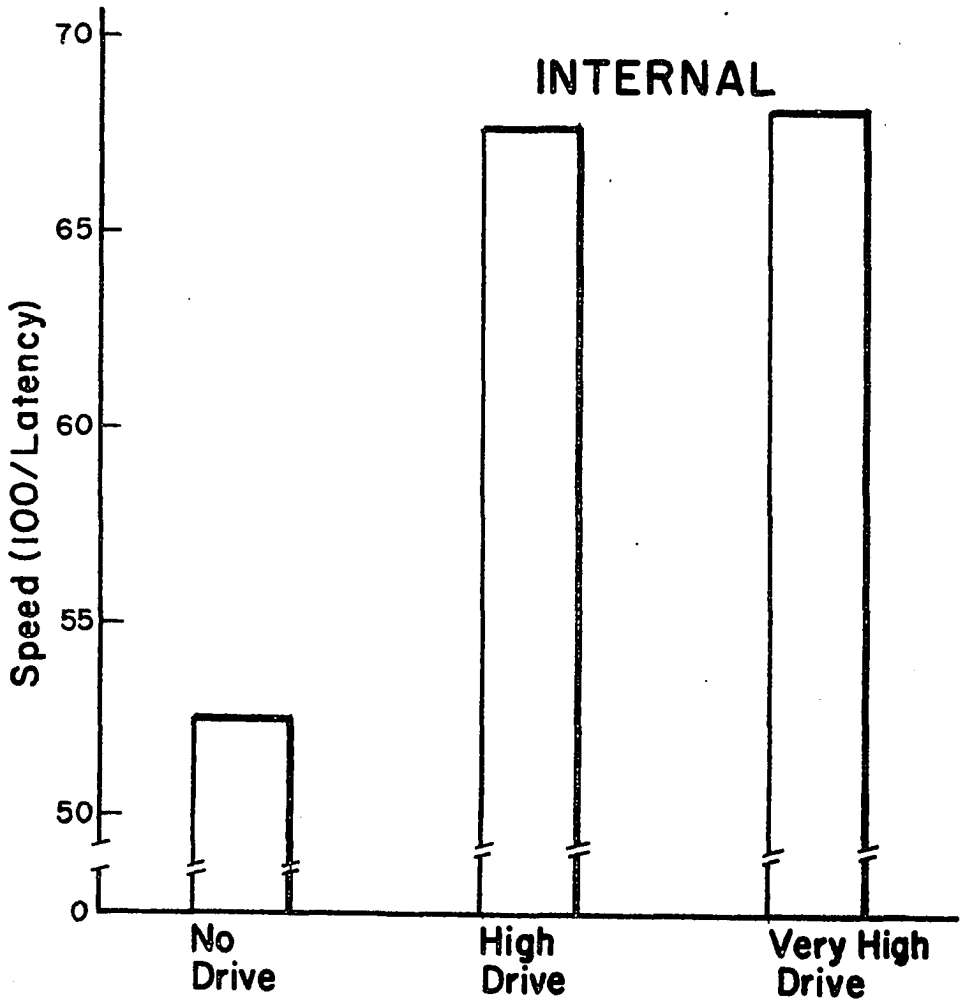
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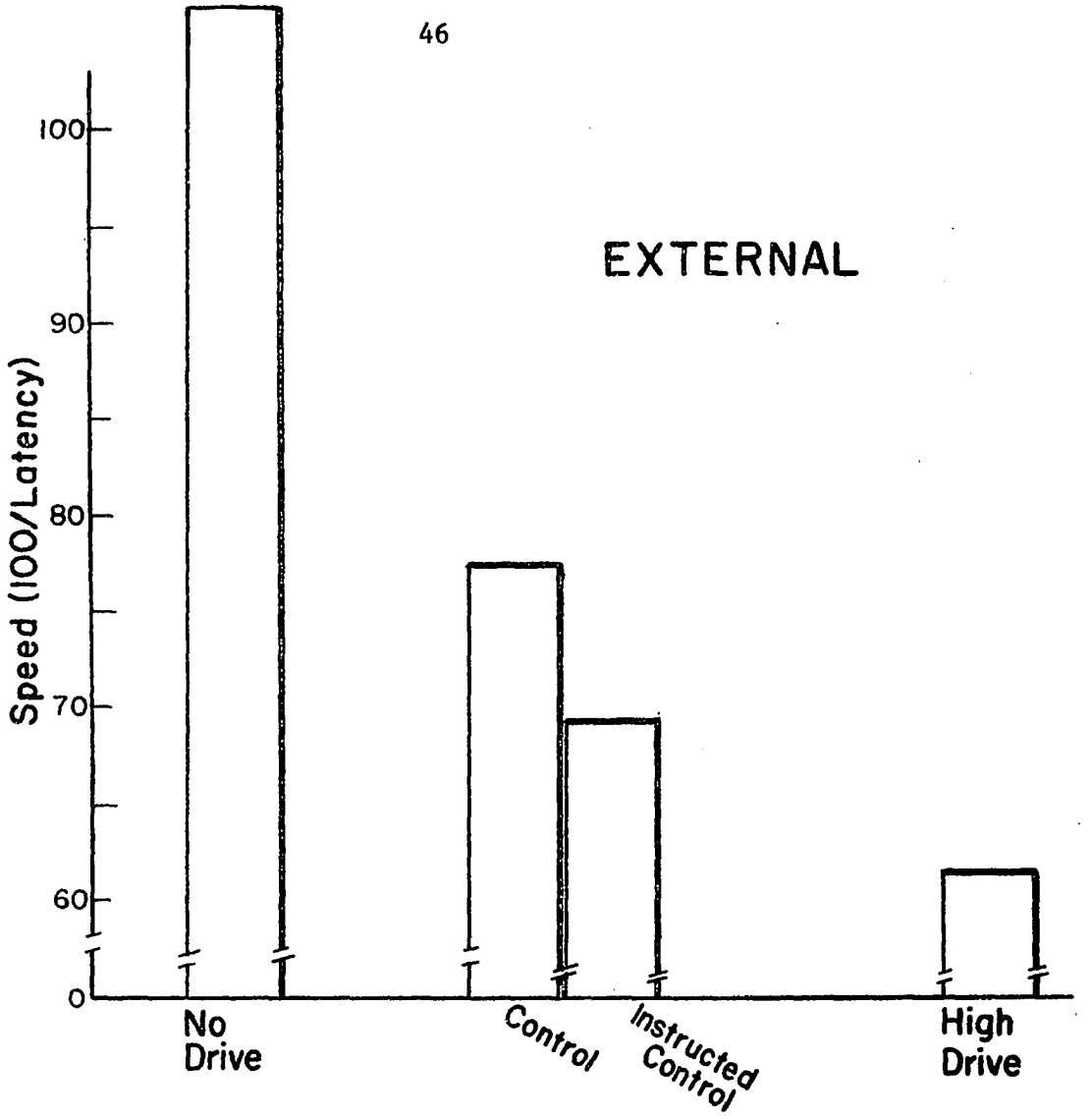
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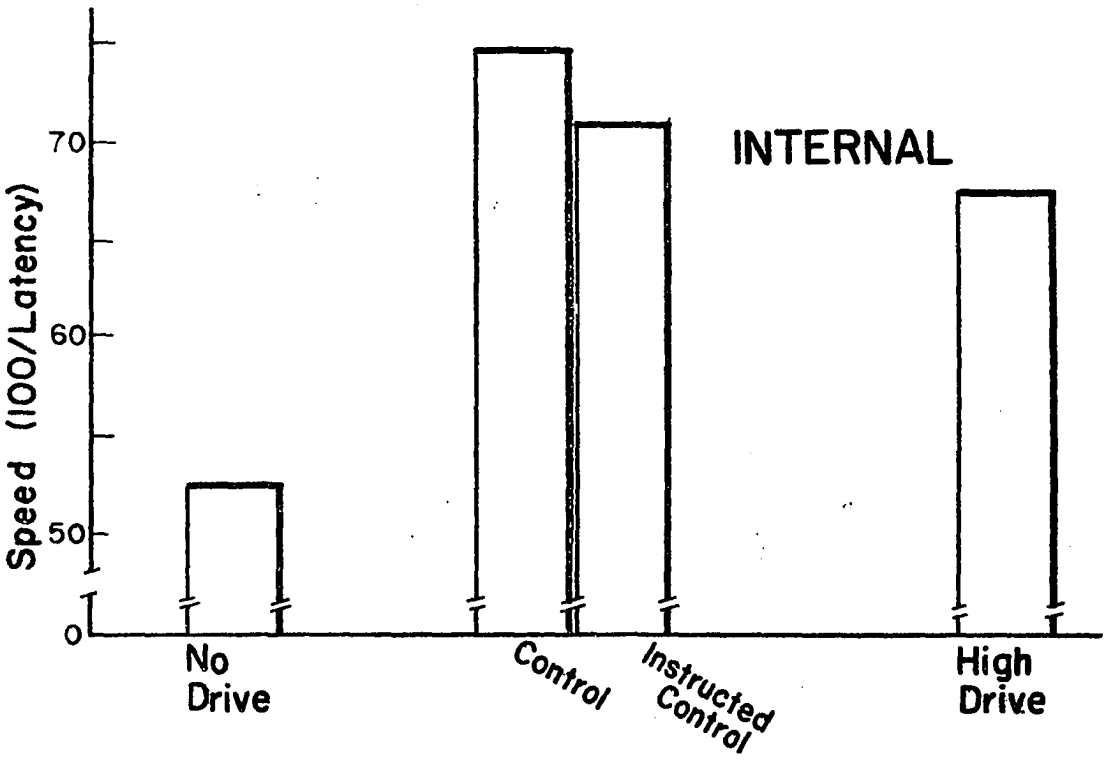
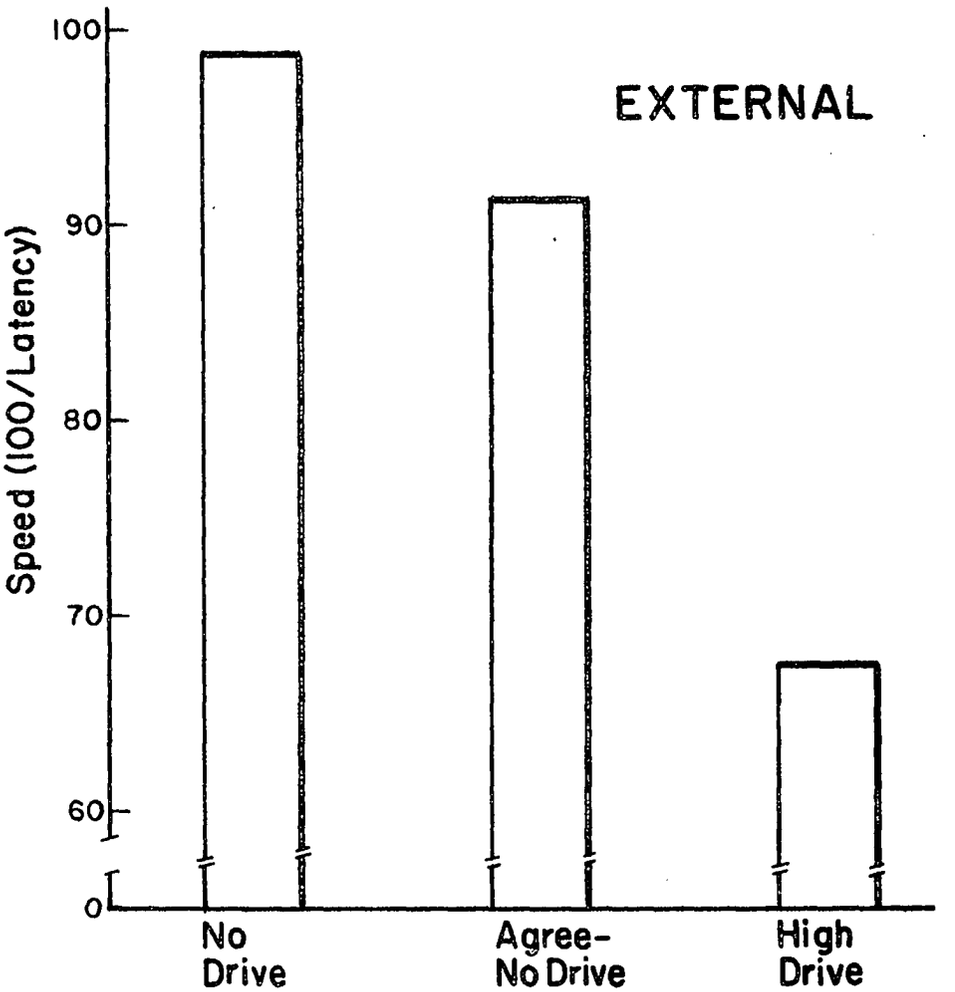
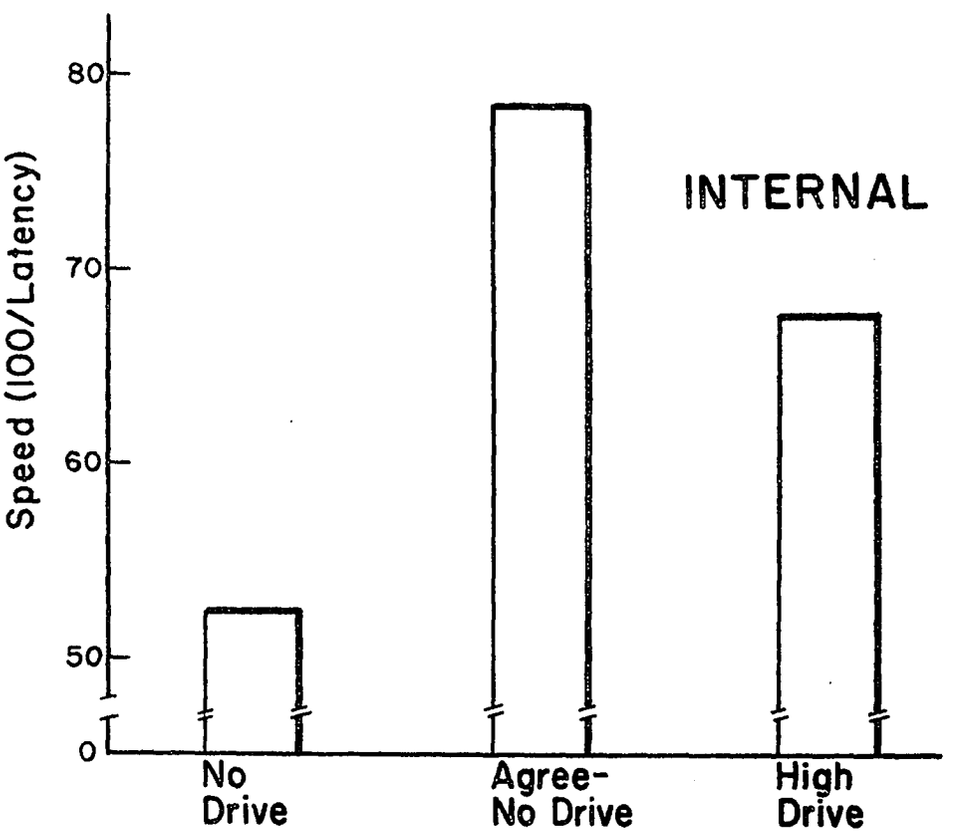
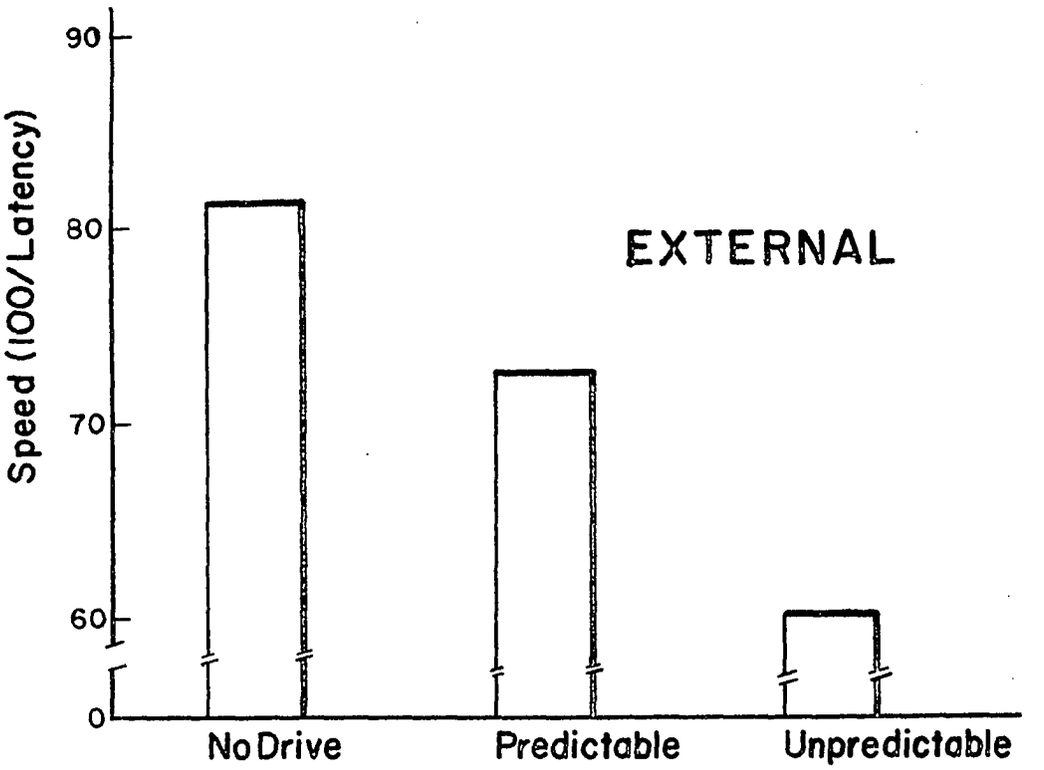
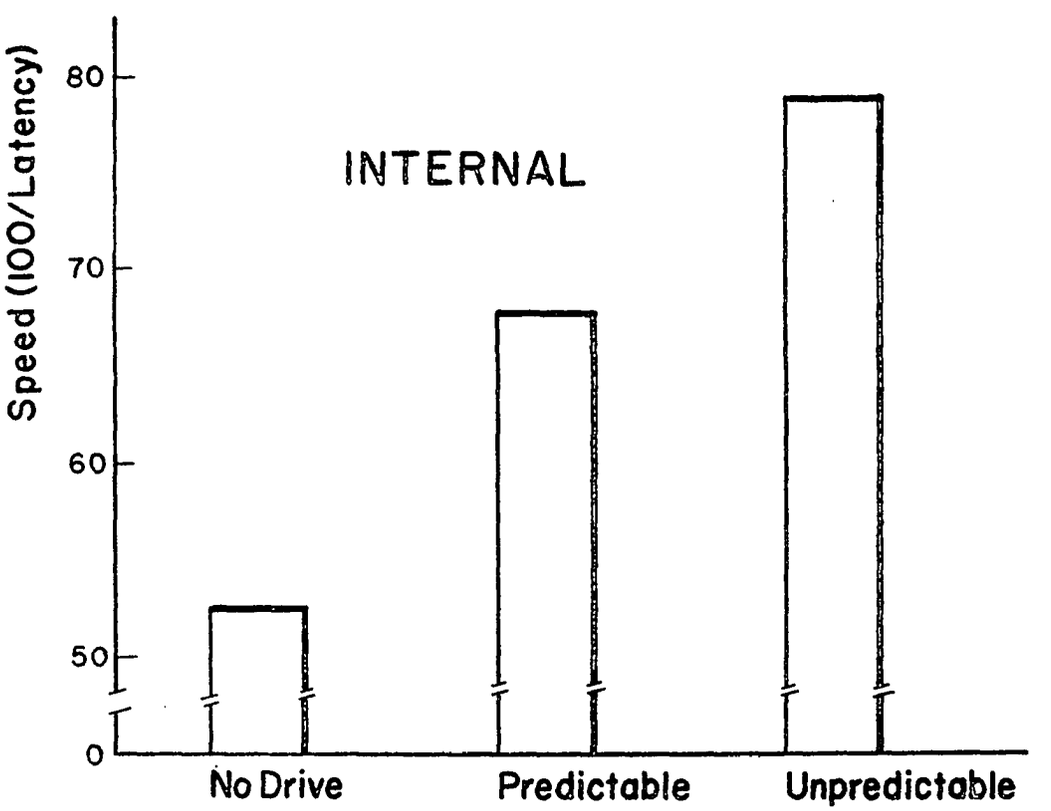
Instructed Control
High Drive


INTERNAL
Speed (100/Latency)
70
60
50
0
No Drive
Control
Instructed Control
High Drive


EXTERNAL
Speed (100/Latency)
100
90
80
70
60
0
No Drive
Agree-No Drive
High Drive


INTERNAL
Speed (100/Latency)
80
70
60
50
0
No Drive
Agree-No Drive
High Drive


Speed (100/Latency)
90
80
70
60
0
EXTERNAL
No Drive
Predictable
Unpredictable


Speed (100/Latency)
80
70
60
50
0
INTERNAL
No Drive
Predictable
Unpredictable