

## INFORMATION TO USERS

This material was produced from a microfilm copy of the original document. While the most advanced technological means to photograph and reproduce this document have been used, the quality is heavily dependent upon the quality of the original submitted.

The following explanation of techniques is provided to help you understand markings or patterns which may appear on this reproduction.

1. The sign or "target" for pages apparently lacking from the document photographed is "Missing Page(s)". If it was possible to obtain the missing page(s) or section, they are spliced into the film along with adjacent pages. This may have necessitated cutting thru an image and duplicating adjacent pages to insure you complete continuity.
2. When an image on the film is obliterated with a large round black mark, it is an indication that the photographer suspected that the copy may have moved during exposure and thus cause a blurred image. You will find a good image of the page in the adjacent frame.
3. When a map, drawing or chart, etc., was part of the material being photographed the photographer followed a definite method in "sectioning" the material. It is customary to begin photoing at the upper left hand corner of a large sheet and to continue photoing from left to right in equal sections with a small overlap. If necessary, sectioning is continued again — beginning below the first row and continuing on until complete.
4. The majority of users indicate that the textual content is of greatest value, however, a somewhat higher quality reproduction could be made from "photographs" if essential to the understanding of the dissertation. Silver prints of "photographs" may be ordered at additional charge by writing the Order Department, giving the catalog number, title, author and specific pages you wish reproduced.
5. PLEASE NOTE: Some pages may have indistinct print. Filmed as received.

**Xerox University Microfilms**

300 North Zeeb Road  
Ann Arbor, Michigan 48106

77-1837

MILLER, Franklin Gutstein, 1945-  
A CONFLICT THEORY OF SOCIAL FACILITATION/  
COACTION AND AFFILIATION.

The University of Oklahoma, Ph.D., 1976  
Psychology, experimental

**Xerox University Microfilms,** Ann Arbor, Michigan 48106

THE UNIVERSITY OF OKLAHOMA

GRADUATE COLLEGE

A CONFLICT THEORY OF  
SOCIAL FACILITATION/COACTION AND AFFILIATION

A DISSERTATION  
SUBMITTED TO THE GRADUATE FACULTY  
in partial fulfillment of the requirements for the  
degree of  
DOCTOR OF PHILOSOPHY

BY  
FRANKLIN GUTSTEIN MILLER

Norman, Oklahoma

1976

A CONFLICT THEORY OF SOCIAL FACILITATION/COACTION AND AFFILIATION

APPROVED BY

R F Weiss

M. Jack Kanak

Walter Melgare

Thomas M. Miller

Gayle A. Denton

DISSERTATION COMMITTEE

## ACKNOWLEDGEMENTS

I would like to express my gratitude to Richard Feinberg, Joyce Weiss, Bijan Rabenou, and Zulekha Rabenou.

I would also like to express my gratitude to my doctoral committee: Professors Robert Weiss, Dayle Denton, Jack Kanak, Roger Mellgren, and Thomas Miller.

My appreciation of Professor Robert Weiss' teaching extends far beyond the full credit he deserves for any of my present and future professional accomplishments.

## TABLE OF CONTENTS

Manuscript to be submitted for publication	Page
INTRODUCTION . . . . .	1
THE MODEL . . . . .	4
A CONFLICT THEORY OF SOCIAL FACILITATION . . . . .	9
Introduction . . . . .	9
Theory . . . . .	11
General Predictions . . . . .	12
Independent Variables . . . . .	12
Experimental Paradigms . . . . .	14
Dependent Variables . . . . .	15
A CONFLICT THEORY OF THE FUNCTIONAL SIGNIFICANCE OF SUBJECT PROFICIENCY . . . . .	16
Introduction . . . . .	16
Theory . . . . .	17
A CONFLICT THEORY OF AFFILIATION . . . . .	22
Introduction . . . . .	22
Theory . . . . .	23
CONCLUSION . . . . .	25
REFERENCES . . . . .	29
APPENDIX A - Innate versus learned determinants of social facilitation/coaction references . . . . .	38
REFERENCES . . . . .	42
APPENDIX B - Exploitation of theoretical assumptions . . . . .	44
REFERENCES . . . . .	47

	Page
APPENDIX C - A review of conflict . . . . .	48
REFERENCES . . . . .	75

A Conflict Theory of  
Social Facilitation/Coaction and Affiliation

Franklin Gutstein Miller

University of Oklahoma

Abstract

Social facilitation and affiliation are theoretically integrated by use of conflict theory as an analogical model. Proceeding from the assumption that the presence of others is typically associated with multiple hedonic events, three theories are developed: a) a general theory of social facilitation, b) a special theory of social facilitation in which subject proficiency effects are predicted, and c) a theory of affiliation. The construction of these theories implies the possibility of formulating similar theories for specifiable classes of social conditions.



A Conflict Theory of  
Social Facilitation/Coaction and Affiliation

Franklin Gutstein Miller

University of Oklahoma

It is possible to distinguish two paradigmatic approaches to the study of the effects of the presence of others on individual behavior. In social facilitation and coaction studies, the experimenter typically controls the degree of social contact between the subject and audiences or coactors. In affiliation studies, degree of social contact is one of the main dependent variables determined by a preset contingency with subjects' behavior. This paper attempts to integrate the two social research areas by use of a theory that contains constructs developed to explain contingent and noncontingent cue effects. The same theory provides resolution for an empirical incongruity between the two social areas. A general conclusion drawn from social facilitation/coaction studies is that the presence of others serves a drive-inducing function. A general conclusion drawn from affiliation studies is that the presence of others serves to reduce drive-related processes. Integration is made possible by use of a theory that integrates drive-inducing and drive-reducing processes. Neal Miller's (1959) theory of conflict explains and predicts behavior in the presence of a stimulus when the behavior affects degree of contact with the stimulus and when degree of contact remains

unaffected by performance. Conflict theory also ties drive induction and drive reduction to specifiable interactions between independent variables and can therefore be used to predict when a stimulus will serve a drive-inducing function and when it will serve a drive-reducing function. It is therefore suggested that Miller's (1959) theory of conflict can be used as an analogical model to integrate diverse "presence of others" phenomena.

Conflict theory is especially promising as a model for explanation and prediction of "presence of others" phenomena because it integrates constructs that have already proven useful when applied individually to explain specific "presence of others" effects. Both of the social areas--and their empirical subareas--have been illuminated by reference to the constructs that are combined in conflict theory. Miller's (1959) theory predicts the effects of presenting an animal with a stimulus that evokes competing response tendencies. This is done by integration of conditioning theories designed to predict behavior in situations in which one response tendency is evoked. Previous examinations of "presence of others" effects have enjoyed illumination by assuming that species mates function analogously to stimuli associated with the single hedonic consequences examined in conditioning research. By further assuming that the presence of others is typically associated with multiple hedonic consequences, Miller's theory can be used as a model; and the ramifications of analogies that have already proven useful may be extended.

Without subscribing to a reductionist philosophy and making no assumption of identity, conflict theory will be used analogically as a model to: a) develop a general theory of social facilitation; b) expand

and provide a means of predicting the effects of subject proficiency; and c) develop a theory of social mitigation of fear (affiliation). The second section of the paper presents Miller's theory in a manner which emphasizes the construct integration it allows. The exposition details the parts of conflict theory that are necessary for the subsequent social derivations. The third section of the paper is a general theory of social facilitation. It is introduced with the suggestion that a conflict theory model allows integration of social facilitation effects that are thought to be based on appetitive processes with social facilitation effects that are thought to be based on aversive processes. The theory itself is presented in four parts: a) first general predictions are made; b) these predictions are sharpened by stipulation of predicted effects of manipulation of specified independent variables; c) a distinction between two types of experimental procedures is suggested; and d) the significance of choice of dependent variables is examined. The fourth section of the paper is a more highly developed, special theory of social facilitation. It is suggested that both general social facilitation and specific subject proficiency effects are dependent on the choice of experimental paradigm. As the theory is presented, each prediction is followed by illustrative specification of relationships between independent and dependent variables. The fifth section of the paper is a theory of social mitigation of fear and affiliation. It is suggested that a conflict model of "presence of others" phenomena allows integration of social facilitation/coaction and affiliation. Since the deductive process provided by the affiliation theory is the same as that provided in the two theories of social facilitation, the analysis is

followed by only two illustrative predictions. The conclusion of the paper contains the suggestion that broad learning theories may be used to integrate social facilitation/coaction and affiliation with a yet broader range of social phenomena.

### The Model

Miller's conflict theory predicts and explains the behavioral consequences of presenting an animal with a stimulus that elicits competing, conditioned responses. Resultant instrumental behavior is assumed to be determined by an algebraic summation of the individual responses. The relative strengths of the individual responses are estimated by calculating the strength of original conditioning and by specifying the degree of similarity between the stimulus array confronting the subject and the stimulus array originally conditioned.

In order to lay the groundwork for the derivations made in the social theories, an exposition of conflict theory is required. The effects of stimulus similarity on instrumental behavior are calculated by use of the basic assumptions underlying the goal gradient hypothesis (see Hull, 1943; Spence, 1947). Miller assumed distance in space to function as a special case of stimulus similarity in that responses distant from a goal area suffer a generalization decrement--as do responses elicited by stimuli different from those originally conditioned. Both situations are explained in terms of stimulus generalization and generalization decrement. The decrement in response strength as an animal is increasingly distant from a conditioned goal can be explained by reference to the temporal delay between responses at the beginning of

a behavior chain leading to reinforcement and primary reinforcement. Thus spatial generalization decrement is tied to within-chain delay of reinforcement (i.e. the length of the behavioral sequence leading to reinforcement) and delay of reinforcement (i.e. the delay imposed following instrumental responding). Generalization decrements that can not be viewed as artifacts of distance and delay can be explained in terms of conditioned reinforcement and its antecedent manipulations (e.g., number of reinforced conditioning trials; and magnitude, quality, and delay of reinforcement). Stimuli associated with primary reinforcement are expected to function as secondary reinforcers and as discriminative cues for instrumental behavior. Stimuli increasingly different and remote from those originally reinforced are assumed to be weaker discriminative and reinforcing agents. Thus the goal gradient hypothesis allows partial estimation of the strength of conflicting, individual responses by reference to specified independent variables.

Further estimation of the individual response strengths is made possible by continued reference to learning theory manipulations and constructs. In Miller's (1959) theory the effect of original conditioning on instrumental behavior in a conflict situation is calculated by use of standard conditioning theories. The learning theory laws and constructs that are needed for the social derivations that will be made are: a) the strength of a positively reinforced approach response and the value of the intervening construct conditioned incentive ( $K$ ) bear a positive relationship to magnitude and quality of reinforcement, and the number of reinforced approach trials; b) approach response strength and  $K$  are decreasing functions of delay of reinforcement and the amount of

effort and time required for the instrumental response leading to reinforcement; c) the strength of a positively reinforced approach response and the value of reinforced (i.e. removal of noxious stimulation) avoidance response and the value of the intervening construct D bear a positive relationship to the intensity of noxious stimulation; and f) the strength of a negatively reinforced avoidance response and the value of the intervening construct H bear a positive relationship to the number of avoidance trials.

It is important to note that the discussion has thus far been directed at estimation of the strengths of instrumentally conditioned responses that are combined to predict the instrumental response consequences of a conflict situation. A number of classical conditioning models are used in the conditioning theories that are combined in Miller's conflict theory. One of these is appetitively conditioned incentive (K) which is assumed to be based on a process analogous to the classical conditioning of positive reinforcement. Specification of some of the ramifications of a classical conditioning model of incentive allows conceptual integration of response strength estimations based on stimulus similarity and strength of original conditioning at a level of refinement beyond that provided by demonstration that both processes are based on the same independent variables. Since the manipulations thought to affect conditioned incentive are assumed to underly conditioned reinforcement; and since conditioned reinforcement is assumed to underly both conditioning and goal gradient behavior; a classical conditioning model of incentive provides an elegantly economical construct for integration of stimulus similarity and strength of conditioning effects.

In addition to providing conceptual integration, a classical conditioning analysis allows increased refinement and precision in prediction of instrumental effects in a conflict situation. The contingencies thought to underly appetitively conditioned incentive have been found to generate discriminative stimuli for instrumental behavior. Thus in a choice or conflict situation a classical conditioning model ties independent variables such as delay, quality, and magnitude of reinforcement to net instrumental behavior. The classical conditioning model further illuminates instrumental processes by reference to the finding that both appetitive and aversive conditioned stimuli have lawful effects on ongoing instrumental behavior (e.g., Overmeir, Bull & Pack, 1971; Overmeir & Schwarzkoff, 1974).

Another use of the appetitive classical conditioning model which underlies the conditioning theories combined in Miller's conflict theory is that it provides a mechanism whereby a source of general energization can be postulated. Schedules of reinforcement that include frustrative nonreward (i.e. omission of previously delivered rewards) result in evidence of increased generalized drive (e.g., Amsel, 1951, 1958; Brown & Farber, 1951; Wagner, 1969). While the conditioning theories combined in conflict theory are not able to calculate some specific schedule of reinforcement effects, the level at which schedule of reinforcement is explained by conditioned incentive allows prediction of gross instrumental effects and generalized drive effects.

Since Miller's conflict theory incorporates avoidance behavior, general energization is further predictable by reference to a classical conditioning model of fear. Conditioned fear is assumed to provide the

specific motivation for avoidance behavior and to contribute to the motivation for all responding. Its reduction is thought to provide the reinforcement for avoidance behavior. Thus manipulations such as strength of noxious stimulation, number of presentations of noxious stimulation, and amount of noxious stimulation reduction are tied to specific instrumental behaviors (i.e. affecting the strength of the conditioned response, and as an aversively conditioned Pavlovian CS, affecting any ongoing instrumental behavior) and generalized drive.

As conditioned fear is assumed to contribute to general motivation, Miller (1959) assumed that conflicting response tendencies raise generalized drive. Brown & Farber (1951) used conflicting response tendencies to develop a theory of emotionally based drive. Conflicting excitatory tendencies and conflict between an excitatory tendency and an opposing inhibitory tendency induce emotion and frustration which increase the level of general motivation and produce unique stimuli which can be conditioned to specific response patterns. There is impressive evidence that conflict does induce generalized drive (Castaneda, 1965; Castaneda & Worrell, 1961; Finger, 1941) and that conflict-induced drive is conditionable (Innes, 1969; Tighe & Leaton, 1966).

In summary: Conflict theory incorporates conditioned reinforcement, conditioned incentive, classically conditioned cues for instrumental behavior, generalization and generalization decrement, habit, conditioned frustration, conditioned fear, and conditioned conflict. These constructs have been used to explain specific "presence of others" effects. The social theories presented in this paper use these existing assumptions



of analogy and widen their range of implications by use of the theoretical integration contained in Miller's conflict theory.

### A Conflict Theory of Social Facilitation

#### Introduction

Learning interpretations and theories of social facilitation/coaction involve an assumption that animals are typically rewarded or punished in the presence of spectators and coactors, and, through some learning process audiences and coactors gain a potency in affecting individual behavior. The issue is, what learning process? The process suggested by any experiment is intimately tied to the independent and dependent variables chosen, and therefore broad theory requires full consideration of available paradigms. In the exposition of conflict theory it was noted that some independent variables are tied relatively directly to particular instrumental behaviors. All the antecedent manipulations that are thought to affect appetitively conditioned incentive are assumed to contribute to the performance of the response originally involved in the conditioning contingencies. There is no evidence of more general energization or response facilitation resulting from reward contingencies (Armus, Carlson, Guinan & Crowell, 1964; Armus & Sniadowski-Dolinsky, 1966; Trapold, 1962; Trapold & Winokur, 1967). An exception is frustrative nonreward which, like fear and conflict, energize any behavior. Thus, depending on whether the response examined has been followed by a biologically significant event in the presence of others, only particular learning processes may be revealed. Consistent reward in the presence of others is expected to result in audiences and

coactors gaining the capacity to serve a discriminative cue function for responses previously made and reinforced in the presence of others. A social hedonic history involving frustration, pain and conflicting consequences is expected to imbue audiences and coactors with the power to energize all responding. Since conflict theory incorporates appetitively conditioned cue processes and aversively conditioned drive processes, it may be used as a model to integrate the two empirical areas.

The issue relates to other distinctions that are in question within the social facilitation literature--the drive-incentive distinction can provide conceptual clarity for existing empirical dichotomies within social psychology. There is an existing dichotomy between theories developed to explain human social facilitation (see Cottrell, 1970) and theories developed to explain social facilitation in lower animals (see Brown & Kiely, 1974; May & Dorr, 1968). Human social facilitation has centered on aversive-based drive processes. Attention has focused on such variables as rivalry (Dashiehl, 1930), peer-authority status (Bergum & Lehr, 1963; Cohen & Davis, 1973), fear of rejection (Buck & Parke, 1972), and evaluation potential (e.g., Paulus & Murdoch, 1971; Sasfy & Okun, 1974). Animal social facilitation theory has centered on appetitively based incentive processes. Attention has focused on the rewarding nature of social contact (e.g., Angermeir, 1960; Baron, Kish & Antonitis, 1962; Holder, 1958). This theoretical dichotomy may simply be a consequence of experimental convenience. While humans eat, drink, breathe, and suffer the pain of electric shock; these processes are harder to get into the laboratory than our extensive array of learned behaviors. Human research may enjoy the precision of a dependent

measure constructed for laboratory purposes. Cottrell's (1968) learned drive theory has directed social facilitation research toward the use of tasks validated as indices of generalized drive. While components of such tasks are likely to have been performed and rewarded in the presence of others, the experimental situation is not likely to evoke generalized response tendencies. Animals also perform both learned and unlearned responses, but since their unlearned behaviors are easier to elicit, responses such as eating are most often examined in the laboratory. Natural and normal laboratory rearing typically involve feeding in the presence of others, and food is an effective reward. The centering of human social facilitation research on drive processes and animal social facilitation research on incentive processes might therefore be viewed as reflecting something other than an ineluctable empirical necessity, and the possibility of theoretical unification should be explored.

#### Theory

Conflict theory incorporates incentive and drive processes. The activation and consequences of both processes are tied to specifiable relationships between independent and dependent variables. Therefore examination of a possible unity in "presence of others" effects can be directed by derivations made from a conflict theory model. An underlying assumption is that the presence of others is typically associated with multiple hedonic consequences and that social stimuli may, within limits, be viewed as functionally equivalent to any other stimuli--affecting behavior according to their learning histories (the assumption of functional equivalence between social and nonsocial stimuli was examined by Holder, 1958). Therefore the presence of others can

function as a discriminative stimulus for an instrumental response and as a source of generalized drive. The general theory of social facilitation details the assumptions and derivations that allow prediction of the activation of both processes.

General Predictions. A. Since stimuli associated with positively reinforced responding facilitate performance of responses instrumental in securing the reinforcement, social stimuli associated exclusively with positive reinforcement are predicted to facilitate performance of responses that were involved in earlier social learning.

B. Since stimuli that serve as a source of conditioned frustration energize novel responses made in their presence, social stimuli associated with frustrative nonreward are predicted to energize novel responses made in their presence.

C. Since stimuli associated with primary aversive events come to function as a source of conditioned drive, social stimuli associated with primary aversive events are predicted to energize novel responses made in their presence.

D. Since stimuli associated with multiple hedonic events energize novel responses, it is predicted that social stimuli associated with multiple hedonic events will energize novel responses made in their presence.

Independent Variables. Since the strength of appetitively conditioned incentive is a function of specified manipulations of independent variables, continued consideration of the assumption of functional analogy between social and nonsocial stimuli allows the prediction that any manipulation analogous to those that increase the strength of appetitively

conditioned incentive will increase the facilitating effect of social stimuli associated exclusively with positive reinforcement, e.g., a) increased reward magnitude, b) increased number of positively reinforced conditioning trials, c) decreased delay of reward, and d) increased reward quality.

Similarly, it is predicted that any manipulation analogous to those that increase the power of a stimulus to serve as a source of conditioned frustration will increase the energizing capacity of social stimuli associated with frustrative nonreward: e.g., a) increased reward on rewarded trials and b) increased number of associations of the social stimulus with frustrative nonreward.

Consideration of the laws developed to explain conditioned fear allows the prediction that any manipulation analogous to those that increase the power of a stimulus to serve as a source of conditioned fear will increase the energizing capacity of social stimuli associated with primary reinforcement: e.g., a) increased intensity in noxious stimulation and b) increased number of pairings of the social stimulus with noxious stimulation.

Since the level of conflict-induced drive is negatively related to the difference in strengths between competing response tendencies, it is predicted that any manipulation that equalizes the strengths of competing associations will increase the energizing capacity of social stimuli associated with multiple hedonic events: e.g., varying toward equality the number of positively reinforced approach and negatively reinforced avoidance trials.

As indicated in the exposition of conflict theory, response strength is a positive function of the degree of similarity between the stimulus array confronting a subject and stimuli that have been directly conditioned. Therefore the facilitating and energizing effects of social stimuli are positively related to the degree of similarity between them and social stimuli that have been directly associated with the hedonic events specified so far.

Experimental Paradigms. Stimulus similarity manipulations highlight a possible distinction between two experimental approaches that can be used to test learning theories of social facilitation/coaction: a) a discriminable audience (or coactors) can be conditioned right to the laboratory and b) speculation into typical conditioning histories can lead to assumptions that particular types of audiences and coactors have been associated with particular consequences. Thus to study possible generalization decrement in (for example) energization from conditioned fear one can a) associate a discriminable form of "the presence of others" with primary aversive events and then test for social, general energization by having subjects perform in the presence of audiences (coactors) more or less similar to these conditioned; or b) test for social general energization in the presence of audiences (coactors) more or less similar to Nazi Storm Troopers. Similarly, one can assume that professors and opposite-sexed peers have been associated with frustration and conflict more than some other discriminable classes of social stimuli. They would therefore be expected to have a greater energizing effect. In this light, learning theory can be used to direct more general examination of the conditions necessary for social facilitation/coaction

and may illuminate issues that are of continuing interest to a broad range of theoretical examinations of social facilitation/coaction. Increased precision can be given to examination of factors such as potential evaluation (see Cottrell, Wack, Sekerak & Rittle, 1968; Paulus & Murdoch, 1971), subject-audience status relationship (see Bergum & Lehr, 1963; Sasfy & Okun, 1974), and state of health of companion domestic fowl (see Tolman, 1967).

Dependent Variables. Since generalized drive energizes all responding (including responses involved in the initial reinforcement and punishment contingencies), incentive based, specific response facilitation can be distinguished from general energization only if full consideration is given to the choice of dependent variables. Appetitively conditioned incentive is expected to energize only responses involved in prior hedonic contingencies. Since components of novel tasks may be similar to responses previously made and reinforced in the presence of others, general energization can be distinguished from incentive based, specific response facilitation only if full consideration is given to the choice of dependent variables. As Cottrell (1968) pointed out, generalized drive is assumed to have specific consequences on responding. A methodical analysis of generalized drive (see Spence & Spence, 1966) has been used to develop tasks that test its full implications. These tasks can be used when audience/coactor conditions are thought to involve drive-inducing processes.

The general theory of social facilitation is directed at full use of conflict theory's integration of conditioned drive and conditioned incentive. The exposition of the theory emphasized the need to consider

a range of experimental paradigms and variables. The next section is a more highly developed special theory of social facilitation in which similar considerations allow continued use of conditioned drive and conditioned incentive to yield derivations of subject proficiency effects.

A Conflict Theory of the Functional Significance of Subject  
Proficiency in Social Facilitation

Introduction

There is impressive evidence that social facilitation effects are stronger among less proficient subjects (e.g., Cottrell, Rittle, & Wack, 1967; Scott & McCray, 1967; Vogel, Scott & Maston, 1949). This finding, which is of general interest in social facilitation/coaction research, is made of particular interest to a broad learning theory of social facilitation by Scott & McCray's (1967) suggestion that the effect may be due to the animals' desire to maintain close social contact--the slower dogs apparently wanted to keep up with the faster dogs. Scott & McCray's suggestion ties social facilitation/coaction to the well substantiated finding that species mates can serve as a source of reinforcement and elicit approach behavior (see Brown & Kiely, 1974; May & Dorr, 1968). As a broad learning theory, conflict theory integrates conditioned reinforcement with incentive based response facilitation and generalized drive. This integration is of special importance because proficiency effects themselves have also been explained in terms of nonproficient subjects experiencing increased evaluation apprehension and therefore perform with increased fear-based drive (see Cottrell,



1968 and 1970). An assumption of a social history including multiple hedonic consequences entertains the possibility that in some circumstances less proficient subjects have been reinforced for maintaining close social contact and in other circumstances less proficient subjects have been punished when in the presence of others. Therefore proficiency effects may result from both incentive and drive processes. Full use of a conflict theory model allows specification of conditions necessary for each effect, and ties proficiency effects to more general social facilitation/coaction phenomena.

### Theory

Since stimuli associated with positive reinforcement facilitate performance of responses that were instrumental in securing original reinforcement, an assumption of functional analogy between social and nonsocial stimuli allows the prediction that social stimuli associated exclusively with positive reinforcement will facilitate responses that were made and reinforced in their presence. Thus, in experimental situations in which performance of the measured task does not affect degree of contact, only those responses previously made and reinforced in the presence of others are expected to enjoy social facilitation. If the social conditioning histories of proficient and nonproficient subjects involve differential association of the presence of others with reinforcement, a proficiency effect is predicted. For example, slower members of a feeding group might associate the presence of others with a smaller magnitude of positive reinforcement than faster members. In this case, proficient eaters might be expected to show greater facilitation of eating than nonproficient eaters.

Maintaining the assumption of functional analogy between social and nonsocial stimuli, and considering the laws surrounding conditioned reinforcement; it is possible to predict that social stimuli associated exclusively with positive reinforcement are expected to facilitate any response upon which their presence is made contingent. Thus, if performance of the experimental task increases degree of social contact; a) a presence of others effect is predicted even when the examined response was not involved in prior social hedonic contingencies, and b) a proficiency effect is predicted. In other words, animals will respond to increase social contact and a regression toward the mean is therefore predicted. Continued exploitation of the conditioned reinforcement analogy allows the prediction that the effect be related to the independent variables affecting the strength of social reinforcement (e.g., number of associations of the presence of others with positive reinforcement and reward magnitude and quality manipulations). If the conditioning histories of proficient and nonproficient subjects involve differential association of the presence of others with reinforcement, a more complex proficiency effect is predictable. For example, if proficient subjects associate the presence of others with a larger magnitude of reinforcement than nonproficient subjects, the regression toward the mean is expected to be more pronounced among proficient subjects. The general finding that nonproficient subject typically experience increased social facilitation (e.g., Cottrell, Rittle, & Wack, 1967) points to the value of exploitation of a model that allows novel predictions of relationships between specified independent and dependent variables.

Since conditioned frustration serves a general energizing function, social stimuli associated with frustrative nonreward are expected to energize novel responses made in their presence. Thus, in experimental situations in which performance of the measured task does not affect degree of social contact, a drive-based presence of others effect is predicted. If the social conditioning histories of proficient and nonproficient subjects involve differential association of the presence of others with frustrative nonreward, a proficiency effect is expected. Thus the general finding that nonproficient subjects experience increased social facilitation may be explained by assuming that they typically get to eat less food when they eat in groups.

As frustration is punishing and its removal is reinforcing, a continuation of the assumption of functional analogy between social and nonsocial stimuli allows the prediction that when performance of the examined task affects degree of social contact, social stimuli associated with frustrative nonreward will produce presence of others and specific proficiency effects. For example, if nonproficient subjects suffer a greater loss of food in group eating than proficient subjects they will experience greater response impairment when performance of the experimental task increases social contact, and they will experience greater response facilitation when performance of the experimental task decreases social contact. Continued exploitation of the conditioned frustration analogy allows both the general social facilitation/coaction and specific proficiency effects to be tied to the independent variables signification in conditioned frustration (e.g., increased reward on rewarded

trials and increased number of associations of the presence of others with frustrative nonreward).

Like frustration, fear serves a general energizing function. Therefore, social stimuli associated with primary aversive events are expected to energize novel responses made in their presence. Thus, in situations in which performance of the measured task does not affect degree of social contact, a drive-based presence of others effect is again predicted. A range of proficiency effects can be generated by differential association of the presence of others with aversive processes. The independent variables significant in avoidance conditioning (e.g., intensity of noxious stimulation, number of pairings of noxious and neutral stimuli, amount of noxious stimulation reduction, and number of times responding in the presence of a conditioned stimulus has been followed by noxious stimulation reduction) can be played with to generate a range of complex social facilitation and proficiency predictions.

Since conditioned fear motivates avoidance behavior, and its reduction is reinforcing, social facilitation and proficiency effects can be predicted in situations in which performance of the examined task affects degree of contact with social stimuli associated with aversive events. For example, if prior combat has resulted in less proficient subjects associating pain with species mates, they are predicted to show response facilitation if performance of the task decreases social contact, and they are predicted to show response impairment if performance of the task increases social contact.

Conditioned conflict is a third source of generalized drive made available by a conflict theory model. Conditioned conflict is therefore

expected to produce results similar to those produced by frustrative nonreward (a form of conflict) and conditioned fear. The drive-inducing capacity of social stimuli associated with multiple hedonic consequences is predicted to be an increasing function of the equality in strength of competing associations. As this factor may differentiate proficient and nonproficient subjects, proficiency effects can be predicted. For example, increased social-energization among nonproficient subjects has been explained in terms of increased evaluation apprehension (see Cottrell, 1968) which reflects increased fear of punishment in the presence of others. Conflict theory allows the complimentary explanation that proficient subjects typically are reinforced in social situations and the presence of others is therefore less likely to evoke competing anticipations with ambiguous stimulus consequences. Nonproficient subjects are therefore expected to show greater drive-like energization in the presence of others.

As the first, more general theory of social facilitation/coaction includes stimulus similarity as a significant variable, the special theory that allows prediction of proficiency effects similarly incorporates generalization processes. The predicted effects listed above are expected to be mediated by the degree of similarity between the social stimuli originally associated with hedonic consequences and the stimulus array confronting the subject. The special theory that explains proficiency effects, like the more general theory, allows examination of stimulus similarity by research in which the social stimulus is conditioned in the laboratory and by research that is based on speculation into typical social, hedonic contingencies. For example, nonproficient

subjects may be rewarded in the presence and at the expense of proficient subjects in the laboratory. It would then be expected that proficient subjects would show increased energization in the presence of similar audiences. Such an experiment may appear highly artificial and trifling, but it may serve to illuminate existing issues such as evaluation apprehension, peer-authority status, recording of subjects' performance, degree of interaction between subject and audience (coactors), and the behavior of audiences (coactors).

### A Conflict Theory of Affiliation

#### Introduction

A number of learning constructs and processes that are integrated in conflict theory have been used to explain social mitigation of fear and stress: e.g., conditioned reinforcement (Latane & Glass, 1968) and counterconditioning (Maria & Bauermeister, 1974). Both explanations rely on processes subsumed in conditioned incentive and thus highlight an incongruity between affiliation and existing learned drive theories of social facilitation. Social facilitation is explained by reference to the capacity of the presence of others to induce drive, and affiliation describes a general finding that the presence of others mitigates some of the effects of drive (see Eppley, 1974). Since conditioned incentive provides an economical means of explaining mitigation of drive effects, and since conflict theory integrates incentive and drive processes, a conflict theory model can be used to explain social mitigation of fear and integrate it with explanations of social induction of fear. Since the deductive process involved in a conflict theory of the

mitigation of fear is the same as that presented in the first two theories, only illustrative examples will be given.

### Theory

The presence of appetitively conditioned stimuli impairs aversive-based responding. Therefore, social stimuli associated with positive reinforcement are expected to mitigate some effects of fear. Thus numerous explanations of a reinforcement basis for social mitigation of fear (e.g., Baum, 1969; Bovard, 1959; Hake & Laws, 1967; Hake, Powell, & Olsen, 1969; Korman & Leob, 1961; Latane & Glass, 1968) can be tied to conditioned incentive. Since a stimulus that elicits responses incompatible with fear and fear-based responding reduces aversive-based responding, it is predicted that a social stimulus that evokes responses incompatible with the measure of fear used in a particular experiment will produce evidence of fear mitigation.

The power of a broad learning theory model lies not only in its ability to allow prediction of affiliation and social facilitation effects, but also in its ability to generate prediction of aversive based processes within an affiliation paradigm. Since the presence of stimuli that are associated with fear reduction results in a decrement in fear-based responding, the presence of social stimuli involved in avoidance learning situations is predicted to result in reduction of fear-based responding. Conflict theory thus allows the prediction that the presence of social stimuli involved in aversive contingencies may produce evidence of both reduced and heightened fear. If the prior social contingency was one of fear and conflict reduction, the motivation underlying the

examined aversive-based task will be lowered by the presence of others. There will therefore be evidence of social mitigation of fear. If the social contingency was one in which the presence of others was associated with primary aversive events and conflict, the motivation underlying the examined aversive-based task will be increased by the presence of others and there will therefore be evidence of social induction of fear.

An illustrative and prototypic example of a conflict model prediction demonstrates the manner in which a broad model can illuminate and integrate diverse issues: If an experimental situation bears similarity to situations in which friends (Kissel, 1965), strangers (Glass, Gordon & Henchy, 1970), supportive/nonsupportive companions (Buck & Parke, 1972), fearful companions (Angermeir, Philhour, & Higgins, 1965; Sarnoff & Zimbardo, 1961), or nonfearful companions (Davitz & Mason, 1948) typically provide rewarding outcomes; the presence of such social stimuli is predicted to produce affiliation and social mitigation of stress. Full exploitation of a reward model allows the prediction that the effect is related to variables such as number of associations of the presence of others with rewarding events, the magnitude and quality of the rewarding event, etc. If the experimental situation is such that the potential affiliate evokes generalized anticipation of frustration, fear, or conflict; social induction of stress is predicted. The strength of the stress is determined by independent variables such as number of associations of the presence of others with noxious stimulation, the equality in strength of competing associations, etc.



The illustrative prediction highlights a continuity between the affiliation and social facilitation theories. Again, stimulus similarity can be used to make predictions of the effects of varying discriminable features of affiliates that are conditioned in the laboratory and stimulus similarity can be used as a basis of speculation into typical conditioning histories. For example, it has been found that both non-fearful (Baum, 1969; Davitz & Mason, 1948; Masserman, 1943) and fearful (e.g., Angermeier, Philhour, & Higgins, 1965; Gerard & Rabbie, 1961; Schachter, 1959; Wrightsman, 1960) affiliates produce affiliation and social mitigation of fear. A conflict theory that assumes a multiplicity of social hedonic consequences might suggest a history of reinforcement for imitation of calm models and a history of reinforcement for approach toward fellow sufferers. Consideration of typical aversive and appetitive contingencies might then illuminate affiliation when a student waiting for an examination has the choice of remaining alone, affiliating with the best student in the class, affiliating with the worst student in the class, or affiliating with a student whose performance has been like his own. More relevant to existing social literature, it may again be pointed out that full consideration of available methodology may illuminate the functional significance of factors such as degree of supportiveness (see Buck & Parke, 1972) and attraction (see Glass, Gordon, & Henchy, 1970; Kissel, 1965).

### Conclusion

Conflict theory can be conceptualized as a combination of elementary processes. The strengths of the conflicted response tendencies

are predictable by use of conditioning theories, and the conflicted responses are assumed to interact in a lawful manner. Therefore social phenomena that are explained by analogical reference to the conditioning constructs that are integrated within conflict theory may enjoy integration by full use of a conflict theory model. Since conflict theory integrates conditioned reinforcement, conditioned fear, and stimulus generalization; and since those constructs and processes have been taken individually to explain particular social facilitation and affiliation phenomena; it is reasonable to expect conflict theory to provide integrative explanation for social facilitation/coaction and affiliation. Other social phenomena that are explained by analogical reference to the conditioning constructs that are integrated within conflict theory may enjoy similar integration. The repeated reference to conditioned incentive suggests that the conditioning of social reinforcement may be intimately tied to both social facilitation/coaction and affiliation. Since attraction has been explained by reference to reinforcement paradigms (see Byrne, 1971), it too may be integrated with social facilitation/coaction and affiliation through full exploitation of a conflict theory model. As Weiss (see reference note) tied speaking in reply to initial agreements and disagreements to social reinforcement and punishment, conversation may be similarly integrated.

The repeated reference to the functional dependence of empirical social phenomena on experimental procedure suggests another way in which the possibility of broad social theory can be conceptualized: Social facilitation/coaction, affiliation, social reinforcement, attraction, and conversation may each be viewed as a particular approach to

the general question of what is the effect of the presence of others on individual behavior. Each approach can be viewed as defined by experimental paradigms that direct attention toward particular learning processes. In social facilitation and coaction paradigms the presence of others is manipulated independently of the subject's behavior. Thus the presence of others may be examined by reference to more general noncontingent cue processes. In affiliation paradigms, as well as in some forms of attraction and conversation paradigms, degree of contact with social stimuli is determined by various forms of a choice response. Thus the presence of others may be examined by reference to more general approach and avoidance processes. In social reinforcement paradigms subjects' behavior also determines degree of social contact; but unlike the typical affiliation paradigm, the relationship between behavior and social contact is mediated by a contingency developed by the researcher. Thus the presence of others may be examined by full consideration of reinforcement processes. In this light, any theory that integrates contingent and noncontingent cue effects may serve to integrate the wealth of data generated as a result of analyzing "presence of others" phenomena in manipulatable and revealing experimental paradigms.

This paper has not exhaustively explored the range of social phenomena that have been some illuminated by reference to learning processes. Most of the learning processes that have been used as models for social research are the more established ones that are integrated in the conditioning theories that underly conflict theory. The position underlying this paper is not, however, that conflict theory can be used as a model for social research. The underlying position is that models are most

useful for explanation, prediction and integration when they are fully exploited. If a social phenomenon is illuminated by an assumption of an analogous relationship between it and some other phenomenon, consideration of all the empirical and theoretical ramifications of the model allows increased perspective in empirical and theoretical examination of the social phenomenon.

## REFERENCES

- Amsel, A. A three-factor theory of inhibition: An addition to Hull's two factor theory. American Psychologist, 1951, 6, 487.
- Amsel, A. The role of frustrative nonreward in noncontinuous reward situations. Psychological Bulletin, 1958, 55, 102-119.
- Angermeir, W. F. Some basic aspects of social reinforcement in albino rats. Journal of Comparative and Physiological Psychology, 1960, 53, 364-367.
- Angermeir, W. F., Philhour, P., & Higgins, J. Early experience and social grouping in fear extinction of rats. Psychological Reports, 1965, 16, 1005-1010.
- Armstrong, E. A. The nature and function of animal mimesis. Bulletin of Animal Behavior, 1951, 9, 46-58.
- Armus, H. L., & Sniadowski-Dolinski, D. Startle decrement and secondary reinforcement stimulation. Psychonomic Science, 1966, 4, 175-176.
- Baron, A., Kish, G. B., & Antonitis, J. J. Effects of early and late social isolation on aggregate behavior in the domestic chicken. Journal of Genetic Psychology, 1962, 100, 355-360.
- Baum, M. Extinction of an avoidance response motivated by intense fear: Social facilitation of the action of response prevention (flooding) in rats. Behavior Research and Therapy, 1969, 7, 57-62.

- Bergum, B. O., and Lehr, D. J. Effects of authoritarianism on vigilance performance. Journal of Applied Psychology, 1963, 47, 75-77.
- Bovard, E. W. The effects of social stimulation on responses to stress. Psychological Review, 1959, 66, 267-277.
- Brown, C. P., & Kiely, P. C. The role of early experience and emotionality in social facilitation of pecking in chickens. Animal Behavior, 1974, 22, 100-109.
- Brown, J. S., & Farber, I. E. Emotions conceptualized as intervening variables--with suggestions toward a theory of frustration. Psychological Bulletin, 1951, 48, 465-495.
- Buck, R. W., & Parke, R. D. Behavioral and physiological responses to the presence of a friendly or neutral person in two types of stressful situations. Journal of Personality and Social Psychology, 1972, 24, 143-153.
- Byrne, D. The Attraction Paradigm. New York: Academic Press, 1971.
- Castaneda, A. The paired-associates method and the study of conflict. In L. P. Lipsitt and C. C. Spiker (Des.), Advances in Child Development and Behavior. Vol. 2 New York: Academic Press, 1965. Pp. 1-18.
- Castaneda, A., & Worell, L. Differential relation of latency and response vigor to stimulus in brightness discrimination. Journal of Experimental Psychology, 1961, 61, 309-314.
- Chen, S. C. Social modification of the activity of ants in nest-building. Physiological Zoology, 1937, 10, 420-436.

- Cohen, J. L., & Davis, J. H. Effects of audience status, evaluation, and time of action on performance with hidden-word problems. Journal of Personality and Social Psychology, 1973, 27, 74-85.
- Conger, J. J., Sawrey, W. L., & Turrell, E. S. The role of social experience in the production of gastric ulcers in hooded rats placed in a conflict situation. Journal of Abnormal and Social Psychology, 1958, 57, 214-219.
- Cottrell, N. B. Performance in the presence of other human beings: Mere presence, audience and affiliation effects. In E. C. Simmel, R. A. Hoppe, and G. A. Milton (Eds.), Social facilitation and imitative behavior. Boston: Allyn and Bacon, 1968.
- Cottrell, N. B. Social facilitation. In C. G. McClintock (Ed.), Experimental Social Psychology. New York: Holt, Rinehart, & Winston, 1970.
- Cottrell, N. B., Rittle, R. H., & Wack, D. L. Presence of an audience and list type (competitional or noncompetitional) as joint determinants of performance in paired-associates learning. Journal of Personality, 1967, 35, 425-434.
- Cottrell, N. B., Wack, D. L., Sekerak, G. J., & Rittle, R. H. Social facilitation of dominant responses by the presence of an audience and the mere presence of others. Journal of Personality and Social Psychology, 1968, 9, 245-250.
- Dashiell, J. R. An experimental analysis of some group effects. Journal of Abnormal Social Psychology, 1930, 25, 190-199.
- Davitz, J. R., & Mason, D. J. Social facilitated reduction of a fear response in rats. Journal of Comparative and Physiological Psychology, 1948, 48, 149-151.

- Epley, S. W. Reduction of the behavioral effects of aversive stimulation by the presence of companions. Psychological Bulletin, 1974, 81, 271-283.
- Finger, F. W. Qualitative studies of "conflict." I. Variations in latency and strength of the rat's response in a discrimination-jumping situation. Journal of Comparative Psychology, 1941, 31, 97-127.
- Gates, G. The effects of an audience upon performance. Journal of Abnormal and Social Psychology, 1924, 18, 334-344.
- Gerard, H. B., & Rabbie, J. M. Fear and social comparison. Journal of Abnormal and Social Psychology, 1961, 62, 586-592.
- Glass, D. C., Gordon, A., & Henchy, T. The effects of social stimuli on psychophysiological reactivity to an aversive film. Psychonomic Science, 1970, 20, 255-256.
- Hake, D. F. and Laws, D. R. Social facilitation of responses during a stimulus aired with electric shock. Journal of the Experimental Analysis of Behavior, 1967, 10, 387-392.
- Hake, D. F., Powell, J. & Olsen, R. Conditioned suppression as a sensitive baseline for social facilitation. Journal of the Experimental Analysis of Behavior, 1969, 12, 807-816.
- Harlow, H. F. Social facilitation of feeding in the albino rat. Journal of Genetic Psychology, 1932, 41, 211-221.
- Holder, E. Learning factors in social facilitation and social inhibition in rats. Journal of Comparative and Physiological Psychology, 1958, 51, 60-64.
- Hull, C. L. Principles of Behavior. New York: Appleton, 1943.



- Hurlock, E. B. The use of group rivalry as an incentive. Journal of Abnormal and Social Psychology, 1927, 22, 278-290.
- Innes, R. J. Escape and avoidance as responses learned to a specific conflict produced drive. Journal of Experimental Psychology, 1969, 80, 78-84.
- James, W. T. Social facilitation of eating behavior in puppies after satiation. Journal of Comparative and Physiological Psychology, 1953, 46, 427-428.
- Kissel, S. Stress reducing properties of social stimuli. Journal of Personality and Social Psychology, 1965, 2, 378-384.
- Korman, M. & Leob, J. Effects of the presence of another animal during acquisition and extinction upon the strength of a fear response. Journal of Comparative and Physiological Psychology, 1961, 54, 158-161.
- Latane, B. & Glass, D. C. Social and nonsocial attraction in rats. Journal of Personality and Social Psychology, 1968, 9, 142-146.
- Maria, J. F., & Bauermeister, J. J. Socially facilitated extinction of a conditioned avoidance response. Bulletin of the Psychonomic Society, 1974, 3, 161-163.
- May, J. G. Jr., & Dorr, D. Imitative pecking in chicks as a function of early social experience. Psychonomic Science, 1968, 11, 175-176.
- Miller, N. E. Liberalization of basic S-R concepts: Extensions to conflict behavior, motivation and social learning. In S. Koch (Ed.), Psychology: A Study of a Science, Vol. II, New York: McGraw Hill Book Company, Inc., 1959.

- Overmeir, J. B., Bull, J. A. III, & Pack, K. On instrumental response interaction as explaining the influences of Pavlovian CSs upon avoidance behavior. Learning and Motivation, 1971, 2, 103-112.
- Overmeir, J. B., & Schwarzkooff, K. H. Summation of food and shock based responding. Learning and Motivation, 1974, 5, 42-52.
- Paulus, P. B., & Murdoch, P. Anticipated evaluation and audience presence in the enhancement of dominant responses. Journal of Experimental Social Psychology, 1971, 7, 280-291.
- Sarnoff, I., & Zimbardo, P. G. Anxiety, fear and social affiliation. Journal of Abnormal and Social Psychology, 1961, 62, 356-363.
- Sasfy & Okun Form of evaluation and audience expertness as joint determinants of audience effects. Journal of Experimental Social Psychology, 1974, 10, 461-467.
- Schachter, S. The Psychology of Affiliation. Palo Alto, Calif.: Stanford University Press, 1959.
- Scott, J. P., & McCray, C. Allelomimetic behavior in dogs: Negative effects of competition in social facilitation. Journal of Comparative and Physiological Psychology, 1967, 63, 316-319.
- Spence, J. T., & Spence, K. W. The motivational components of manifest anxiety: Drive and drive stimuli. In C. D. Spielberger (Ed.), Anxiety and Behavior. New York: Academic Press, 1966. Pp. 291-326.
- Spence, K. W. The role of secondary reinforcement in delayed reward learning. Psychological Review, 1947, 54, 1-8.
- Thorpe, W. H. Learning and instinct in Animals. Massachusetts: Harvard University Press, 1963.

- Tigue, T. J., & Leaton, R. N. Escape from conflict: I. The effects of increasing difficulty of discrimination. Psychonomic Science, 1966, 6, 129-130.
- Tolman, C. W. The feeding behavior of domestic chicks as a function of rate of pecking by a surrogate companion. Behavior, 1967, 29, 57-62.
- Tolman, C. W. The varieties of social stimulation in the feeding behavior of domestic chicks. Behavior, 1968, 30, 275-286.
- Trapold, M. A. The effect of incentive motivation on an unrelated reflex response. Journal of Comparative and Physiological Psychology, 1962, 55, 1034-1039.
- Trapold, M. A., & Winokur, S. Transfer from classical conditioning and extinction to acquisition, extinction, and stimulus generalization of a positively reinforced instrumental response. Journal of Experimental Psychology, 1967, 73, 517-525.
- Vogel, H. H. Jr., Scott, J. P., & Maston, M. V. Social facilitation and allelomimetic behavior in dogs by 1. Social facilitation in a noncompetitive situation. Behavior, 1949, 2, 121-133.
- Wagner, A. R. Frustrative nonreward: A variety of punishment? In B. A. Campbell and R. M. Church (Eds.), Punishment and Aversive Behavior, New York: Appleton-Century-Crofts, 1969, Pp. 158-181.
- Weiss, R. F., & Miller, F. G. The drive theory of social facilitation. Psychological Review, 1971, 78, 44-57.
- Wilson, T. Early experience and facilitation of feeding in domestic chicks. Journal of Comparative and Physiological Psychology, 1968, 66, 800-802.

Wrightsman, L. S. Jr. Effects of waiting with others on changes in level of felt anxiety. Journal of Abnormal and Social Psychology, 1960, 61, 216-222.

#### REFERENCE NOTE

Weiss, R. F. Interpersonal communication: The reinforcing functions of speaking in reply. Mimeographed manuscript, University of Oklahoma, Norman, Okla., 1976.

APPENDIX A

INNATE VERSUS LEARNED DETERMINANTS OF

SOCIAL FACILITATION/COACTION

INNATE VERSUS LEARNED DETERMINANTS  
OF SOCIAL FACILITATION/COACTION

Although there is impressive evidence that social facilitation/coaction is a function of past social experiences (e.g., Brown & Kiely, 1974; May & Dorr, 1968; Wilson, 1968), some studies have revealed an independence from prior experience (Conger, Sawrey, & Turrell, 1958; Harlow, 1932). There is also some theoretical speculation that allows innate basis for social facilitation/coaction (e.g., James, 1953; Tolman, 1967). While some such theoretical speculation is directed toward broad explanatory constructs (e.g., Armstrong, 1951; Thorpe, 1963), explanations that rely on innate tendencies are generally limited to specific behaviors and species--and tend to produce a plethora of terminology. Learning interpretations tend to allow greater breadth. For example, proceeding from Scott & McCray's (1967) suggestion that proficiency effects are the result of the animals' desire to maintain close social contact, a conditioned reinforcement interpretation was found to compliment a conditioned drive interpretation (i.e. a history of more social punishment for less proficient subjects); and an entire range of predictions was generated. If the basis for affiliation (which can result in proficiency effects) is viewed as innate, there is no apparent explanation for proficiency effects in situations in which improved performance does not increase contact between the subject and

an audience (e.g., Chen, 1937; Cottrell, Rittle, & Wack, 1967; Gates, 1924; Hurlock, 1927). Proceeding from an innate explanation, there is also no apparent way in which the proficiency effect can be made to contribute to broader explanations of "presence of others" phenomena. On the other hand, conditioned reinforcement and conditioned drive explanations can be made to integrate with other "presence of others" explanations that are based on similarly integrated models that are drawn from learning.

This is not to say that a learning view does not, in some cases, stretch credibility. For example, Chen (1937) found the accelerating affect of coaction in ant nest-building to be a function of the initial proficiency of the ants. It is hard to point to stimulus and response contingencies that might affect an individual ant's nest-building behavior. Similarly, while some data implicates what may be learned factors in bird social behavior (see Tolman, 1968); ethological studies (see Thorpe, 1963) reveal a range of similar, nonhuman social behaviors that apparently defy learning explanations--as they defy experimental examination of their determinants. It is not surprising that learned drive theories of social facilitation/coaction strain most for nonhuman data. Humans have a wealth of social, conditioned reinforcers and punishers that may be appealed to for explanation of specific "presence of others" effects. But, as indicated above, there is evidence that nonhuman social behavior is also mediated by social experiences and nonhuman social energization is found where the dependent variable is a learned response--the case for innate "presence of others" effects being strongest for species specific behaviors (e.g., bird pecking). It



appears that the cause of unifying theory is best served by a learning approach: It is probably more productive to seek experiential determinants of bird pecking than innate determinants of differential human reaction to blind-folded and sighted audiences (Cottrell, Sekerak, Wack, & Rittle, 1968).

#### REFERENCES

- Armstrong, E. A. The nature and function of animal mimesis. Bulletin of Animal Behavior, 1951, 9, 46-58.
- Brown, C. P. & Kiely, P. C. The role of early experience and emotionality in social facilitation of pecking in chickens. Animal Behavior, 1974, 22, 100-109.
- Chen, S. C. Social modification of the activity of ants in nest-building. Physiological Zoology, 1937, 10, 420-436.
- Conger, J. J., Sawrey, W. L., & Turrell, E. S. The role of social experience in the production of gastric ulcers in hooded rats placed in a conflict situation. Journal of Abnormal and Social Psychology, 1958, 57, 214-219.
- Cottrell, N. B., Rittle, R. H., & Wack, D. L. Presence of an audience and list type (competitional or noncompetitional) as joint determinants of performance in paired-associates learning. Journal of Personality, 1967, 35, 425-434.
- Cottrell, N. B., Wack, D. L., Sekerak, G. J., & Rittle, R. H. Social facilitation of dominant responses by the presence of an audience and the mere presence of others. Journal of Personality and Social Psychology, 1968, 9, 245-250.
- Gates, G. The effects of an audience upon performance. Journal of Abnormal and Social Psychology, 1924, 18, 334-344.
- Harlow, H. F. Social facilitation of feeding in the albino rat. Journal of Genetic Psychology, 1932, 41, 211-221.

- Hurlock, E. B. The use of group rivalry as an incentive. Journal of Abnormal and Social Psychology, 1927, 22, 278-290.
- James, W. T. Social facilitation of eating behavior in puppies after satiation. Journal of Comparative and Physiological Psychology, 1953, 46, 427-428.
- May, J. G. Jr., & Dorr, D. Imitative pecking in chicks as a function of early social experience. Psychonomic Science, 1968, 11, 175-176.
- Scott, J. P., & McCray, C. Allelomimetic behavior in dogs: Negative effects of competition in social facilitation. Journal of Comparative and Physiological Psychology, 1967, 63, 316-319.
- Thorpe, W. H. Learning and Instinct in Animals. Massachusetts: Harvard University Press, 1963.
- Tolman, C. W. The feeding behavior of domestic chicks as a function of rate of pecking by a surrogate companion. Behavior, 1967, 29, 57-62.
- Wilson, T. Early experience and facilitation of feeding in domestic chicks. Journal of Comparative and Physiological Psychology, 1968, 66, 800-802.

## APPENDIX B

### EXPLOITATION OF THEORETICAL ASSUMPTIONS

## EXPLOITATION OF THEORETICAL ASSUMPTIONS

Inherent in this paper is the suggestion that a modelling theory can and should direct research both from the perspective of the model and from the perspective of the research area that is explained by the model. While it may appear that reconstruction of social phenomena to conform to the boundaries of a learning model results in demonstrative and trifling experiments, limiting the use of a model to existing social issues and restricting it to existing social paradigms can result in perpetuated obfuscation and a plethora of relatively unilluminating data. For example, by suggesting the use of the learning concepts drive and response dominance, Zajonc (1965) provided social facilitation/coaction with increased precision by specification of the effects of drive on habits of differing strength. Thus the dependent variables studies in social facilitation/coaction may have been taken further from the realm of naturally occurring behavior, but data interpretation was some freed from the mire of equally appealing alternatives. Cottrell's identification and demonstration of a learned basis of drive provided an approach to examine the conditions necessary for social facilitation. Feared audiences were predicted to have an energizing effect, and there amassed a wealth of data illuminating human vulnerability (e.g., Cottrell, Wack, Sekerak & Rittle, 1968; Henchy & Glass, 1968; Paulus & Murdoch, 1970). Weiss & Miller (1971) suggested that full consideration of a learned drive

model allows examination of previously unconsidered consequences of the presence of others and examination of the basis of social drive. This paper has explored the possibility of conflict as a source of drive underlying social facilitation/coaction and affiliation. The derivations are based on assumptions of analogy which allow use of the predictions generated by conflict theory. While it may appear contrived to reward a subject in the presence of a discriminable and feared audience, Miller's (1959) derivation of the level of resultant fear when increased incentive results in approach to a feared goal may serve to illuminate the potentially vague issue of social energization in situations in which an animal is free to perform alone or in the presence of others.

## REFERENCES

- Cottrell, N. B. Performance in the presence of other human beings: Mere presence, audience and affiliation effects. In E. C. Simmel, R. A. Hoppe, and G. A. Milton (Eds.), Social Facilitation and Imitative Behavior, Boston: Allyn and Bacon, 1968.
- Cottrell, N. B., Wack, D. L., Sekerak, G. J., & Rittle, R. H. Social facilitation of dominant responses by the presence of an audience and the mere presence of others. Journal of Personality and Social Psychology, 1968, 9, 245-250.
- Henchy, T., & Glass, D. C. Evaluation apprehension and the social facilitation of dominant and subordinate responses. Journal of Personality and Social Psychology, 1968, 10, 446-454.
- Miller, N. E. Liberalization of basic S-R concepts: Extensions to conflict behavior, motivation and social learning. In S. Koch (Ed.), Psychology: A Study of a Science, Vol. II. New York: McGraw Hill Book Company, Inc., 1959.
- Paulus, P. G., & Murdoch, P. Anticipated evaluation and audience presence in the enhancement of dominant responses. Journal of Experimental Social Psychology, 1971, 7, 280-291.
- Weiss, R. F., & Miller, F. G. The drive theory of social facilitation. Psychological Review, 1971, 78, 44-57.
- Zajonc, R. B. Social facilitation. Science, 1965, 149, 269-274.

APPENDIX C  
A REVIEW OF CONFLICT



### A Review of Conflict

The Spence-Hull (Spence, 1956) theory of selective learning and Miller's (1959) theory of conflict are attempts to combine and extend theories of instrumental conditioning so that more complex behavior may be explained. Miller's theory deals with the consequences of conflicting response tendencies: The relative strengths of the individual responses are estimated by derivation from established theories of instrumental conditioning and the conflicting responses are assumed to interact in a lawful manner--yielding predictable net outcomes. Since the strengths of the individual response tendencies are assumed to be affected by habit strength, drive, and incentive variables; Miller's theory may be broadly viewed as providing an explanatory scheme for any conflict produced by compounds of habits, drives, and incentives. Conflict theory has been extended to predict performance in selective learning tasks. It also provides a mechanism whereby drive and cue consequences of responses competition may be predicted. The present review of conflict centers on Miller's (1959) theory because it is thought that the realized and potential breadth of that theory makes it suggestive of ways in which apparently diverse, complex phenomena may be integrated.

Fundamental to Miller's (1951, 1959) theory of conflict is the goal gradient hypothesis. Developed by Hull (1934, 1943) and extended by

Spence (1947), the goal gradient hypothesis explains increased response strength as an organism nears a goal in terms of stimulus generalization, delay of reinforcement, and secondary reinforcement. According to a generalization explanation, a response is conditioned in the goal area where the most primary reinforcement occurs. Increasingly distant or dissimilar stimuli have a progressively decreased capacity to evoke the response. Hull's original formulation relies on conditioning throughout the behavior sequence leading to reinforcement, with the strength of conditioning being limited by the delay between the response and reinforcement. Responses at the beginning of a behavioral sequence are conditioned to their accompanying stimuli with such conditioning suffering from a delay of reinforcement. Both Hull (1934) and Spence (1947) used secondary reinforcement as a mechanism to explain the effects of delayed reinforcement and to provide a general account of temporal gradients. The primary gradient, based on delay, is thought to combine with a more extended gradient which is based on the capacity of stimuli associated with reinforcement to function as secondary reinforcers and, through a process of higher order conditioning, condition increasingly remote stimuli. Stimuli removed from the goal area become so conditioned only when intermediate stimuli become conditioned secondary reinforcers. Temporal gradients not resulting from spatial distance may be explained as resulting from weakened conditioning of secondary reinforcement as stimuli may occur repeatedly during a delay interval without being reinforced. The longer the delay interval the smaller the proportion of cues optimally contingent with the ultimate reinforcement. Non spatially-based temporal gradients may also be explained by assuming that time

intervals are a part of the stimulus complex that is conditioned: Intervals progressively different from those directly conditioned suffer increased generalization decrement. The goal gradient hypothesis has been found useful in predicting both approach (Brown, 1948; Hull, 1934) and avoidance (Brown, 1948; Miller & Miles, 1935) behavior.

Two pivotal postulates of Miller's theory are based on the goal gradient hypothesis: a) the tendency to approach a goal is stronger the nearer the subject is to it, and b) the tendency to avoid a feared stimulus is stronger the nearer the subject is to it (Miller, 1959). There is ample support for these assumptions for a) spatial gradients of approach (Brown, 1948; Murray & Miller, 1952); b) spatial gradients of avoidance (Brown, 1948; Bugelski & Miller, 1938; Miller & Murray, 1952; Murray & Miller, 1952); and c) temporal gradients of approach (Maher, Weisstein & Sylva, 1964; Rigby, 1954; Rosenbaum, 1951). Rigby (1954) also found evidence of a temporal gradient of avoidance.

Miller (1951, 1959) took the evidence of decreased response strength with increased distance from the point of reinforcement as an indication that distance in space is a special case of stimulus similarity. This position is both congruent with explanations of spatial gradient behavior and a logical interpretation of the observed functional similarity between distance and similarity. So viewed, conflict theories based on the above two postulates may be extended to any situation in which an animal can be said to be moving along a dimension of stimulus similarity toward a stimulus associated with a reinforcing or punishing state of affairs. Berkun (1954) and Murray & Berkun (1955) distinguished nearness and similarity and developed a three dimensional model to

explain behavior in an approach/avoidance conflict in which the subject has an opportunity to approach increasingly dissimilar goal areas through increasingly dissimilar alleys. The methodological innovation provides opportunity for examination of deductions about displaced responses which may result from conflict. However, Murray & Berkun suggest no alternative mechanism to explain the basis of distance gradients and their account of the joint action of distance and similarity gradients may just as easily and more parsimoniously be considered an account of the joint action of two gradients based on two dimensions of stimulus similarity.

Miller's conflict theory incorporates instrumental reward and instrumental escape/avoidance behavior, and the responses so combined are assumed to be affected by the variables generally thought significant in theories of instrumental conditioning. Miller's (1959) analysis incorporates common drive, incentive, and habit variables, and those not included by Miller (e.g., delay of reinforcement and schedule of reinforcement) may be easily incorporated. Miller explicitly postulated that the strength of tendencies to approach or avoid varies directly with the strength of the drives upon which they are based; and that below the asymptote of learning, increasing the number of reinforced trials will increase the strength of the response tendency that is reinforced. He further specified a number of common incentive and strength of noxious stimulation variables thought to affect strength of approach and strength of avoidance. Gradients of approach and avoidance are thus thought to be raised or lowered as a function of common learning independent variables. Murray & Miller (1952) found that schedule of

reinforcement affects the slopes of response gradients and Rosenbaum (1951) found temporal gradients of approach to be a function of length of food deprivation.

Using theoretical accounts (Miller, 1951; Mowrer, 1947) of fear as a classically conditioned response with drive inducing stimulus consequences (Brown, Kalish, & Farber, 1951) that motivate avoidance behavior (Brown & Jacobs, 1949; Miller, 1941, 1948); Miller assumed that the gradient of avoidance is steeper than that of approach. Miller (1944, 1948, 1951) and Brown (1948) explained steeper avoidance gradients in terms of learned drives, such as fear, being based on internal responses that obey the same laws as overt responses. Avoidance generalization gradients are thus based not only on decrements in instrumental avoidance response strength, but also on decrements in the strength of the classically conditioned, internal, fear response. Approach generalization gradients, typically based on primary drives, are based only on decrements in instrumental response strength. In keeping with this position, Brown (1948) and Murray & Miller (1952) found avoidance gradients to be steeper than approach gradients.

Renner (1967) found that at high levels of motivation the temporal gradient of punishment is flatter than that of positive reinforcement. In other words, at low levels of food deprivation and shock, positive reinforcement and punishments have comparable delay gradients. At higher levels of motivation, increased delay reduces the effectiveness of positive reinforcement more than that of punishment. This may be taken as further evidence of the significance of conditioned drive in explanation of gradient behavior. The delay area in a punishment

situation becomes classically conditioned to the shock and functions as a source of conditioned drive which can punish behavior. Although the delay cues in a reward situation may come to function as a source of secondary reinforcement, the relevant motivation underlying instrumental reward behavior remains unaffected until primary reinforcement occurs. In a delayed punishment situation, the delay cues may arouse the aversive drive cues that accompany the fear responses. As CR strength is a positive function of UCS strength, increased shock is expected to increase the strength of conditioned fear which can then function as a stronger punisher.

Miller's analysis does not rest on approach or avoidance per se, but rather on whether or not the underlying motivation is learned and reliant on the conditioning of external cues. In an avoidance-avoidance conflict situation, Miller & Murray (1952) found avoidance gradients based on the primary motivation of pain to be flatter than avoidance gradients based on the learned motivation of fear. Maher (1964) suggested that human approach and avoidance gradients are likely to be parallel in that human approach motivation is likely to represent a complex of learned and primary drives. While the conditionability of appetitive drives is a distinct issue, parallel response gradients are deducible from Miller's explanation of the observed difference in slope.

Conflict theory is directed toward situations in which the animal is confronted with a stimulus capable of arousing two, competing response tendencies. Proceeding from earlier analyses (Lewin, 1931), Miller (1944) distinguished four types of conflict: approach-approach, approach-avoidance, avoidance-avoidance, and double approach-avoidance. In the

approach-approach situation, moving toward one area in which approach responses have been reinforced takes the animal away from a similarly conditioned goal area. While the animal is confronted with a stimulus potent on two generalization gradients, neither goal evokes avoidance tendencies and behavior is expected to be determined by the higher of the two gradients. The approach-approach conflict is not expected to yield such simple resolution: The animal is confronted with stimuli lying along generalization gradients emanating from a goal associated with both approach and avoidance responses. Again, behavior is expected to be determined by the higher of the two gradients; but since the avoidance gradient is typically steeper than the approach, the two gradients are likely to intersect. Beyond the point of intersection the approach gradient is the higher and the animal is expected to make approach responses. Nearness (or increasing stimulus similarity) raises the height of the avoidance gradient more than the approach, and stimuli between the point of intersection and the goal elicit a net avoidance tendency. The animal is thus expected to in some way vascillate about the point of intersection. Avoidance-avoidance conflicts are also expected to yield vascillation and blocking: Moving away from one area in which avoidance responses have been reinforced takes the animal closer to a similarly conditioned goal area. With no alternate escape route, avoiding one feared stimulus presents the animal with stimuli eliciting increasingly strong fear. Double approach-avoidance conflict behavior is determined by the algebraic summation of the net tendencies resulting from approach and avoidance gradients being generated from two goal areas: On either side of the zero point the animal is expected to approach the

nearer goal until that goal's avoidance gradient is higher than its approach gradient. The animal is then expected to retreat to a point where the net tendency is to approach the other goal. Fear will again come to dominate and the animal is thus expected to vascillate around the algebraic zero point. Double approach-avoidance conflicts can be constructed in the laboratory (see Hovland & Sears, 1938; Worel, 1967) and can be used as a reconceptualization of approach-approach conflicts in which approaching one goal necessitates abandoning another desired goal. Phillips (1956) suggested that approach-avoidance conflicts can also be conceived as double approach-avoidance conflicts: Avoiding the approach-avoidance, conditioned goal brings the animal nearer to a goal in which the absence of aversive events elicits approach behavior and the absence of reinforcement for approach elicits avoidance behavior. The gross behavioral consequences of approach-avoidance and double approach-avoidance are similar--vascillation at some point distant from the goal area. Data on approach-avoidance conflicts have not generally required the assumption of two additional gradients and postulation of motivation based on nonfrustrative nonreward. With measures of vascillation such as decision time, refusal to respond, multiple responding and hedonic adequacy of responses; approach-approach conflicts, unlike the other three types of conflict, have been found to be relatively easily resolved (Barker, 1942; Edwards & Diers, 1962; Hovland, 1937; Hovland & Sears, 1938; Schill, 1966). Defining approach-approach conflict as easy, Worel and his colleagues (see Worel, 1967) confirmed predictions dealing with relative difficulty or strength of conflict.



Andreas (1958) viewed blocking (nonresponse) as an artifact of experimentation in which one stimulus is conditioned to an approach response and another to an avoidance response. In such situations conflict is defined as simultaneous presentation of both stimuli, and blocking may be considered a reasonable response to the unexpected stimulus compound. Andreas found reduced blocking when the compound was expected. Similarly, Epstein & Smith (1967), Smith & Epstein (1967) and Smith & Gehl (1974) considered blocking an artifact of experimentation in which the subject is not induced to response (i.e. leave the start position). They instituted a negative start procedure and significantly reduced blocking in approach-avoidance, avoidance-avoidance, and double approach-avoidance conflicts. Other measures of vacillation were still lowest in approach-approach conflicts. As the name implies, the negative start procedure may profitably be viewed as introduction of an additional avoidance gradient into the stimuli controlling behavior. Miller (1959) indicated that if the subject is able to leave a not easily resolved conflict situation, compromise, or tangential responses will occur. Andreas and Smith and his colleagues introduced the possibilities of limiting the likelihood or punishing such a response when it is available. The potential for investigation of conflicts between more than two responses will be discussed below.

Attowe (1960) developed a decision type theory of conflict in which the four types of conflict are not viewed as discreet but rather ranged along a continuum defined by the relative magnitude of approach or avoidance incentive outcomes. The magnitude of incentive conflict is determined by dividing the sum of approach and avoidance incentive into

the difference between approach and avoidance outcomes (i.e. approach minus avoidance/approach plus avoidance). In this system, approach-approach conflicts (+1), like situations completely dominated by avoidance (-1), are thought to represent maximum risk; whereas combinations of approach incentives and avoidance incentives yield values closer to 0 and represent minimum risks. Approach-approach incentive conflicts are thus viewed as the most difficult to resolve.

In Miller's (1951, 1959) theory, individual response gradients are based on specified independent variables and the behavioral consequences of competing response tendencies may be predicted by an algebraic summation of the strengths of the individual response tendencies. Since the avoidance gradient is steeper than the approach gradient, animals placed far from an approach-avoidance conditioned goal are expected to approach part way and then stop. Animals placed near the goal are expected to retreat. These predictions have received ample empirical verification (Kaufman & Miller, 1949; Miller & Kraeling, 1962; Trapold, Miller & Coons, 1960). The assumption of algebraic summation has received support from the finding that manipulations that raise the height of the approach gradient move the point of vacillation toward the conditioned goal area and manipulations that raise the height of the avoidance gradient move the point of vacillation away from the conditioned goal area (Bower & Miller 1960; Kaufman & Miller 1949). The assumption of algebraic summation of predictable response tendency gradients has been confirmed not only with the dependent measure of distance travelled but also from examination of speed and strength of pull of approach and

avoidance responses that are stopped at various points in approach-avoidance conflict situations (Brown, 1948).

As the response tendency with the steeper gradient is expected to suffer most from increased stimulus dissimilarity, it is predicted that approach responses, blocked by avoidance tendencies are likely to occur in new situations. This prediction has been confirmed by Miller & Kraeling (1952), Murray & Berkun (1955), and Elder, Noblin, & Maher (1961). This derivation was used by Trapold, Miller & Coons (1960) to explain disconfirmation of the more basic prediction that animals placed between the point of response tendency intersection and an approach-avoidance conditioned goal should retreat to the point of intersection. They explained the observed approach behavior in terms of the novel placement near the goal changing the stimulus conditions and therefore lowering the avoidance gradient more than the approach.

Recognizing that avoidance and other inhibitory responses generalize, but with less strength than those inhibited (see Miller, 1948), and viewing spatial distance as a case of stimulus similarity; Miller (1951, 1959) developed eight deductions dealing with the effects of incentive, drive, and stimulus similarity variables on the likelihood and strength of displaced responses. In addition to extending conflict theory to predict the strength of displaced responses, the language introduced in these deductions renders conflict theory more easily generalizeable as a source of explanation for experiments not designed to test conflict theory and as a source of explanation for nonlaboratory data. Indeed, verification of these deductions is largely indirect. As indicated above, Murray & Berkun (1955) developed a theory distinguishing distance and

similarity and tested it by constructing an experimental situation in which rats had an opportunity to make a displaced response. Their ingenious procedural innovation was also used effectively by Elder, Noblin, & Maher (1961). This procedure allows distance, speed, and vigor measures; and could be used to test Miller's precise deductions concerning the relationship between common learning variables and strength of displaced responses.

Conflict theory allows prediction not only of the net response strength, but it also can be used to predict the relative level of fear resulting from response in a conflict situation that contains response tendencies that are motivated by an aversive drive. An implication of Miller's algebraic summation assumption is that a conflicted response is more likely to occur not only if its gradient is raised by a suitable manipulation of independent variables but also if the opposing response gradient is lowered. For example, the finding that increased hunger and magnitude of reward increase the strength of approach in an approach-avoidance conflict can be inversely interpreted in terms of lowered approach gradients yielding a more avoidance dominated net result. Masserman & Yum (1946) and Conger (1951) found an increase in approach response strength when subjects were given alcohol and put into an approach-avoidance conflict. Bailey & Miller (1952) found sodium amytal to have the same effect. Bailey & Miller attributed this to the ability of inebriants to lower fear motivation. Conger made a similar analysis of the observed increase in approach response strength and further drew the intriguing conclusion that alcohol addiction may be explained in terms of the reinforcing effects of reduction in strength of acquired drives.

Classically conditioned fear can be weakened and extinguished by omission of the UCS (Miller, 1951). Such an extinction procedure should serve to increase the strength of observed approach in an approach-avoidance conflict. Murray & Berkun (1955) and Berkun (1954) conditioned approach-avoidance conflicts and then omitted the aversive event. The strength of approach was found to increase as a result of nonpunished approach responses even when those responses were not rewarded. In keeping with deductions concerning displacement, approach responses leading to fear extinction trials were easier to elicit when the opportunity for displaced responses was present. Epstein & Fenz (1962) found less conflict induced activation and response displacement as well as increased strength of approach as a result of hedonically successful approach responses. There is also substantial evidence that the introduction of positive reinforcers reduces the anxiety consequences of fear and conflict (e.g., Farber, 1948; Masserman, 1943; Moltz, 1954, & Wolpe, 1952).

A further implication of Miller's conflict theory is that increased approach behavior results in greater fear. As the avoidance gradient is steeper than that of approach, increased nearness to the goal results in increased fear. Conflict thwarted goal responses that are elicited by lowering the avoidance gradient should result in less fear than those elicited by raising the approach gradient. In other words, while manipulations like increased magnitude and quality of reward increase the probability that an animal will approach a conflicted goal region; an approach response so elicited will result in greater fear than an approach response elicited by manipulations such as increased stimulus dissimilarity or extinction of fear from omission of shock.

The analyses discussed so far deals with situations in which conflicting response tendency gradients cross--either as a result of their emanating from distinct goal regions each lying on a gradient generated from the other, or from one gradient being steeper than the other. As indicated above, Maher (1964) suggested that human approach gradients may be based on learned drives and could therefore parallel avoidance gradients. Miller's assumption of algebraic summation would lead to the prediction that the stronger response tendency would determine behavior and if the two gradients were of the same height, vascillation would occur throughout. Rigby (1954) found rats to vascillate throughout temporal intervals leading to an approach-avoidance conflicted event when approach and avoidance gradients were parallel. In a series of human studies on the conflicting response tendencies induced in parachuting enthusiasts, Epstein (1967) observed increased conflict reactions as jump time neared. As the motivation underlying voluntary risk-taking is not easily determined, precise derivations can not be made from Miller's theory. Maher, Weisstein, & Sylva (1964) found a temporal point of maximum conflict in a human approach-approach situation. This point was found to be a constant fraction of the time subjects were given to make a decision. As indicated above, this situation may be functionally analogous to a double approach-avoidance conflict where the point of vascillation is not affected by the initial position of the subject.

Empirical investigation of deductions from Miller's theory have generally been conducted in situations in which a rat is placed in a straight alley some distance from a conflicted goal or between two

conflicting goals    Sears & Hovland (1941) used a similar methodology to study human conflict behavior: Subjects were trained to move a stylus toward or away from various light signals, and different types of conflicts were induced by presentation of compound signals. This relatively open-field situation allows observation of a wide range of what Miller termed compromise responses. As indicated above, Smith and his colleagues (see Smith & Epstein, 1967) introduced a negative start procedure in which subjects were trained to avoid the initial placement. This methodological innovation suggests the possibility of studying the interaction of response tendency gradients emanating from three goal areas. Each end of a T Maze could be made the point of reinforcement for approach and/or avoidance, and points of vacillation as well as response speed and vigor could be predicted from algebraic summation of the multiple tendencies.

As indicated, the gradients of Miller's conflict theory are of response strength and are affected by habit, drive, and incentive manipulations. Renner (1967) reviewed an extensive investigation of the interaction of drive and incentive manipulations on delay of reward and punishment gradients. The relative utility of variously delayed compound outcomes was measured by both the subjects' choice of outcomes and the effectiveness of the outcomes in modifying behavior. The correspondence between preference and learning/performance results supports Renner's contention that performance data provide a quantitative way to index the relative utility of different incentive outcomes. Such correspondence provides support for Miller's assumption that conflict behavior can be predicted from an analysis of the strengths of individual response

tendencies. Renner distinguished between his system which deals with the relative value of outcomes and Miller's theory which deals with response strength. However, incentive manipulations are assumed to affect response strength in Miller's theory and it may prove interesting to examine the interaction of compounded approach and avoidance incentive manipulations on the individual responses entering into behavioral conflict. The suggestion is to use Renner's findings to predict behavior in complex multiple approach-avoidance situations. For example, if one particular combination of shock and food is preferred under one level of food deprivation and a different combination is preferred under another level of deprivation; deprivation should have a predictable effect on point of vacillation and response strength in a double approach-avoidance conflict in which each end of a straight alley is associated with one of the combinations. Similarly, knowledge of the relative effectiveness of different complex incentive combinations in conditioning instrumental behavior can be used to predict double approach-avoidance behavior. This approach promises both greater precision in the use of preference as a measure of the relative utility of complex incentive outcomes and extends the range of predictions possible in double approach-avoidance situations.

So far the discussion has dealt with conflicting response tendencies that are strengthened by positive or negative reinforcement. In other words, satisfying and aversive events are made contingent on individual responses which are combined to produce response conflict. Brown (1942) assumed that in discrimination learning tasks, the stimulus not associated with reinforcement (S-) produces avoidance responses which generalize along a gradient of stimulus similarity. Approach responses also



generalize along a gradient of stimulus similarity and any stimulus lying on both gradients is thought to produce conflict. In accord with Miller's (1959) theory of conflict and the Spence-Hull theory of selective learning (Spence, 1956), behavior is expected to be determined by an algebraic summation of response tendencies.

Brown (1942) trained rats on a brightness discrimination task and then presented them with pairs of very similar or identical stimuli. Making the stimuli more equal reduces the difference in strength between approach and avoidance responses and produces stronger conflict which is expected to yield less rapid and accurate responding. Identical stimuli on the approach side of the intersection are expected to produce an approach-approach conflict in which an indiscriminate approach response provides easy resolution. Stimuli near the point of intersection are expected to produce a double approach-avoidance conflict and stimuli on the avoidance side of the intersection are expected to produce an avoidance-avoidance conflict. In both of these situations blocking and withdrawal are expected. These derivations from Brown's extension of Miller's theory were confirmed in the finding that as test pairs were shifted toward the training S-, there was an increase in response latency. Also in accord with Miller's theory is the finding that increasing the motivation underlying approach raised the height of the approach gradient and moved the point of intersection closer to the original S-. With increased food deprivation, stimuli more similar to the original S- produced more and stronger indiscriminate approaches. Similarly, rats shocked for responding to the S- during training showed evidence of a heightened avoidance gradient. Also in accord with Brown's derivations,

Kellogg (1931) and Berlyne (1957) found that reaction time increased with increasing stimulus similarity. Kellogg further found time to increase as a function of number of response alternatives.

Brown & Farber (1951) suggested a third way in which conflict may be induced: They developed a theory of frustration based on conflict between excitatory and inhibitory tendencies generated by nonreinforcement of a previously reinforced response. There is scant evidence of the utility of conflict theory in predicting the individual and combined response strength consequences of nonreward since most of the studies dealing with frustration have centered on its drive and cues consequences (see Amsel, 1958; Brown, 1961). Analyses of nonreward as an aversive event suggest the possibility of viewing partial reinforcement and extinction in terms of conflict generated by the strengthening of an inhibitory tendency. Conceptions based on the same underlying assumptions have already proven useful: Extinction has been viewed as the growth of an inhibitory tendency (Hull, 1943) and partial reinforcement effects have been explained in terms of the aversive nature of nonreward (Amsel, 1958). According to a conflict view each rewarded trial increases the strength of approach and each nonrewarded trial increases the strength of avoidance. By this view, each trial of a partial reinforcement schedule and each trial of experimental extinction has a predictable effect on approach and avoidance gradients and consequent net response strength. The advantage of incorporating the effects of nonreward within a theory of conflict is that in doing so, diverse phenomena may be explained by simple combinations of theories of instrumental conditioning.

While evidence of the utility of such a conception awaits confirmation of the ability of conflict theory to predict the response strength consequences of experimental extinction, there is promise in data indicating that conflict produces drive and cue consequences seen as essential in existing explanations of the relationship between schedule of reinforcement and extinction behavior (Amsel, 1958; Brown & Wagner, 1964; Capaldi, 1967). Conflict theory may prove more useful than Amsel's frustration explanation of the relationship between nonreward and extinction behavior because its relatively precise specification of the consequences of each rewarded and nonrewarded trial allows incorporation of drive and cue effects at a level of precision demanded by investigations designed to test theories that rely on the conditioning of cues produced by particular sequences of goal events.

Miller suggested that conflict induces a level of general motivation greater than that resulting from a simple summation of the drives motivating the conflicting responses. Brown & Farber (1951) hypothesized that conflict-induced drive is inversely related to the difference in strength between the competing response tendencies. Increasing difficulty of discrimination has been shown to increase both the vigor and latency of responding in rats (Finger, 1941) and humans (Castaneda & Worel, 1961). The increase in vigor is an indication of heightened drive which results from greater response competition. Lanier (1941) found that words rated as both pleasant and unpleasant produced a stronger GSR response than pleasant, unpleasant, or neutral words. There is indirect evidence of conflict--induced drive in the findings that discrimination learning and presentation of cues associated with both

positive reinforcers and aversive events leads to neurotic behavior (Conger, 1951; Cook, 1939; Gantt, 1936; Masserman, 1943; Masserman & Yum, 1946; Wolpe, 1952). Castaneda and McCullers (see Castaneda, 1965) confirmed the more refined prediction that the drive induced by conflict preferentially energizes responses high in a habit hierarchy.

Haner & Brown (1955) found response vigor to increase as a function of increased approach response strength at the point of goal frustration. Haner & Brown's suggestion that the degree of frustration is a positive function of approach strength at the time of thwarting is not necessarily congruent with Brown & Farber's (1951) earlier suggestion that conflict-induced drive is inversely related to the difference in strength between the competing response tendencies. If the approach behavior sequence is first thwarted near the goal, it might be thought that approach tendencies dominate whereas further from the goal, where approach strength is weaker, nonreinforcement might be expected to produce an avoidance tendency more nearly equal in strength to the approach tendency. It may be profitable to assume that the strength of frustration-produced avoidance is greater the stronger the approach at the point of thwarting. The increase in vigor associated with frustration near the point of approach reinforcement may then reflect an increase in strength of conflict resulting from greater absolute strength of competing tendencies (see Sears & Hovland, 1941). Understanding of the stimulus consequences of nonreward may be furthered by specification of antecedents and combination laws of frustration-produced drive and resultant conflict-produced drive.

Further evidence of conflict-produced drive comes from studies showing that removal or reduction of conflict is reinforcing (Hearst & Sidman, 1961; Innes, 1969; Tigie & Leaton, 1966). Indirect evidence of the reinforcing nature of conflict reduction comes from data indicating that presentation of a stimulus that predicts reinforcement is itself reinforcing (Prokasy, 1956).

Epstein & Fenz (1962) developed a theory of conflict-produced activation based on the assumption that gradients of approach and avoidance activation combine additively. As indicated above, Miller considered approach motivation to be determined by factors that do not vary along a gradient. Epstein's theory is congruent with Maher's (1964) in suggesting that human approach motivation may be a complex of both innate and learned factors and could therefore vary along a generalization gradient. As indicated, this position is congruent with Miller's explanation of the observed difference in the slope of approach and avoidance tendencies.

Epstein's (1967) assumption of simple motivation addition is not, however, congruent with Miller's (1959) and Brown & Farber's (1951) assumption that conflict produced drive is greater than the sum of the drives motivating conflicted responses. The Miller (1959) and Brown & Farber (1951) position is most directly supported by the finding that humans (Innes, 1969) and rats (Tigie & Leaton, 1966) will learn a response to escape an approach-approach conflict. Brown & Farber further assumed that conflict-induced drive produces unique proprioceptive stimuli whereby an animal can learn to discriminate conflict from other drive states. There is substantial data indicating that responses learned in

one conflict situation generalize to other conflict situations (Innes 1969; Miller, 1944; Schill, 1966; Tigue & Leaton, 1966; Worel, 1962; Worel & Worel, 1964). Brame & Blick (1974) found no transfer from one conflict situation to another, but attributed their results to a methodological confound. The discriminability of conflict is not necessarily evidence that conflict-drive is other than a simple summation of underlying drives, but an assumption of simple summation does not readily suggest a mechanism or process to explain transfer from one conflict situation to another. There is insufficient data to formulate precise laws relating the antecedents of frustration to its response strength consequences. It is also impossible, at this point, to formulate laws relating the antecedents of conflict to consequent drives and cues. With such information available, Miller's conflict theory may be extended to explain some of the diverse effects of nonreward.

In the introductory paragraph of this paper it was suggested that Miller's theory may be broadly viewed as providing an explanatory scheme for any conflict produced by compounds of habits, drives, and incentives. Conflict theory is an extension of established S-R theories that predict response strength on the basis of drive and incentive energization of responses associated with the stimulus configuration confronting the animal. The general case from which Miller developed his theory is that in which obviously discreet and conflicting responses are associated with the same stimulus configuration. The strength of such associations and differential energization determine the relative strengths of responses. Brown (1942) extended conflict theory to include selective learning in which the assumption of conflicting response tendencies is

not so obvious. Miller (1959) incorporated the stimulus consequences of drive in his theory and indicated that habit strength is affected by the operative drives. He provided evidence that an approach response can be conditioned to fear. By the same token, Amsel (1958) provided evidence that an approach response can be conditioned to frustration. The instrumentally conditioned response strength consequences of changes in drive may thus be thought to reflect a form of conflict. Changing the drive level or the predominant drive in a conditioning situation can be thought of as not only affecting the energization of the response conditioned, but it may also serve to elicit other responses which may interact with the originally conditioned response. From this vantage, a conflict theory may illuminate questions concerning changes in drive level, drive summation and the operation of irrelevant drives.

By a similar token, changes in incentive conditions in instrumental conditioning may be viewed as an introduction of conflict into the situation. From the perspective of a micromolar approach (see Logan, 1956) the response strength consequences of change in incentive conditions may be viewed as reflecting the conditioning of distinct responses. From this vantage, a conflict theory may illuminate questions concerning behavioral and incentive contrast and multiple schedules of reinforcement.

There has been recent interest in the interaction between Pavlovian CSs and cues for instrumentally conditioned behavior (Bull, 1970; Bull & Overmeir, 1968; Bull & Pack, 1971; Overmeir & Schwartzkoff, 1974; Goossen, Kostank, & Bolles, 1966; Rescorla & Lolordo, 1965). In general appetitive Pavlovian CSs facilitate instrumental reward behavior and suppress avoidance behavior. Shock-based Pavlovian CSs have the

opposite effect. Explanations of the interaction between Pavlovian and instrumental discriminative stimuli have centered on interactions of motivational states and mediational cues elicited by the discriminative stimuli (Overmeir, Bull, & Pack, 1971; Overmeir & Schwarzkoff, 1974).

Classical conditioning has been implicated as a model to explain instrumental escape/avoidance behavior; and, as indicated above, this formulation is included in Miller's (1959) theory of conflict. Indeed, avoidance-avoidance conflicts may be viewed as resultant from two fear CSs. Theoretical explanations of the operation of incentive in reward-conditioning have also implicated classical conditioning. As indicated above, some of the development of a classical conditioning explanation of incentive is involved in the goal gradient hypothesis which is a fundamental aspect of Miller's theory. In the same vein, Overmeir & Schwarzkoff (1974) point to a CS-UCS pairing in instrumental discrimination learning in their explanation of the interaction of classical and instrumental discriminative stimuli. In this light, conflict involving approach tendencies may be viewed as involving appetitive Pavlovian CSs.

As indicated, explanations of interaction between discriminative stimuli make reference to combinations of motivational and cue effects. The degree to which such interaction is functionally dependent on drive and/or cue effects remains at issue (see Overmeir & Schwarzkoff, 1974). The manner in which such interaction affects response strength also remains at issue (see Overmeir, Bull, & Pack, 1971). Overmeir and Schwarzkoff specified an algebraic summation as the composition rule in their explanation of cue interaction. As Miller's theory is a



combination of instrumental conditioning theories that implicate Pavlovian conditioning or, less extravagantly, as Miller's theory deals with cue interaction; it seems reasonable that it may be effectively used as a model to explain other cue interaction phenomena. This approach indicated methodical investigation of the effects of manipulations known to affect CR strength on compound CSs and, more generally, on compounds of discriminative stimuli. The general prediction would be that factors that increase CR strength would increase the dominance of a response so manipulated when its CS is compounded with another cue. An exemplary prediction would be that appetitive CS suppression of instrumental avoidance responding is a positive function of the number of Pavlovian appetitive CS-UCS pairings.

The present review provides testimony to the proposition that composition assumptions that incorporate established single response theories can be used to predict more complex behavior. Miller's (1959) theory is based on the general assumption that response strengths that are deducible from theories of instrumental reward and instrumental escape/avoidance conditioning combine algebraically. This assumption has proven useful in predicting the net response strength consequences of conflict between instrumentally conditioned responses. Investigations of conflicts that include responses motivated by aversive drives have illuminated avoidance conditioning and have led to a series of deductions concerning the strengths of displaced responses which may result from response conflict. Miller's theory can also be used to predict the level of fear resulting from response in conflicts that include avoidance tendencies.

Theoretical argument and substantiating data suggest that conflict theory may be extended to predict behavior in a selective learning situation. There is also theoretical justification for viewing frustrative nonreward as explicable via conflict theory. Conflict theory contains a means of calculating the net response strength consequences of each rewarded and nonrewarded trial. As response strength and resultant fear are calculable via conflict theory, the drive and cue consequences of conflict may also be calculable. The relationship between response competition and resultant drives and cues remains to be clarified and explained. Once this is done, Miller's theory may be able to be used to predict the trial by trial drive and cue consequences of changing habit strength, drive, and incentive.

This review has highlighted the fact that Miller's theory of conflict is a combination of established theories--themselves broad and far reaching. Recent interest in learning has focused on the details of complex interaction phenomena. Conflict theory has been extended and shows promise of further useful extension as a means of explanation and integration for diverse complex phenomena.

## REFERENCES

- Amsel, A. The role of frustrative nonreward in noncontinuous reward situations. Psychological Bulletin, 1958, 55, 102-119.
- Amsel, A., & Roussel, J. Motivational properties of frustration:  
I. Effect on a running response of the addition of frustration to the motivational complex. Journal of Experimental Psychology, 1952, 43, 363-368.
- Andreas, B. G. Motor conflict behavior as a function of motivation and amount of training. Journal of Experimental Psychology, 1958, 55, 173-178.
- Atthowe, J. M. Jr. Types of conflict and their resolution: A reinterpretation. Journal of Experimental Psychology, 1960, 59, 1-9.
- Bailey, C. J., & Miller, N. W. The effect of sodium amytol on an approach-avoidance conflict in cats. Journal of Comparative and Physiological Psychology, 1952, 45, 205-208.
- Berkun, M. M. Factors in the recovery from approach-avoidance conflict Journal of Experimental Psychology, 1957, 54, 65-73.
- Berlyne, D. E. Conflict and information-theory variables as determinants of human perceptual curiosity. Journal of Experimental Psychology, 1957, 53, 399-404.
- Bower, G. H., & Miller, N. E. Rewarding and punishing effects from stimulating the same place in the rat's brain. Journal of Comparative and Physiological Psychology, 1958, 51, 669-674.

- Brame, J. M., & Blick, K. A. Absolute and relative bidirectional transfer in verbal conflict resolution tasks. Journal of Psychology, 1974, 88, 113-119.
- Brown, J. S. Factors determining conflict resolution in difficult discrimination. Journal of Experimental Psychology, 1942, 31, 272-292.
- Brown, J. S. Gradients of approach and avoidance responses and their relations to level of motivation. Journal of Comparative and Physiological Psychology, 1948, 41, 450-465.
- Brown, J. S. The Motivation of Behavior. New York: McGraw-Hill, 1961.
- Brown, J. S., & Farber, I. W. Emotions conceptualized as intervening variables--with suggestion toward a theory of frustration. Psychological Bulletin, 1951, 48, 465-495.
- Brown, J. S. & Jacobs, A. The role of fear in the motivation and acquisition of responses. Journal of Experimental Psychology, 1949, 39, 747-759.
- Brown, J. S., Kalish, R. I., & Farber, I. W. Conditioned fear as revealed by magnitude of startle response to an auditory stimulus. Journal of Experimental Psychology, 1951, 41, 317-328.
- Brown, R. T., & Wagner, A. R. Resistance to punishment and extinction following training with shock and nonreinforcement. Journal of Experimental Psychology, 1964, 68, 503-507.
- Bugelski, R., & Miller, N. E. A spatial gradient in the strength of avoidance responses. Journal of Experimental Psychology, 1938, 23, 494-501.

- Bull, J. A. An interaction between appetitive Pavlovian CSs and instrumental avoidance responding. Learning and Motivation, 1970, 1, 18-26.
- Capaldi, E. J. A sequential hypothesis of instrumental learning. In K. W. Spence & J. T. Spence (Eds.), The Psychology of Learning and Motivation, Vol. I. New York: Academic Press, 1967.
- Castaneda, A. The paired-associates method and the study of conflict. In L. P. Lipsitt and C. C. Spiker (Eds.), Advances in Child Development and Behavior. Vol. 2. New York: Academic Press, 1965, Pp. 1-18.
- Castaneda, A., & Worel, L. Differential relation of latency and response vigor to stimulus in brightness discrimination. Journal of Experimental Psychology, 1961, 61, 309-314.
- Conger, J. J. The effects of alcohol on conflict behavior in the albino rat. Quarterly Journal for the Study of Alcohol, 1951, 12, 1-29.
- Cook, S. W. The production of "experimental neurosis" in the white rat. Psychosomatic Medicine, 1939, 1, 293-308.
- Coulson, G., & Walsh, M. Facilitation of avoidance responding in white rats during a stimulus preceeding food. Psychological Reports, 1968, 22, 1277-1284.
- Edwards, A. L., & Diers, C. J. Social desirability and conflict. Journal of Social Psychology, 1962, 58, 349-356.
- Elder, T., Nobline, C. E., & Maher, B. A. The extinction of fear as a function of distance versus dissimilarity from the original conflict situation. Journal of Abnormal and Social Psychology, 1961, 63, 530-533.

- Epstein, S., & Fenz, W. D. Theory and experiments on the measurement of approach-avoidance conflict. Journal of Abnormal and Social Psychology, 1962, 64, 97-112.
- Epstein, S., & Smith, B. Modes and adequacy of resolution of three basic types of cognitive-motor conflicts. Journal of Experimental Psychology, 1967, 74, 264-271.
- Farber, I. W. Response fixation under anxiety and non-anxiety conditions. Journal of Experimental Psychology, 1948, 38, 111-131.
- Finger, F. H. Qualitative studies of "conflict". I. Variations in latency and response vigor to stimulus in brightness discrimination. Journal of Comparative Psychology, 1941, 31, 97-127.
- Gantt, W. H. An experimental approach to psychiatry. American Journal of Psychiatry, 1936, 92, 1007-1021.
- Grossen, N. E., Kostansek, D. J., & Dolles, R. Effect of appetitive discriminative stimuli on avoidance behavior. Journal of Experimental Psychology, 1969, 81, 340-343.
- Hanner, C. F., & Brown, F. A. Clarification of the instigation to action concept in the frustration-aggression hypothesis. Journal of Abnormal and Social Psychology, 1955, 51, 204-206.
- Hearst, E., & Sidman, M. Some behavioral effects of a concurrently positive and negative stimulus. Journal of the Experimental Analysis of Behavior, 1961, 4, 251-256.
- Hovland, C. I., & Sears, R. R. Experiments on motor conflict: I. Types of conflict and their modes of resolution. Journal of Experimental Psychology, 1938, 23, 477-493.

- Hull, C. L. The rat's speed-of-locomotion gradient in the approach to food. Journal of Comparative Psychology, 1934, 7, 393-422.
- Hull, C. L. Principles of Behavior. New York: Appleton-Century-Crofts, 1943.
- Innes, R. J. Escape and avoidance as responses learned to a specific conflict-produced drive. Journal of Experimental Psychology, 1969, 80, 78-84.
- Kaufman, E. L., & Miller, N. E. Effect of number of reinforcements on strength of approach in an approach-avoidance conflict. Journal of Comparative and Physiological Psychology, 1949, 42, 65-74.
- Kellog, W. N. The time of judgement in psychometric measures. American Journal of Psychology, 1931, 43, 65-86.
- Lanier, L. H. Incidental memory for words differing in affective value. Journal of Psychology, 1941, 11, 219-228.
- Lewin, K. Environmental forces in child behavior and development.  
In C. Murchison (Eds.), A Handbook of Child Psychology. Worcester, Mass.: Clark University Press.
- Logan, F. A. A micromolar approach to behavior theory. Psychological Review, 1956, 63, 63-73.
- Maher, B. A. The application of the approach-avoidance conflict model to social behavior. Journal of Conflict Resolution, 1964, 8, 287-291.
- Maher, B. A., Weisstein, G., and Sylva, A. R. The determinants of oscillation in a temporal conflict. Psychonomic Science, 1964, 1, 13-14.

- Masserman, J. H. Behavior and Neurosis. Chicago: University of Chicago Press, 1943.
- Masserman, J. H., & Yum, K. An analysis of the influence of alcohol on experimental neuroses in cats. Psychosomatic Medicine, 1946, 8, 36-52.
- Miller, N. E. The frustration-aggression hypothesis. Psychological Review, 1941, 38, 337-342.
- Miller, N. E. Experimental studies of conflict. In J. McV. Hunt (Ed.) Personality and the Behavior Disorders, New York: Ronald Press, 1944, Pp. 431-465.
- Miller, N. E. Studies of fear as an acquirable drive. I: Fear as motivation and fear reduction as reinforcement in the learning of new responses. Journal of Experimental Psychology, 1948, 38, 89-101.
- Miller, N. E. Learnable drives and rewards. In S. S. Stevens (Ed.) Handbook of Experimental Psychology. New York: Wiley, 1951,
- Miller, N. E. Liberalization of basic S-R concepts: Extensions to conflict behavior, motivation and social learning. In Koch, S. (Ed.) Psychology: A Study of a Science, Vol. II. New York: McGraw-Hill, Pp. 196-292, 1959.
- Miller, N. E., & Kraeling, D. Displacement: Greater generalization of approach than avoidance in a generalized approach-avoidance conflict. Journal of Experimental Psychology, 1952, 43, 217-221.
- Miller, N. E., & Miles, W. R. Effect of caffeine on the running speed of hungry, satiated and frustrated rats. Journal of Comparative Psychology, 1935, 20, 397-412.



- Miller, N. E. & Murray, E. J. Displacement and conflict: Learnable drives as a basis for the steeper gradient of avoidance than of approach. Journal of Experimental Psychology, 1952, 43, 227-231.
- Moltz, H. Resistance to extinction as a function of variations in stimuli associated with shock. Journal of Experimental Psychology, 1954, 47, 418-424.
- Murray, E. J., & Berkun, M. M. Displacement as a function of conflict. Journal of Abnormal and Social Psychology, 1955, 51, 47-56.
- Murray, E. J., & Miller, N. E. Displacement: Steeper gradient of generalization of avoidance than of approach with age of habit controlled. Journal of Experimental Psychology, 1952, 43, 222-226.
- Overmeir, J. B., Bull, J. A. III, & Pack, K. On instrumental response interaction as explaining the influence of Pavlovian CSs upon avoidance behavior. Learning and Motivation, 1971, 2, 103-112.
- Overmeir, J. B., & Schwarzkoff, K. H. Summation of food and shock based responding. Learning and Motivation, 1974, 5, 42-52.
- Rescorla, R. A., & Lardo, V. M. Inhibition of avoidance behavior. Journal of Comparative and Physiological Psychology, 1965, 59, 406-412.
- Rigby, W. K. Approach and avoidance gradients and conflict behavior in a predominantly temporal situation. Journal of Comparative and Physiological Psychology, 1954, 47, 83-89.
- Rosenbaum, G. Temporal gradients of response strength with two levels of motivation. Journal of Experimental Psychology, 1951, 41, 261-267.

- Schill, T. The effects of type and strength of induced conflict on conflict generalization and later preference for conflict stimuli. Journal of Personality, 1966, 34, 35-54.
- Sears, R. R. Initiation of the repression sequence by experienced failure. Journal of Experimental Psychology, 1937, 20, 570-580.
- Sears, R. R., & Hovland, C. I. Experiments on motor conflict: II. Determination of mode of resolution of conflict by comparative strengths of conflicting responses. Journal of Experimental Psychology, 1941, 28, 280-286.
- Smith, B. & Epstein, S. Influence of incentive on adequacy and mode of conflict resolution. Journal of Experimental Psychology, 1967, 75, 175-179.
- Smith, B. D., & Gehl, L. Multiple-exposure effects on resolution of four basic conflict types. Journal of Experimental Psychology, 1974, 102, 50-53.
- Spence, K. W. The role of secondary reinforcement in delayed reward learning. Psychological Review, 1947, 54, 1-8.
- Spence, K. W. Behavior Theory and Conditioning. New Haven, Conn.: Yale University Press, 1956.
- Tigue, T. J., & Leaton, T. Escape from conflict: 1. The effects of increasing difficulty of discrimination. Psychonomic Science, 1966, 6, 129-130.
- Trapold, M. A., Miller, N. E., & Coons, E. E. All-or-none versus progressive approach in an approach-avoidance conflict. Journal of Comparative and Physiological Psychology, 1960, 53, 293-296.

- Wolpe, J. Experimental neurosis as learned behavior. Journal of Experimental Psychology, 1952, 43, 243-268.
- Worel, L. Responses to conflict as determined by prior exposure to conflict. Journal of Abnormal and Social Psychology, 1962, 64, 438-445.
- Worel, L., & Worel, J. Generalization of conflict and conflict tolerance. Psychological Reports, 1964, 14, 203-215.