PROGRESS IN
Experimental Personality Research

Edited by Brendan A. Maher

DEPARTMENT OF PSYCHOLOGY
AND SOCIAL RELATIONS
HARVARD UNIVERSITY
CAMBRIDGE, MASSACHUSETTS

VOLUME 9

1979

ACADEMIC PRESS New York San Francisco London

A Subsidiary of Harcourt Brace Jovanovich, Publishers

CONTRIBUTORS TO THIS VOLUME

PAULA J. CAPLAN

W. MILES COX

JOHN H. FRYER

VLADIMIR J. KONEČNI

RICHARD R. J. LEWINE

ROBERT A. PRENTKY

NORMAN F. WATT

CONTENTS

CONTRIBUTORS

Numbers in parentheses indicate the pages on which the authors' contributions begin.

PAULA J. CAPLAN,* *Family Court Clinic, Clarke Institute of Psychiatry, Toronto, Ontario, Canada M4W 2J4 and Department of Psychiatry, University of Toronto, Ontario, Canada.*

W. MILES COX, *Division of Social Sciences, University of Minnesota, Morris, Minnesota 56267* (89)

JOHN H. FRYER, *Psychology Service, Rogers Veterans Administration Medical Center, Bedford, Massachusetts 01730* (199)

VLADIMIR J. KONEČNI, *Department of Psychology, University of California at San Diego, La Jolla, California 92093* (149)

RICHARD R. J. LEWINE, *Department of Psychology, University of Denver, Denver, Colorado 80208* (199)

ROBERT A. PRENTKY, *Department of Psychiatry, University of Rochester Medical Center, Rochester, New York 14642* (1, 199)

NORMAN F. WATT, *Department of Psychology, University of Denver, Denver, Colorado 80208* (199)

*Mailing address: Toronto Family Court Clinic, 950 Yonge Street, Toronto, Ontario M4W 2J4, Canada.

DETERMINANTS OF AESTHETIC PREFERENCE AND EFFECTS OF EXPOSURE TO AESTHETIC STIMULI: SOCIAL, EMOTIONAL, AND COGNITIVE FACTORS

Vladimir J. Konečni[1]

DEPARTMENT OF PSYCHOLOGY
UNIVERSITY OF CALIFORNIA AT SAN DIEGO
LA JOLLA, CALIFORNIA

I. Introduction

Largely as a function of the theoretical and experimental efforts of Arnheim (1966), Berlyne (1971, 1974), Child (1969), and Kreitler and Kreitler (1972),

[1]The research described in this chapter was supported in part by grant GS-42802 from the National Science Foundation and by grants from the University of California. Versions of the paper were presented at the 6th International Symposium of Experimental Aesthetics and the 21st International Congress of Psychology, both held in Paris, France, during July of 1976. A shorter version was published in French under the title "Quelques déterminants sociaux, émotionnels et cognitifs des préférences esthétiques relatives à des mélodies de complexité variable" (*Bulletin de Psychologie*, 1976-1977, **30**, 688-715), and also circulated in English under the title "Some social, emotional,

ISBN 0-12-541409-9

among others, there has been a considerable surge of interest in the psychology of art during the last decade. In his influential review of the literature, Child (1969) partitioned the psychology of art into four broad domains. The first of these may be labeled "the artist and the creative process" and it includes a broad range of approaches, from the psychoanalytic descriptions of artists' personalities and motivation (e.g., Freud's essay on Leonardo da Vinci), to the study of creativity as a personality trait, and the process of creation of a work of art through successive stages (e.g., Arnheim's 1962 analysis of Picasso's *Guernica*). The second area may be termed "work of art"; the approaches here also cover a broad range—from psychoanalytic treatments (e.g., Freud's essays on Michelangelo's *Moses*), to profound theoretical treatments of an entire artistic medium, such as music (Meyer, 1956), and impressive experimental efforts by Berlyne and his collaborators to describe objects of aesthetic enjoyment (both "real" works of art and artificially synthesized aesthetic patterns) in terms of "collative" stimulus properties, such as complexity and novelty (Berlyne, 1971, 1974).

The third domain in Child's analysis may be labeled "the process of appreciation." It is concerned with the emotional, cognitive, physiological, and other aspects of reading, viewing, or listening to a work of art or an artificially synthesized aesthetic pattern (Berlyne & Ogilvie, 1974; Crozier, 1974; Day, 1967; Konečni & Sargent-Pollock, 1977; Munsinger & Kessen, 1964; Sargent-Pollock & Konečni, 1977). The fourth area is concerned with the short- and long-term effects on the appreciator of exposure to works of art. Unfortunately, with the exception of philosophical treatises (starting with Aristotle's *Poetics*) on the "social functions of art," on one hand, and clinical and industrial uses of art (Arnold, 1975; Bonny, 1975; Carter, 1975; Gonick-Barris, 1976; Foulke & Keller, 1976; Levick & Herring, 1973; Neboschick, 1975; Wilson, 1976), on the other, very little experimental and theoretical attention has been devoted to this important issue.

Although the healthy growth of the psychology of art can be easily documented, a close inspection of the literature reveals a curious phenomenon. Namely, with the exception of the work on the effects of the prestige of the artist on the degree of appreciation of a work of art by laymen (Chapman & Williams, 1976; Farnsworth & Beaumont, 1929; Francès, 1963; Sherif, 1935), there has been an almost complete absence of investigations of the role of social variables in art appreciation. Specifically, whereas there have been numerous studies of aesthetic preference and choice (see Berlyne, 1971, 1974, for excellent reviews), these measures have often been treated in the psychology of art as if they were

---

and cognitive determinants of aesthetic preference for melodies differing in complexity" (Technical Report No. 66, December 1976, Center for Human Information Processing, University of California at San Diego).

somehow independent of the social context in which people are exposed to aesthetic stimuli in daily life.

In contrast, one of the main contentions of the present chapter is that a thorough understanding of aesthetic behavior cannot be achieved without examining how it changes as a function of its immediate social antecedents. It is clearly often the case that people choose between different sets of aesthetic stimuli and are exposed to them in the direct or indirect presence of other people. Given the various lines of evidence provided by social psychology, it would be very surprising if aesthetic choice were not influenced by variables which arise in, and are unique to, social situations. In addition, it seems reasonable to assume that a person's aesthetic behavior in a given situation is strongly affected by his or her current emotion or mood, and many of these clearly have roots in social interaction (e.g., Cantor & Zillmann, 1973; Konečni, Crozier, & Doob, 1976; Konečni & Sargent-Pollock, 1977).

The social variables I am referring to can thus be characterized in terms of the stimuli which emanate from people's everyday behavior in common social "micro-situations" or episodes. I propose that such variables can have powerful effects on the aesthetic choice of individuals exposed to them, in part because of the pronounced emotional states they induce.[2] The emotions referred to are common, phenomenologically distinct, and easily reported states, such as anger, fear, and joy (cf. Ekman, Friesen, & Elsworth, 1972; Izard, 1977; Tomkins, 1962, 1963). Moreover, the aesthetic choice in question could be something as simple and mundane as selecting one phonograph record or radio station over another. For too long, psychology of art has been "elitist" in its choice of stimulus materials, settings, and research questions. It would seem that an adequate psychology of art must take into account not only novelties and vogues in the *creation* of art, but also changing styles, settings, and objects of aesthetic *appreciation* (cf. Konečni, 1978a, 1978b).

Just as aesthetic choice does not occur in a social-emotional vacuum, it also does not take place in a cognitive one. It is clearly the case that in many everyday situations involving exposure to works of art, by no means all of a person's attention or processing capacity (Broadbent, 1958; Kahneman, 1973; Konečni & Sargent-Pollock, 1976; Moray, 1969; Posner, 1975; Treisman, 1964) is devoted solely to the appreciation of a work of art. Instead, the person may be concurrently engaged in other intellectual activities or motor tasks. (This becomes particularly obvious when one takes into account the mundane settings—such as the automobile and the family living room—in which people are most commonly exposed to art, especially music.) Since it also seems quite likely that the enjoy-

[2]These social "micro-variables" should be distinguished from the more global (and probably more elusive) factors, such as social class, status, and role. I will not be concerned with the latter category of social variables in this article.

ment of works of art requires "cognitive work," that is, requires that the stimuli of which the aesthetic object or event consists be analyzed, processed, and that their meaning be extracted (e.g., Berlyne, 1971; Gunzenhäuser, 1962; Moles, 1958; Morris, 1957; Perkins & Leondar, 1977), it is reasonable to assume that a person's choice between one and another set of aesthetic stimuli would depend both on the nature of these alternatives and on the demands—in information-processing and emotion- and arousal-relevant terms—of the concurrent intellectual, social, and/or physical activity in which the person is engaged (cf. Konečni & Sargent-Pollock, 1976).

Thus, one of the two main issues to be addressed by the research reported in the present chapter is concerned with the effects of social, emotional, and cognitive factors on aesthetic preference and choice. However, the psychology of art has so far largely ignored not only such effects, but also the converse relationship, that is, the effects of exposure to aesthetic stimuli on emotional states and various social behaviors of interest (the fourth domain of the psychology of art in Child's conceptualization). A host of researchable questions can be asked in this context, the answers to which seem important not only for the psychology of art, but also for social and environmental psychology. For example, how are people's emotions and moods affected by different types of art from different historical periods? To what extent do people consciously expose themselves to various types of art to reduce the duration and impact of negative emotions and increase the duration and impact of positive emotions they are experiencing? Can people's relationships with their family members and co-workers be improved by exposure to different types of art under appropriate circumstances? Given the large proportion of time that young people today seem to devote to exposure to art, especially music, and the general availability of sophisticated stereo equipment, what role, if any, does art have in courtships and the maintenance of intimate relationships on a daily basis? What role does art, broadly defined, play in the drug subculture? Almost no research has addressed such questions, despite the fact that they seem to be the obvious ones if one is seriously interested in the functions and uses of art, and that analogous questions have frequently been asked by social and environmental psychologists for nonaesthetic stimuli. Therefore, the second main objective of the research presented in this chapter was to attempt to correct the existing situation by studying the effects of exposure to aesthetic stimuli, although, admittedly, in a highly circumscribed fashion.

The two major thrusts of the present chapter that have been discussed above are clearly complementary, among other reasons because they can be regarded as representing two related aspects of an "aesthetic mini-episode" (Konečni, 1978a, 1978b). Alternatively, these two issues can be viewed as components of a feedback loop linking a person with a particular subset of stimuli (the aesthetic ones) in his or her environment. In the present analysis, a person's choice between various forms and types of art is assumed to be at least in part governed by the presence and behavior of other people and the emotions they induce; the

exposure to the chosen aesthetic stimuli, in turn, is assumed to alter the appreciator's mood and emotion, and thus, his or her behavior toward others, which would presumably alter these others' future actions towards the appreciator, etc.

The purpose of the present chapter is to present empirical findings relevant to these issues and to offer, in Section IV, a rudimentary unifying theoretical model. Hopefully, some of the findings and conclusions will be of interest not only to the psychologists of art, but also to social/personality and environmental psychologists. In fact, one of the reasons for the way in which the reported experiments were originally designed was to establish some preliminary links between these three subdisciplines that clearly have overlapping interests. Not only are aesthetic stimuli appreciated in a social context, but they are also important components of the man-made physical environment with which environmental psychologists have been traditionally concerned. Yet few, if any, social-psychology/personality texts and recent reviews of environmental psychology (Altman, 1975; Canter, 1975; Heimstra & McFarling, 1974; Stokols, 1978) have devoted any attention to aesthetic stimuli or to the psychology of art.

Experiments which will be reported in this chapter have all been carried out during the last few years and constitute a part of a broader, ongoing research program. For reasons of brevity, clarity, and continuity of presentation the experiments I will be discussing deal with only one type of aesthetic stimuli, that is, computer-generated melodies differing in complexity (or "uncertainty," in information-theory terms). There is much to recommend this type of stimulus material (more on this below); besides, the major conclusions reached on the basis of this work have generally been corroborated in studies in which different types of aesthetic stimuli, including "real" works of art, have been used (Allen, Hammerbeck, & Konečni, 1978; Konečni & Sargent-Pollock, 1977; Sargent-Pollock & Konečni, 1977). For similar reasons, the experiments I will be discussing involve only a small number of emotional states (notably anger and fear) and social behaviors of interest (most of the studies deal with aggressive behavior). Since the main purpose of the article is to illustrate an approach, convey the flavor of the research, and summarize its main implications, I have presented only as much detail of procedures, designs, and results of the various experiments as was absolutely necessary. Procedures used in experiments that have not been previously published (approximately a half of the reported experiments) are presented in somewhat more detail. Experiments that have been previously published are nevertheless discussed in sufficient detail, and alongside the new experiments, in order to ensure coherence and continuity of presentation, and because the original publication sources almost certainly have nonoverlapping readership.

Although it would have been desirable to carry the research out in naturalistic settings, the complexity of experimental manipulations and the need for experimental control required that all of the studies which I will discuss be carried out

in the laboratory. Nevertheless, many of the questions addressed in this research program were formulated on the basis of close observations of simple forms of real-life aesthetic behavior.

II. Effects of Social, Emotional, and Cognitive Factors on Choice between Melodies Differing in Complexity

Before discussing any of the experiments, it is essential to describe in some detail the characteristics of the aesthetic stimuli that were used and the manner in which they were constructed. In one way or another, the same two types of melodies were used in all of the experiments described in this chapter. In the first group of experiments (Section II), the choice between these melodies differing in complexity served as the main dependent measure, that is, as the criterion of the effects of social, emotional, and attentional factors under investigation. In the second group of experiments (Section III), the exposure to simple versus complex melodies served as one of the major independent variables, whereas changes in emotional states and in the amount of aggressive behavior were the main dependent variables.

The method of construction of the two types of melodies had originally been developed by Vitz (1966) and modified by Crozier (1974) and Konečni, Crozier, and Doob (1976). A PDP-8/S computer was used to generate two types of continuous melodies (the presentation rate was two tones per second on the average), which differed in complexity or uncertainty (Garner, 1962). This was achieved by varying the number of pitches, durations, and loudnesses of tones from which the two types of melodies were constructed. A tone could be repeated before all other possible tones within a type had been chosen (sampling with replacement). The quantification in information-theory terms consisted of taking the logarithm (base 2) of the total number of possible tones used in the construction of the given type of melody. In the construction of simple melodies, there was a total of 16 possible tone events (different pitch–duration–loudness combinations), or a complexity/uncertainty level of 4.00 bits/tone; 576 tone events were possible for complex melodies, or 9.17 bits/tone. The components of the two types of melodies are presented in Table I.

As a result of the method of construction, different melodies within a given type were similar, but not identical. For example, a particular 10-second segment of the simple melody differed somewhat from another 10-second segment of the simple melody, but both of these taken collectively were vastly different from any 10-second segment of the complex melody. Also, both quantitatively and subjectively, any 10-second simple melody was far simpler, involving less uncertainty, than any 10-second complex melody. Loosely speaking, while the former were reminiscent of nursery tunes, the latter resembled avant-garde music.

TABLE I

COMPONENTS OF THE TWO TYPES OF MELODIES

	Note names and Hz	Number of durations	Duration (msec)	Number of loudness levels	Loudness (dB)	Total number of possible events	Log_2 of the number of events (bits/tone)
Simple melodies (4 pitches)	F_4 = 349 G_4 = 392 A_4 = 440 C_5 = 523	2	333 667	2	75 80	16	4.00
Complex melodies (18 pitches)	F_4 = 349 G_4 = 392 A_4 = 440 B_4^b = 466 C_5 = 523 D_5 = 587 —	8	40 81 162 323 485 646 970 1293	4	70 75 80 85	576	9.17
	F_3 = 175 A_3 = 220 C_4 = 262 D_4 = 294 F_5 = 698 G_5 = 784 —						
	F_2 = 87 C_3 = 131 D_3 = 147 A_5 = 880 C_6 = 1047 F_6 = 1397						

Earlier work (Crozier, 1974) had indicated that nonaroused subjects rate the simple melodies as more pleasing but less interesting than the complex melodies, and that they choose the two types about equally often and listen to them equally long. Additional information about these melodies can be found in some published articles (Crozier, 1974; Konečni *et al.*, 1976; Konečni & Sargent-Pollock, 1976).

A few words are in order concerning the rationale for the use of this type of stimulus material. The two major approaches to the psychological study of aesthetic phenomena have been labeled "synthetic" and "analytic," respectively (e.g., Berlyne, 1971). The synthetic method involves attempts to extract the basic elements of an artistic medium and develop stimulus materials from these elements; in contrast, in the analytic approach, real works of art are typically used as stimuli (cf. Sargent-Pollock & Konečni, 1977). Clearly, there are advantages to both approaches. The computer-generated melodies (and thus the synthetic method) were used in the present series of experiments for the following reasons: (a) In exploratory work of this kind, it was important to exercise rigorous experimental control over the stimulus material and to specify in detail the characteristics of the melodies and the dimensions involved in their production; (b) although the melodies were not real compositions, their structural aspects were musical, and the subjects generally reported that they could easily perceive the melodies as music and follow their music preferences in choosing between them.

The melodies were specifically selected so as to be liked about equally by normally aroused subjects (while being radically different in terms of complexity); this minimized the probability of "floor-" and "ceiling"-effect problems when the two types of melodies were made the choice alternatives of subjects who had been exposed to the experimental variables.

A. Effects of Socially Induced Anger and Opportunity to Retaliate

Two principal features of Berlyne's (1971, 1974) "new experimental aesthetics" seem to be an attempt to describe objects of aesthetic enjoyment in terms of collative stimulus properties, such as complexity and novelty, and an emphasis on the role of arousal and the arousal potential of collative stimualtion in aesthetic preference. An important derivative of Berlyne's model (1967) is that the choice of stimuli in the higher ranges of collative dimensions (e.g., relatively complex melodies) should decrease when the level of arousal is already high, presumably because (a) complex stimuli themselves tend to raise the level of arousal (Berlyne, Craw, Salapatek, & Lewis, 1963; Bryson & Driver, 1969), (b) effects due to different arousing sources typically add, and (c) excessively high levels of arousal are aversive.

There are, of course, many ways in which a person's level of arousal can be raised. Of particular interest in the present context are the arousal-raising procedures which involve aversive *social* stimuli. One such procedure has been developed by Doob and Wood (1972) and Konečni and Doob (1972). In this procedure, a carefully trained accomplice of the experimenter (posing as a subject) insults the subject in a standardized manner, while simultaneously preventing him or her from completing a task. The insults appear arbitrary and are delivered in a face-to-face situation; they are accompanied by irritating gestures implying the accomplice's intellectual superiority and impatience with the subject's behavior (e.g., detached humming and foot-tapping after the accomplice had ostensibly finished the task and while the subject is still working). Not surprisingly, subjects exposed to this procedure experience a considerable degree of anger, as measured by verbal ratings, postexperimental interview responses, observer ratings, and so on. In addition, it has been found that the cardiovascular indices of arousal rise sharply when subjects are exposed to this and similar manipulations; however, a decrease in the level of angered subjects' arousal, in comparison to controls, is typically obtained following these subjects' retaliation (e.g., by means of electric shocks) against the annoying accomplice (e.g., Gambaro & Rabin, 1969; Hokanson, Burgess, & Cohen, 1963; Hokanson & Shetler, 1961; unpublished data from my laboratory). The latter result is the physiological counterpart of the behavioral "cathartic effect" (Konečni, 1975a).[3]

Some interesting hypotheses can be formulated by considering simultaneously the findings mentioned above, even though these findings stem from two quite different lines of research (the aggression and collative-motivation literatures). Provided that the probability that subjects would expose themselves to complex stimulus patterns is decreased when the level of arousal is high, and if anger represents a state of aversively high arousal which can be brought down by the angered subjects' hurting of the annoying accomplice, one would expect such anger- and aggression-related activities to influence subjects' aesthetic-choice behavior, where the melodies differing in complexity are the choice alternatives. In comparison to the nonangered subjects who are presumably characterized by an intermediate ("normal") level of arousal prior to choice, the highly aroused, angered subjects should choose the more complex melodies relatively less often.

[3]Despite the continuing debate over the validity of the catharsis hypothesis (Bandura, 1973; Feshbach, 1970), it is now clear that a decrease in the amount of aggressive responding of angered individuals does occur following some forms of "expression of aggression." When a person's anger has been experimentally induced, the amount of his subsequent physical aggression against the annoying agent may be reduced, in comparison to the appropriate controls, by giving him the opportunity to physically "hurt" the annoyer (Doob & Wood, 1972; Konečni, 1974, 1975a; Konečni & Doob, 1972; Konečni & Ebbesen, 1976). Needless to say, there are also numerous specifiable conditions under which the decrease in aggressive activity does not occur (see Ebbesen, Duncan, & Konečni, 1975, and Konečni, 1973, 1975a, for a review of the literature).

Conversely, angered subjects who had an opportunity to retaliate against the annoying accomplice by administering electric shocks to him or her should display choice behavior similar to that of the nonangered control subjects.

These hypotheses were fully confirmed in an experiment carried out by Konečni, Crozier, and Doob (1976). There were three experimental conditions. Subjects in the annoy–shock condition were first insulted by the accomplice in the manner described earlier and then allowed to retaliate by delivering to this person a fixed number of what they thought were electric shocks (in a learning-task context). Subjects in the annoy–wait condition were equally insulted by the accomplice, but did not have an opportunity to retaliate; in the second part of the experiment, they simply waited alone in a room with nothing to do. Finally, subjects in the no annoy–wait condition were neither insulted, nor did they have an opportunity to deliver any electric shocks.

In the final part of the experiment, all subjects were led to believe that they would now participate in an unrelated study, one that involved music preference judgments. Each subject was asked to press one of two buttons every 10 seconds and told that while he would hear a melody in either case, its type would differ depending on the button pressed. The melody would go on for 10 seconds and could not be discontinued during that interval. It was stressed that there were no right/wrong responses. Two 10-second examples of each of the two types of melodies were then demonstrated to each subject. A "trial" consisted of pressing a button and hearing in both ears (through the earphones) either a simple or a complex melody for 10 seconds. There were 50 such trials for each subject, but the number was not announced in advance. The main dependent measure was the proportion of complex-melody choices made by subjects. These results are presented in Fig. 1.

The main prediction was clearly confirmed in that subjects in the annoy–wait condition displayed radically different choice behavior than did subjects in the other two conditions. Whereas the annoy–shock and no annoy–wait subjects chose the simple and complex melodies about equally often (50.00% and 56.17%, respectively, of complex-melody choices over 50 trials), the annoy–wait subjects clearly shunned the complex melodies and chose them on only 29.33% of the trials (the planned contrast was highly significant).[4]

The demonstration of effects on aesthetic choice behavior of the socially induced anger and retaliation against the source of noxious social stimuli supports one of the key claims made in this article. The results clearly showed that aesthetic choice behavior (at least when melodies differing in complexity are the choice alternatives) can be strongly influenced by a number of purely social, arousal- and emotion-relevant variables arising in a dyadic interaction. In giving

[4]Because of the survey nature of the present article, statistical tests are not reported. However, the reader may assume that any discussed or interpreted "finding," "main effect," "interaction," or a "difference between treatment means" is, in fact, statistically significant at least at the .05 level.

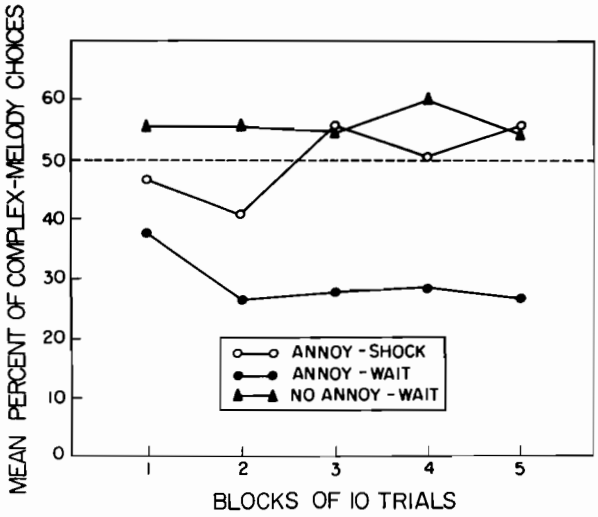

FIG. 1. Mean percentage of complex-melody choices by experimental condition over blocks of 10 trials each (12 subjects per condition).

support to somewhat counterintuitive predictions generally not derivable from other theoretical positions, the results thus demonstrated the heuristic value of a model of aesthetic-choice behavior which takes social stimulation and emotional mediators into account.

One might, of course, argue that the results can be understood in terms of a straightforward arousal model (e.g., Berlyne, 1967, 1971), and that a reference to emotional states is necessary. The major reason for this is that in the present experiment it is impossible to distinguish between *high arousal* and *high anger*, where the latter can be defined as an emotional state which is arrived at through a cognitive interpretation of the social stimuli and the labeling of the resultant arousal-level increase (cf. Schachter & Singer, 1962). In other words, the results appear to support a simple arousal model only because high arousal and a high degree of anger (of which arousal is only one component, whereas the cognitive labeling of the arousal-level increase is the other) are confounded. However, when a distinction between them is achieved experimentally (Konečni, 1975b), as will be seen later, the arousal model does not fare very well and a more complex theoretical position which includes emotions and the cognitive labeling of the arousal-level fluctuations is needed.

B. Effects of Socially Induced Anger and Type of Aesthetic Feedback

The experiment reported in Section II,A showed that the choice between simple and complex computer generated melodies is affected by negative emo-

tional states, such as anger, and by anger-related aggressive activity. In a hitherto unpublished experiment (Konečni, 1977a) these issues were further investigated in that the listening to simple and complex melodies was made contingent on the performance or nonperformance of aggressive actions (depending on the experimental conditions) by angered and nonangered subjects. One way of asking the question with which this experiment dealt is: To what extent can the amount of aggressive behavior be modified by its consequences for the aggressor, when the consequences are aesthetic in nature (i.e., simple or complex melodies? The complementary question is: To what extent does an angered person ignore the (arousal-related) aesthetic consequences of his behavior in order to retaliate?

Before describing the experiment, some additional remarks concerning anger and aggressive behavior are in order. As a part of the theoretical model outlined in an earlier paper (Konečni, 1975a), I proposed that there is a relationship of bidirectional causality between the degree of anger and the amount of aggressive behavior that is expressed. On one hand, the higher the degree of anger, the greater the amount of aggression. On the other hand, aggressive actions performed by angered individuals are expected to reduce the degree of anger by decreasing the physiological justification for the emotion, that is, by decreasing the level of arousal. (The hypothesized reasons for this are given in the original paper and are briefly discussed in the introduction to the experiment reported in Section III,B of the present chapter.)

The bidirectional-causality model makes the simple but important assumption that there is a continuous feedback loop between behavior and internal state. A person's emotional state affects his actions and these have an effect on other people; in addition, the execution of actions and their consequences for others affect the actor's emotional state, which, in turn, regulates his subsequent behavior, and so on. According to this analysis, aggressive behavior does not have consequences only for the target of aggression, but also for the aggressor, in the sense that his or her level of anger (and arousal) may be decreased by aggressive actions.[5] In the present experiment, the customary effects of aggressive behavior upon an angered aggressor's emotional state were supplemented by manipulating the consequences of the behavior, that is, by making the exposure to the arousal-related stimuli of aesthetic nature (melodies differing in complexity) contingent on the performance or nonperformance of aggressive actions.

The design was a 2×7 between-subjects factorial involving female subjects and accomplices. Half of the subjects were first angered in the same way as in the experiment reported in Section II,A, whereas the other half were treated neutrally. The second part of the experiment involved what was described to subjects

[5]A person's aggressive actions obviously may affect not just his level of arousal but also other private events, such as, for example, his attitudes and thoughts about the target of aggression, about aggression in general, etc. Such effects are of less interest in the present context.

as a "creativity test" (see Konečni & Doob, 1972, for details of this task). Essentially, this is an ambiguous pseudo-task through which human aggressive behavior can be measured. On each of many trials, a subject evaluates the "creativity" of the accomplice's response to a stimulus word and decides whether to punish (i.e., deliver a "painful electric shock" or a "loud and unpleasant blast of noise") or reward (i.e., switch on a green light meaning "good") the accomplice for that response. Because no criterion of creativity is specified, a subject has complete discretion over the number of punishments; also, since the stimulus words and responses are the same for all subjects, systematic differences in the number of "punishments" delivered by subjects in the various experimental conditions presumably reflect the effects of experimental treatments on aggressive behavior.[6] In the present experiment, there were 50 trials on each of which a subject (a) had to either punish (blast of noise ostensibly delivered) or reward (green light ostensibly switched on) the accomplice by pressing the appropriate button, and (b) could keep the button pressed down for as long as she wished up to 10 seconds, which supposedly extended accordingly the duration of the negative or positive reinforcement to the accomplice.

However, a subject's behavior affected not only the accomplice (ostensibly), but also the subject herself (in fact). Depending on which button she pressed (i.e., whether she punished or rewarded the accomplice), and on the experimental condition to which she had been randomly assigned, a subject was exposed to either a simple melody, or a complex melody, or neither (silence), for as long as she kept the button pressed down. The structure of the situation facing the subject (for the experiment as a whole) is portrayed schematically in Fig. 2. The seven levels of the second experimental variable represented the various binary sets of consequences of the subjects' behavior (i.e., binary combinations of the three possible outcomes). These seven treatments are defined in Table II. Each subject was assigned to only one of the seven treatments; the contingencies defining a treatment were operative on all 50 trials. In some conditions, every time the subjects pressed the noise (punishment) button, they heard a simple melody for as long as they kept the button pressed down (Conditions 2 and 7), whereas in other conditions the subjects heard a complex melody (Conditions 3 and 6) or nothing (Conditions 1, 4, and 5) when pressing the same (noise) button. Conditions 2 and 7, for example, differed from each other only in the consequence of the *alternative* response (pressing the reward button); whereas in Condition 2 subjects heard nothing when they pressed the reward button, the Condition-7 subjects heard a complex melody for as long as they kept that button pressed

[6] This procedure, of course, is quite different from that used in the Annoy–Shock condition of the experiment reported in Section II.A., where subjects delivered a fixed number of punishments to the accomplice and had no choice in the matter (i.e., the delivery of noxious stimuli was an independent variable).

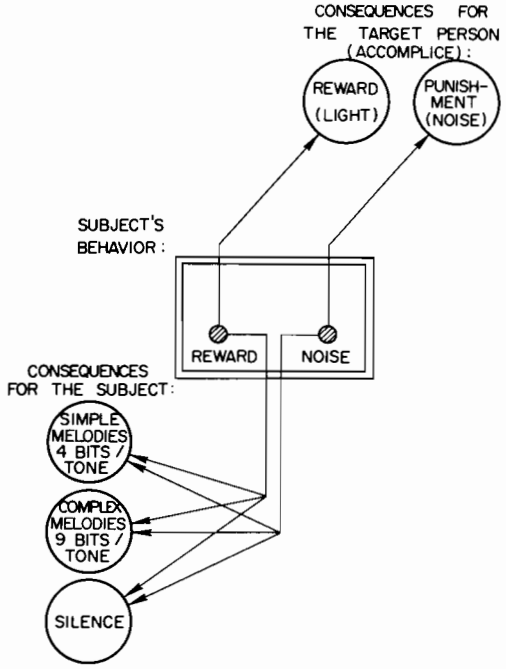

FIG. 2. A schematic representation of the structure of the experiment (Konečni, 1977a). On each of 50 trials the subject had to press one of two buttons (center); pressing one button ostensibly delivered a blast of loud noise to the accomplice for as long as the button was pressed, whereas pressing the other button supposedly switched on a green light signifying that the accomplice's "creative" response had been "good" (top right). Depending on which button the subject pressed and on the experimental condition to which she had been assigned, she heard a simple melody, a complex melody, or nothing for as long as the button was pressed (bottom left). In a particular condition, each of the two behaviors always had only one type of consequence. There were seven experimental conditions, defined by seven different binary sets of consequences of the subjects' behavior.

down. Only in Condition 1 (a control treatment) did the two behaviors (rewarding and punishing the accomplice) lead to the same outcome (silence) for the subjects.

The predictions were based on the results reported in Section II,A, the Konečni (1975b) study (reported in Section III,A), and other relevant aggression and arousal findings. It was expected that angered subjects would differ from the nonangered ones not only in terms of their far greater inclination to punish the accomplice (this has been found in just about every aggression study ever done), but also in terms of their relative preference for the different consequences. In particular, angered subjects' predicted order of preference for the three outcomes was as follows: Simple melodies > silence > complex melodies (on the basis of

TABLE II
MEAN TOTAL DURATION OF BLASTS OF NOISE AND OF THE REWARD LIGHT BY EXPERIMENTAL CONDITION[a]

Conditions	Anger		No anger	
	Noise	Reward	Noise	Reward
1. Reward: No consequence Noise: No consequence	21.25[b]	29.13	13.28	44.66
2. Reward: No consequence Noise: 4 Bits/tone	35.02	31.59	19.17	43.07
3. Reward: No consequence Noise: 9 Bits/tone	19.13	34.54	13.61	32.02
4. Reward: 4 Bits/tone Noise: No consequence	21.49	55.68	18.99	44.59
5. Reward: 9 Bits/tone Noise: No consequence	28.72	28.51	15.20	62.68
6. Reward: 4 Bits/tone Noise: 9 Bits/tone	16.51	34.26	19.51	60.69
7. Reward: 9 Bits/tone Noise: 4 Bits/tone	62.69	21.44	14.85	43.28

[a] $N = 10$.
[b] Seconds.

the results in Section II,A, angered subjects were expected to shun complex melodies). In contrast, nonangered subjects' order of preference was expected to be as follows: Simple melody = complex melody > silence. Namely, pilot research had indicated that nonaroused subjects (a) like the simple and complex melodies used in these experiments about equally, and (b) prefer either type of aesthetic stimuli to silence.

Given these predictions, it follows that angered subjects in some conditions should experience conflicting motivations, whereas for those in other conditions congruent motivations should be operative. For example, every time an angered person in Condition 6 delivered a blast of noise to the accomplice, she heard a presumably undesirable complex melody. Given this conflict, subjects could be expected to press the punishment button relatively infrequently. In contrast, since angered subjects in Condition 7 heard a presumably desirable simple melody every time they pressed the punishment button, they could be expected to press it relatively often. The difference between these two conditions in the number of punishments delivered should, of course, be further enhanced by the respective consequences of the alternative responses. In Condition 6, rewarding the ac-

complice simultaneously meant receiving the desirable simple tones; on the other hand, rewarding the accomplice in Condition 7 meant receiving the undesirable complex tones. Overall, if the above reasoning is correct, and with regard to angered subjects only, Conditions 6 and 7 should be at the opposite extremes in terms of the number and duration of punishments delivered to the accomplice, with subjects in Condition 7 being considerably more aggressive than those in Condition 6. The number and duration of punishments administered by angered subjects in the remaining five treatments were expected to fall between these extremes; their ordering was predicted on the basis of the assumptions made above about the subjects' relative preference for the three types of consequences.

In Table II are presented the main results of the experiment—the mean total duration (in seconds) of blasts of noise and of the reward light delivered over 50 trials by subjects in the various experimental conditions. These entries, of course, simultaneously indicate the mean total duration of the subject's self-exposure to simple or complex melodies, or to silence (depending on the experimental condition).

As can be seen from Table II, angered subjects on the average pressed the punishment (noise) button for a far longer period of time than did the nonangered subjects, whereas the reverse was generally true in the case of the reward (green light) button. More interesting were the effects produced by the consequences of the subjects' behavior, that is, the effects of the seven experimental conditions. Among nonangered subjects, the seven treatments were relatively ineffective in that in all the conditions the subjects pressed the punishment button for quite brief periods of time. In other words, the motivation not to hurt the other person was apparently much stronger than was the motivation to obtain a particular auditory (aesthetic) outcome. For angered subjects, the results in the "noise" (punishment) column confirmed the predictions in a striking manner. In order to illustrate this point more clearly, the results for angered subjects are also presented in Fig. 3.

In this figure, the conditions are ordered on the abscissa such that the total duration of blasts of noise delivered in the various conditions should increase from left to right, and the total duration of the reward light increase from right to left, *if* the theoretical assumptions and predictions discussed above were true. As can be seen, except for one minor reversal, the order in terms of the mean total duration of punishments was exactly as predicted.[7] By far the longest punishments were delivered in Condition 7 where the consequence of the administration

[7]The results in terms of the mean total duration of the reward-button pressing matched the theoretical predictions only in part. As can be seen in Fig. 3, subjects in Conditions 3 and 6 did not administer the reward light for nearly as long as had been predicted. This occurred despite the fact that they, just as predicted, emitted very little of the alternative behavior, punishing the accomplice (presumably because that behavior would have exposed them to complex melodies).

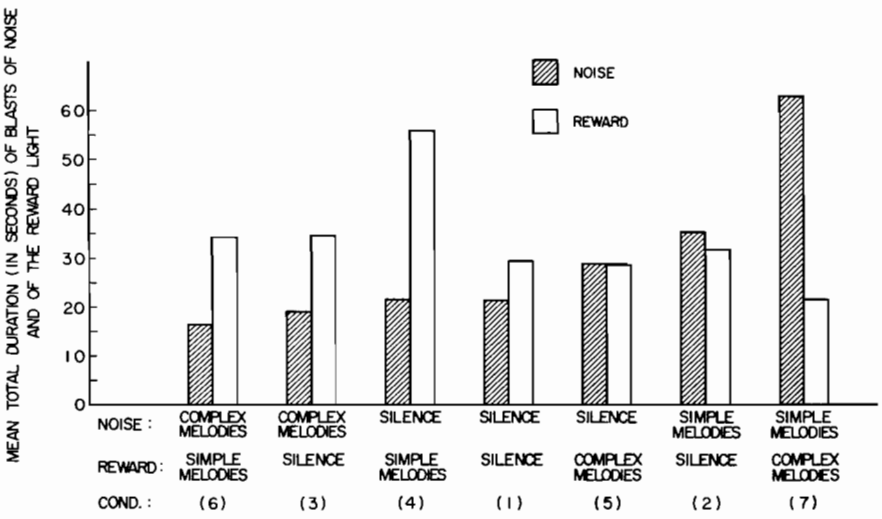

FIG. 3. Mean total duration (in seconds) of blasts of noise and of reward light as a function of the seven experimental conditions (angered subjects only). The conditions are ordered on the abscissa such that the mean total duration of noise should increase from left to right, and the mean total duration of the reward light increase from right to left, if the theoretical assumptions discussed in the text were true.

of punishment was a simple melody, whereas the consequence of not punishing (i.e., of rewarding) the accomplice was a complex melody. In contrast, the least amount of punishment was observed in Condition 6 where the consequences of the two responses were reversed (with regard to Condition 7).

The results in terms of the mean number of blasts of noise by experimental condition are presented in Table III.[8] As can be seen, there was the expected large effect of anger versus no anger. Also, among angered subjects, there was again an almost perfect agreement between the order of the treatment means and the theoretically predicted order. By far the largest number of punishments was administered by subjects who heard a simple melody each time they pressed the punishment button, while the consequence of the alternative response (rewarding the accomplice) was a complex melody (Condition 7) or silence (Condition 2). The smallest number of punishments was again delivered in conditions in which the consequence of pressing the punishment button was hearing a complex melody. In fact, angered subjects in Condition 3 actually delivered fewer blasts of noise than did the nonangered subjects in the same condition.

The results of this experiment are not only in close agreement with those reported in Section II,A, but also offer some interesting insights concerning the

[8]Since all subjects had to press either the noise or the reward button on each of the 50 trials, the mean number of rewards in the various experimental conditions is redundant as a dependent measure.

TABLE III
MEAN NUMBER OF BLASTS OF NOISE BY EXPERIMENTAL CONDITION[a]

	Conditions	Anger	No anger
1.	Reward: No consequence Noise: No consequence	19.80	14.90
2.	Reward: No consequence Noise: 4 Bits/tone	22.10	15.70
3.	Reward: No consequence Noise: 9 Bits/tone	16.40	18.10
4.	Reward: 4 Bits/tone Noise: No consequence	19.50	18.80
5.	Reward: 9 Bits/tone Noise: No consequence	21.70	17.70
6.	Reward: 4 Bits/tone Noise: 9 Bits/tone	18.80	14.40
7.	Reward: 9 Bits/tone Noise: 4 Bits/tone	26.60	17.30

[a] $N = 10$. Maximum possible score = 50.

underlying processes in question. One very important aspect of the results is the extent to which the amount of aggression expressed by angered subjects can be modified by the aesthetic consequences of the behavioral alternatives. When deciding what to do on each trial, angered subjects appear to be guided not only by their emotional state (anger), but also by the outcome (melodies or silence) of the emotion-appropriate behavior (aggression), or, more precisely, by the effect of that outcome on their internal state. As has been mentioned earlier, the assumption that there is a continuous feedback loop between behavior and internal state is a key feature of the proposed bidirectional-causality model of anger and aggression.

It should be pointed out that angered subjects preferred simple melodies to silence (which they preferred, in turn, to complex melodies). These results (see Tables II and III and Fig. 3) are in agreement with those obtained by Konečni (1975b), who found that simple melodies were not merely nonarousing, but actively soothing, in that they seemed to decrease the degree of anger and the amount of aggression over and above the effects of the homeostatic processes. (This study will be discussed more fully in Section III,A.)

A complementary way of viewing the present results is that they demonstrate a dependence of aesthetic choice not only on emotional state (this has already been demonstrated in Section II,A), but also on (a) the emotion-relevant behavior

toward social targets, and (b) the internal consequences of that behavior. Thus, just as one could say that the amount of aggression subjects displayed was regulated by the aesthetic consequences of the behavior, it is also reasonable to think of the results in terms of the subjects' long-term preferences for melodies of different complexity being—at least temporarily—modified by the context in which they were presented (i.e., the subjects' emotional state, their behavior toward the cause of that state, etc.).

C. Effects of Nonsocial Aversive Stimulation and Various Cognitive Tasks

The next question to consider is the role of attention and information processing in the type of aesthetic choice examined in the present chapter. Such factors deserve a close look for at least two reasons.

The first reason follows from a consideration of the link between the level of arousal and choice, namely, results reported in Sections II,A and II,B (as well as several other experiments) show that the level of arousal is an important determinant of aesthetic choice, at least when the choice alternatives are melodies differing in complexity. (Although the role of cognitive labeling of arousal fluctuations must not be neglected.) Nevertheless, the following question remains unanswered: How is it that relatively gross changes in the arousal system affect the complex and subtle operations presumably involved in aesthetic choice (and presumably in most other types of choice)? It seems that a reasonable cause can be built here for the applicability of recent developments in the area of attention, particularly the limited-processing-capacity model (e.g., Broadbent, 1958; Moray, 1969; Treisman, 1964). It is quite possible that the effect on choice of the level of arousal induced prior to choice may be due to changes in processing capacity, namely, a high level of arousal may reduce the preference for complex stimuli because it decreases the overall processing capacity. This may be regarded as an extension of the views that high arousal "narrows" attention, and impairs descrimination and cue selection (Broadbent, 1971; Easterbrook, 1959; Kahneman, 1973). In other words, highly aroused subjects may avoid complex melodies (when given the choice between them and simple melodies), because complex melodies require more information processing, whereas the subjects' processing capacity has been reduced by high arousal.

The second reason is closely related to the first and has to do with a fundamental property of the type of choice under consideration. The choice obviously does not consist of merely pressing one or another button, but involves *processing* of the chosen melody. At the same time, it would seem likely that at least the initial phase of aesthetic appreciation consists in large part of a detailed analysis of the information contained in a work of art, in an aesthetically appealing event, and so on (cf. Berlyne, 1971). This would appear to be particularly true in the case of

stimuli used in the present series of experiments, which have complexity as the underlying dimension. Complexity, like other collative variables, is fundamentally statistical in nature and for subjects to be able to make an even primitive distinction between complex and simple melodies, they would presumably have to carry out a considerable amount of information processing.

In short, whereas the type of aesthetic choice I am concerned with is clearly affected by the arousal-related and emotional variables (which, in turn, are affected by social stimuli), the processing-capacity factors also must play a role in this type of choice. Because the appreciation of aesthetic stimuli I have used can be assumed to require information processing, and because complex melodies presumably impose greater demands on processing capacity than do simple melodies, it follows that the choice of simple versus complex melodies ought to be affected by other cognitive demands, concurrently made on the subject. In addition, as I have suggested, the level of arousal itself may have an effect on choice precisely because it reduces the amount of processing capacity. In other words, it could be argued that the level of arousal is a second-order variable, fully mediated by the processing-capacity factors. This, of course, in no way reduces the importance of the level of arousal; rather, such an analysis simply outlines a more complex causal chain which, in addition to the level of arousal, may also have processing capacity as an important link.

These issues were examined in an experiment carried out by Konečni and Sargent-Pollock (1976). In this experiment, subjects had 50 trials on each of which they chose to expose themselves to 10 seconds of either a simple or a complex melody (as in Section II,A). Prior to each block of five choice trials, half of the subjects were exposed to aversive (and arousing) squarewave auditory stimulation at 97 dB for 20 seconds. The other half of the subjects were exposed to the identical stimulation, but at 56 dB. In other words, some subjects made choices between melodies differing in complexity while highly aroused, whereas other subjects were far less aroused while making such choices.

The second independent variable was the task on which the subjects worked concurrently with the processing of the chosen melody on each trial. There were five conditions which systematically differed in (a) the processing effort demanded, and (b) the likelihood of an arousal-level increase due to conceptual conflict (Berlyne, 1960) and/or physical exertion. The control subjects did not work on any task while listening to the melodies. Another one-fifth of the subjects worked on the digit-symbol task. This task was used because it requires the continuous processing of information, with little fluctuation in processing difficulty over time. Subjects' work on this task required a considerable amount of information processing as well as a good deal of physical activity, in that the subjects had to write down a large number of symbols (matching them with digits as specified by a key). Subjects worked on this task continuously during each choice trial, pausing only to press one of the two buttons every 10 seconds. (To

allow the full impact of the auditory stimulation, work was not allowed in this or other conditions during the 20-second auditory-stimulation intervals preceding blocks of trials.) It was predicted that the processing demands of the digit-symbol task would reduce the proportion of complex-melody choices in comparison to the no-task group. However, such an outcome would not unequivocally support the processing-capacity hypothesis, unless the possible arousal-generating effects of the digit-symbol task, due to rapid writing, were controlled for. An additional group (contour-tracing) was therefore included. These subjects were given the digit-symbol sheets with the responses already filled in and asked to trace, as fast as possible, the contour of each filled-in-symbol, without checking the correctness of the answers. Thus, they engaged in as much rapid writing as the digit-symbol group, but had to process far less information. The processing-capacity hypothesis predicted that these subjects' choice behavior would be similar to the control (no-task) group's.

Another possiblity is that the digit-symbol task—a series of mini-problems—consists of repeated instances of conceptual conflict, which is presumably salient at decision points in problem-solving activity and has arousal-raising properties (Berlyne, 1960; Blatt, 1961). It could well be argued that such conflict should be distinguished from the effect of processing effort/load. Therefore, on the assumption that active storing of information involves much processing effort, but contains fewer elements of conflict than the work on the digit-symbol task does, an additional condition was included. These subjects closely attended to slides of paintings during the choice trials and tried to memorize as many details as possible. A different slide was shown during each of the 10 blocks of five choice trials and it remained in view during the entire block (50 sec). Finally, the fifth group of subjects saw the same slides, but without the memorization instructions; they were told that the only purpose of the slides was to "enrich their visual environment." (Note that the use of paintings in this experiment was merely a convenience and had nothing to do with aesthetic concerns. Any fairly complex stimuli could have been used.)

The level of physical activity in the two conditions involving slides was equal and minimal. Also, these conditions presumably contained few elements of conceptual conflict and actually qualified for membership in the class of tasks that, according to Lacey (Lacey & Lacey, 1974), produces cardiac deceleration. Nevertheless, the processing-capacity hypothesis, unlike an arousal model, would predict that the memorization subjects would choose fewer complex melodies than would subjects without such instructions.

In summary, the basic design of the present experiment was a 2 (aversive vs. mild auditory stimuliation) $\times$ 5 (tasks during choice) factorial. The main dependent measures were (a) the proportion of complex/simple melody choices, and (b) fluctuations in blood pressure due to auditory stimulation and cognitive tasks. (Subjects' systolic blood pressure was monitored throughout the experiment.)

The experiment was thus a relatively comprehensive attempt to analyze the subtle interplay of cognitive (attentional, processing-capacity) and motivational (arousal-level-related) factors in this type of aesthetic choice, with reference to issues raised above.

The systolic blood pressure results can be summarized as follows: (a) aversive stimulation was arousing, but mainly early in the experimental session; (b) conditions involving physical activity (rapid writing) were more arousing than those that involved watching slides or no task at all; (c) the increment in arousal due to conflict and problem-solving activity was very small (the digit-symbol condition vs. the contour-tracing condition); and (d) the treatment involving storage of information (slides memorization) did not differ from merely watching slides or having no task at all: none of these were arousing.

The aesthetic-choice results are presented in Table IV (mean percentage of complex-melody choices by experimental condition). It is evident that exposure to the aversive stimulation sharply reduced subjects' choice of complex melodies, and that this was true irrespective of the type of task in which subjects were engaged during the choice trials (the aversive vs. mild stimulation main effect was highly significant, but the interaction term was not). Thus, aversive stimulation both increased the level of arousal in terms of systolic blood pressure and decreased the preference for complex melodies.

Subjects' preference was also strongly affected by the particular task in which they were engaged while making the choices and processing the chosen melodies. The digit-symbol and slides-memorization tasks were by far the most successful in reducing the preference for complex melodies. The contrast of these two conditions with the remaining three accounted for virtually all of the variance due to the type of task. This contrast captures statistically and theoretically what seems to be the essence of the differential effects of various activities performed concurrently with choice. The digit-symbol task and the task of closely attending to, and memorizing, details of paintings presumably demanded more processing

TABLE IV
MEAN PERCENTAGE OF COMPLEX-MELODY CHOICES BY EXPERIMENTAL CONDITIONS[a]

Prechoice stimulation	Task during choice				
	No task	Digit-symbol	Contour tracing	Slides/ memorization	Slides/no memorization
Aversive	39.48	20.87	41.80	25.84	43.89
Mild	54.37	35.93	47.55	41.78	51.63

[a] $N = 10$. From Konečni and Sargent-Pollock (1976). Copyright 1976 by the American Psychological Association; reprinted by permission.

capacity than did the other tasks. As a consequence, more capacity was allocated to these tasks (cf. Kahneman, 1973). Since complex stimuli are presumably more difficult to process than are simple stimuli, and given that the option existed, subjects chose to expose themselves and process the less demanding additional stimulation (simple melodies) in order to avoid a processing overload.

Not that the arousal aspects of cognitive tasks were quite irrelevant. The slides-memorization subjects were far less aroused than were the digit-symbol subjects, but chose as few complex melodies. Also, the digit-symbol group was no more aroused than was the contour-tracing group, but chose far fewer complex melodies. Finally, the slides-memorization subjects were as little aroused as those without the memorization instructions and those without any task at all; yet, the former group chose significantly fewer complex melodies than did the latter two groups. This converging evidence provides strong support for the processing-capacity position.

Thus, processing factors, "uncontaminated" by the arousal-level considerations, had a direct and powerful effect on the choice between simple and complex melodies. This can be readily understood if the present experiment is regarded as a special case of a divided-attention situation. Subjects had to process information from two sources during the same time period. One source of information (task) was "compulsory," and to it was allocated as much capacity as demanded. However, subjects had a choice over what other information they would process (simple vs. complex melodies). Moreover, from the initial demonstration and early trials, subjects were aware of the relative complexity of the two types of melodies and of the respective processing effort required. Therefore, across conditions, subjects' choices may have been guided by the differential processing demands of the compulsory tasks, that is, by the amount of processing capacity unconsumed by these tasks. The greater the spare capacity (the smaller the likelihood of an overload), the greater the proportion of complex-melody choices.

How does arousal fit in this scheme? After all, aversive stimulation (compared to mild) increased the level of arousal and decreased the proportion of complex melody choices. It is possible that whereas in some circumstances an arousal-level increase is an important determinant of choice, it may even then be a second-order determinant, mediated by cognitive-labeling processes that lead to distinct emotional states (Konečni, 1975a, 1975b), and by a decrease in the available processing capacity (as has been discussed). Such an analysis facilitates the interpretation of most of the present and many earlier findings in that it assumes that a high level of arousal, the pronounced emotional states (for which the high arousal provides a physiological justification), and the demanding cognitive tasks reduce the choice of complex melodies by virtue of decreasing processing capacity. Whereas in principle it remains possible that arousal affects choice directly through an independent mechanism that bypasses the processing-capacity factors, this idea appears to lack both plausibility and parsimony. Not

only is it unclear as to what the features of such a mechanism might be, but its output would still have to be combined at some point in the central nervous system with effects of cognitive tasks, which have been shown to be mediated by the processing-capacity factors.

As an aside, it may be pointed out that the present paradigm can be treated as a loose analog of many real-life situations where the type of music one chooses to listen to may in part be governed by the processing demands of the activity in which one is concurrently engaged. For example, a person's choice of a phonograph record (where the relative information-processing demands of the available records are known from prior listening) may be heavily influenced by whether he plans to work on a research paper, or to write Christmas cards to distant relatives, while listening to the record!

In summary, the three experiments discussed so far have isolated a number of factors which affect the choice between melodies differing in complexity. In addition, these experiments offer some insights about the causal chain involved. Social variables may affect choice by virtue of having an effect on emotional states. The emotional states have to be cognitively labeled (as we shall shortly see in more detail), but also require a physiological justification (provided by the arousal fluctuations) for the label. The level of arousal may, in addition, be influenced by nonsocial and nonemotional factors, such as aversive auditory stimulation, and is generally an important predictor of aesthetic choice. However, although a variety of social and nonsocial variables thus appear to affect aesthetic choice by virtue of their effect on the level of arousal, the effect of the level of arousal itself seems to be mediated by the amount of the available processing capacity. Various cognitive tasks also have an effect on choice and this effect seems to depend solely on the processing-capacity considerations and is independent of the cognitive tasks' arousal potential. These matters will be discussed in more detail in Section IV.

III. Effects of Exposure to Melodies Differing in Complexity on Emotional States (Anger, Fear) and Aggressive Behavior

As suggested in Section I, any treatment of aesthetic appreciation which aspires to some degree of completeness must deal not only with antecedents of aesthetic preference and choice, but also with consequences of such choice. In particular, consequences of exposure to works of art for various types of social behavior are of great interest, despite the fact that perhaps the most prevalent (if unstated) attitude in the psychology of art has been that the process of interest does not extend far beyond the *exposure* to aesthetic stimuli. These stimuli are often implicitly treated as if they are chosen and appreciated, but have no *effects* on human social behavior.

It would seem that in our culture an average person's contact with art (broadly defined) is considerable, very frequently occurs in informal settings (e.g., the living room), and is incorporated into the stream of other activities that often involve other people (e.g., family members). To the extent that art may affect moods and emotions, and given the social context in which it is often appreciated, it would be surprising if people's exposure to aesthetic stimuli would not have quite considerable effects on their social behavior. The above analysis also suggests that, paradoxically, some of the most important effects of art (in terms of the sheer frequency of their occurrence in the daily life of average men and women) may be quite transient, in that they are mediated by moods and emotions that ordinarily dissipate relatively quickly. Such considerations also reaffirm the importance of a social-psychological "microanalytic" approach to the study of the effects of aesthetic stimuli.

The experiments which I will be discussing in this section represent only the first steps in the direction suggested by the preceding remarks. Unfortunately, the exploratory and basic nature of the research has forced me to stay away from people's living rooms and from the intriguing effects of exposure to art on the interaction between friends, lovers, and family members. Nevertheless, the present investigation of the effect of exposure to melodies differing in complexity on negative emotional states and aggressive behavior has perhaps begun to answer a few of the key motivational questions raised or implied by the above analysis.

A. Effects of Melodies Differing in Complexity and Loudness Level

Results reported in Section II,A were interpreted as a demonstration of the powerful effects on aesthetic choice behavior of (a) socially induced anger, and (b) retaliation against the source of noxious social stimuli. Findings reported in Section II,B showed that the amount of aggressive behavior expressed by angered subjects can be modified by the behavior's aesthetic *consequences*. In experiments previously reported by Konečni (1975b), some complementary questions were examined: To what extent can effects of anger be augmented or reduced by musical stimuli differing in complexity over which subjects have no control (unlike Section II,B) and which precede the emission of aggressive behavior (also unlike Section II,B)? In this regard, does the loudness level at which aesthetic stimuli are presented play a part in determing the amount of aggression that ensues? Is the degree of a negative *emotional* state—anger—a controlling factor, or is the amount of aggression governed simply by the level of *arousal?* In discussing the findings in Section II,A, I pointed out that it was impossible to distinguish between the effects of high anger and high arousal in the Konečni *et al.* (1976) study. The design of the experiment by Konečni (1975b), however, allowed that such a distinction be made.

In the 2 × 5 factorial, between-subjects design of that experiment, subjects were first treated either insultingly or neutrally by an accomplice. All subjects then had an opportunity to give supposedly painful "electric shocks" to the accomplice on each of 50 trials. Four-fifths of the subjects, divided into four groups, listened to a 10-sec melody on each trial while making the decision whether or not to shock the confederate, whereas the remaining one-fifth received no stimulation. Melodies for the four different groups were either simple or complex, and were played at either a comfortable or a high loudness level (73 vs. 97 dB, respectively).

The insult manipulation, as in experiments discussed earlier, served as a social source of the arousal-level increase and it was expected that subjects exposed to it would not only become aroused, but also label themselves angry (Konečni, 1975a). Both loud and complex stimuli have previously been found to raise the level of arousal (e.g., Berlyne, Craw, Salapatek, & Lewis, 1963; Berlyne & Lewis, 1963; Bryson & Driver, 1969). In addition to being arousing, a melody (simple *or* complex) presented at close to 100 dB, like any other type of auditory stimulation, also tends to be aversive. However, subjects knew that the accomplice was not responsible for the type of auditory stimulation they received and that it was a "part of the experiment." For this reason it was expected that subjects would be far less likely to label the increases in the level of arousal due to the loudness of the melodies as anger. Finally, prior work with complex melodies has shown that these stimuli, while arousing, are not in any way aversive or anger-inducing.

In summary, the design of the Konečni (1975b) study permitted a comparison of individual and joint effects on aggression of three arousal-raising treatments. One of these treatments (insult vs. no insult) presumably differed from others in that it led to subject differentiation in terms of the adoption of the label of anger. The remaining two arousing treatments could reasonably be expected to differ in terms of aversiveness. Whereas melodies presented at 100 dB, in comparison to those presented at a comfortable listening level, were presumably both more arousing and more aversive, complex melodies, in comparison to simple melodies, were only more arousing.

I hypothesized that whereas not every arousal-level increase should lead to an increase in the amount of aggression, once an arousal-level increase has been labeled as anger, additional increases following closely in time could further substantiate the anger label and increase its degree, thus leading to a greater amount of aggression. This could occur despite the fact that these additional increases by themselves would have no effect on aggression. In line with the above reasoning, it was predicted that the loud and complex melodies, because of their arousal-raising attribute, would increase the amount of aggression displayed by angered subjects. In contrast, no differential effects of simple versus complex and loud versus soft melodies were expected in the case of nonangered subjects.

The design of this experiment made possible the investigation of another issue of interest. Namely, experiments in Sections II,A and II,B showed that angered subjects preferred simple melodies not only to the complex ones, but also to no stimulation. These results suggested the interesting possibility that simple melodies played at a comfortable listening level might have a "soothing" effect and actually *reduce* the level of arousal and anger. Because of such considerations, it seemed possible that angered subjects listening to simple melodies at a soft listening level might display less aggression than would equally-angered subjects exposed to no stimulation.

A few procedural details ought to be described before presenting the results. The insult procedure was the same as the one described earlier. The task in the course of which subjects had the opportunity to shock the accomplice was the "creativity test" used in the experiment reported in Section II,B. Each of 50 trials consisted of the following components: The subject read a word from a standard list into a microphone, and the accomplice provided a standard response after about 3 seconds. As soon as the subject heard the accomplice's response over a speaker, a 10-sec melody began and the subject heard it through headphones. At some point during these 10 seconds, the subject pressed either the reward or the "shock" button. When the 10-second melody came to an end, the subject read the next word. The no-stimulation subjects were not exposed to melodies at any point in the experiment. Note that a particular subject received on all 50 trials only one of the four possible stimulation treatments (e.g., simple melodies at 97 dB).

The mean number of shocks administered by subjects in different experimental conditions is presented in Table V. Both main effects were significant; in addition, there was a highly significant interaction, which indicated that exposure to various types of auditory stimulation had substantial differential effects on aggression only when subjects had been angered. Among angered subjects, expo-

TABLE V
MEAN NUMBER OF SHOCKS BY EXPERIMENTAL CONDITION[a]

	Stimulation				
Accomplice's behavior	Simple–soft (4.00 bits/tone at 73 dB)	Simple–loud (4.00 bits/tone at 97 dB)	Complex–soft (9.17 bits/tone at 73 dB)	Complex–loud (9.17 bits/tone at 97 dB)	None
Insult	11.58_{c}	20.33_{a}	19.58_{a}	22.92_{a}	15.58_{b}
No insult	10.75_{c}	11.33_{c}	11.42_{c}	13.08_{bc}	11.00_{c}

[a] $N = 12$ per cell. Cells having common subscripts are not significantly different at the .05 level by the Duncan multiple-range test. From Konečni (1975b). Copyright 1975 by the American Psychological Association; reprinted by permission.

sure to simple melodies presented at a loud level, to complex melodies at a soft level, and particularly to complex melodies at a loud level, resulted in a considerable amount of aggression. In contrast, angered subjects who had listened to simple melodies presented at the soft level displayed significantly less aggression than did angered subjects exposed to no stimulation. No such effects were evident among nonangered subjects.

There are several important implications of these results. First, it seems that an essential condition for the aggression-enhancing effect of complex and loud stimuli, known to raise the level of arousal, is that subjects be insulted, that is, that they label themselves angry. The arousal-level increments due to sources not conductive to the anger label (i.e., the melodies) had very little direct effect on aggression. When anger had already been instated, however, the arousal-level increases due to the melodies augmented the amount of aggression, presumably by virtue of intensifying the emotion. The cognitive-labeling hypothesis thus withstood an important test in that even repeated exposure to aversive auditory stimulation (i.e., to melodies presented at close to 100 dB) did not have much effect on aggressive behavior when subjects were not angry. These results cast serious doubt on the validity of a simple arousal-level model.

Second, with regard to the effects of complexity and loudness of the melodies on angered subjects, it is convenient to consider the insult–no-stimulation condition as providing a point of reference: At the immediate, empirical level, in terms of the amount of aggression, and at the conceptual level, in terms of the level of arousal and the degree of anger. The fact that angered people who had been repeatedly exposed to 10-second simple melodies presented at a comfortable listening level displayed far less aggression than did angered subjects exposed to no stimulation, seems to suggest that the simple, soft melodies may have actively reduced the level of arousal and the degree of anger, beyond the gradual recovery pattern of the arousal system due to homeostatic processes (presumably evident in the insult–no-stimulation group). Taken together with the previously reviewed findings in Sections II,A and II,B, results of the present experiment suggest that the simple, soft melodies are soothing. Whereas this finding is inconsistent with the view that the psychophysical and collative variables, such as loudness and complexity, have a unidirectional effect on the level of arousal, it is quite consistent with a theoretical model which takes emotional and cognitive factors into account. It is of some interest to note that Konečni and Sargent-Pollock (1977) found that certain Renaissance paintings can have a soothing effect similar to that of simple melodies presented at a soft listening level.

Third, whereas simple, soft melodies reduced the amount of aggression, both the loudness and complexity of stimulation increased the amount of aggression displayed by insulted subjects, presumably because they raised the level of arousal above that of angered subjects not exposed to stimulation. The pattern of results suggested that these two effects were additive, although the evidence for additivity was somewhat equivocal.

In conclusion, the present experiment showed quite convincingly that aesthetic stimuli dealt with in this article can have powerful effects on a negative emotional state (anger) and a related behavior (aggression); some constraints on these effects were also elucidated.

B. Delayed Effects on Aesthetic Choice and Aggression of Reducing Anger by Simple Melodies and Aggressive Actions

In Sections II,A and II,B, and in footnote 3, the evidence for behavioral and physiological aspects of the cathartic effect was briefly reviewed. It was also suggested that perhaps the most parsimonious explanation of this effect was in terms of a relationship of bidirectional causality between the level of arousal (labeled anger) and the amount of aggression expressed (Konečni, 1975a).

Support for one of the components of the arousal–anger–aggression model comes from studies which have demonstrated that aggression might be superior to nonaggressive activities in reducing the amount of subsequent aggression expressed by the initially angered subjects (cf. Konečni, 1975a). It seems that the latter finding is mediated in part by the anger-decreasing properties of angered people's aggression. A possible reason for this state of affairs may be that the prevailing real-life contingencies favor the performance of aggressive over nonaggressive responses in noxious social situations (such as being insulted by another person). Aggression may be more efficient than are various nonaggressive responses in ending others' aggression. Whereas nonaggressive activities and the passage of time may be said to reduce the amount of subsequent aggression in a "passive" manner, by merely allowing homeostatic processes to act, the expression of physical aggression may have a more active influence on the level of arousal (and thus on the degree of anger and the amount of subsequent aggression). This may be the case because of the proven usefulness of aggression in ending others' aggression, that is, because of its association with the successful elimination of others' aggression and the consequent decrease in the level of arousal and anger (Konečni, 1975a).

If it is indeed true that real-life contingencies favor aggressive over nonaggressive responses in anger-inducing noxious situations, and if the former are superior in decreasing the level of arousal (labeled anger) from an aversively high level, it follows that every instance in which aggression alleviates anger will increase the probability that aggression would occur in future cases of anger induction.

Consider the following experimental treatment. A person is first angered and during the period following the anger manipulation (i.e., while anger is gradually, but slowly, subsiding), the person is given an opportunity to physically hurt the annoyer. In this situation, aggressive behavior is not only paired with a gradual decrease in a negative emotional state (subjects presumably prefer

negative emotional states to become less pronounced), but, in addition, if the above analysis is correct, aggressive behavior has been allowed to accelerate the decrease of the intensity of the negative emotional state (anger). In short, the "recovery" from a high degree of anger is accelerated by aggression over and above the rate of recovery which would have been produced by homeostatic processes acting alone. In the next phase of the experiment, the subject is allowed to relax (e.g., by reading light materials for a short period of time), which should allow anger to subside completely. Following this, the subject is again angered and the issue of interest is how much aggression would (s)he express in comparison to various control groups who had experienced some combination of the following: (a) No expression of aggression following the first case of anger induction; (b) no anger induction preceding the first expression-of-aggression stage; (c) no second induction of anger. The prediction on the basis of the theoretical model outlined above would be that the experimental condition in which all of the components were present (i.e., the initial pairing of anger and aggression, and the subsequent, second, induction of anger) would result in a far greater amount of aggression in the final part of the experiment than would conditions in which some of the components were missing.

What would happen if a person, after being insulted, was not given the opportunity to express aggression toward the annoyer, but instead listened for a few minutes to simple melodies (which were found in earlier studies to be soothing)? Unlike other nonaggressive activities—but like aggressive activity—listening to simple melodies could be expected on the basis of the evidence presented earlier to *accelerate* the recovery from a pronounced negative emotional state, that is, to lead to less anger sooner than would ordinarily be the case. If this were true, one would expect subjects in the simple-melody condition to display far less aggression following the second anger induction than would subjects in the condition described above. Whereas subjects in the former condition would presumably display a great deal of aggression, because they had previously experienced a fast recovery from an aversive anger state due to aggression, subjects in the latter condition (a) had not expressed aggression on the first occasion, and (b) had instead experienced a fast recovery from a high degree of anger due to simple, soothing melodies. If given the opportunity, the latter subjects would presumably want to expose themselves to simple melodies when experiencing anger again—in order to bring about its fast reduction—rather than express aggression to achieve the same goal.

These were the main ideas behind the design of a previously unpublished experiment by Konečni (1977b). There were nine experimental conditions which are summarized in Table VI. Basically, there were three main conditions (1–3), and six control conditions in which some of the components present in the main conditions were lacking. All subjects and accomplices were female. In Condition 1, subjects were first angered by the accomplice. The accomplice attacked the

TABLE VI

PANEL A: MEAN NUMBER AND TOTAL DURATION (IN SECONDS) OF BLASTS OF NOISE TO THE ACCOMPLICE AND SIMPLE TONES TO SELF BY EXPERIMENTAL CONDITION[a]

			Stage D (dependent measures)			
Stage A	Stage B	Stage C	Number of noise blasts	Number of melodies	Duration of noise blasts	Duration of melodies
1. Anger + aggression	15-min rest	Anger	17.60	13.90	51.72	44.46
2. Anger + melodies[b]	15-min rest	Anger	11.90	20.80	40.49	97.10
3. Anger + no activity	15-min rest	Anger	13.80	15.80	38.40	53.30
4. No anger + aggression	15-min rest	Anger	13.70	19.60	31.66	82.31
5. No anger + melodies[b]	15-min rest	Anger	10.90	13.70	30.50	54.16
6. No anger + no activity	15-min rest	Anger	12.10	17.30	25.40	57.39
7. No anger + aggression	15-min rest	No anger	9.00	18.30	11.92	60.52
8. No anger + melodies[b]	15-min rest	No anger	11.90	18.20	15.18	67.55
9. No anger + no activity	15-min rest	No anger	8.90	17.50	22.08	69.67

PANEL B: MEAN NUMBER OF NOISE BLASTS BY EXPERIMENTAL CONDITION

	Activity in Stage A		
Condition	Aggression	Melodies	None
Anger twice	17.60	11.90	13.80
Anger once	13.70	10.90	12.10
No anger	9.00	11.90	8.90

[a] $N = 10$. The data in panel B are the same as those in the column of number of noise blasts of panel A, but presented in the form of a 3×3 design.

[b] 4.00 Bits/tone, 73 dB(A).

subject as soon as she walked into the laboratory, blamed her for being late in a hostile and arrogant manner, and implied that being late for important appointments implied irresponsibility and immaturity; although most subjects came to the laboratory punctually, the accomplice pretended the appointment had been made for 15 minutes earlier. Immediately following this episode, subjects delivered a fixed number of blasts of noise to the accomplice in a learning-task context, which completed Stage A of the experiment (see Table VI). Subjects were then given 15 minutes of rest during which time they were alone and seated comfortably, reading magazines (Stage B). During this period, subjects' anger presumably subsided completely. In Stage C, subjects in Condition 1 were again angered, by the same accomplice, who now used the insult procedure involving anagrams that had been described previously.

In the final part of the experiment, the dependent measures were collected. These were the number and duration of blasts of noise delivered to the accomplice in the context of a task, and the number and duration of simple melodies to which the subjects exposed themselves. Subjects were told that every time a light of particular color came on they could press a button, for as long as they wished, which would deliver a blast of noise to the accomplice. Ostensibly, the purpose of this was to study the effects of unsignaled punishment on performance in a new type of intellectual task on which the accomplice was working. Subjects were also told that when a light of a different color came on, they could press another button, which would expose them to some (always the *simple*) melodies (these were demonstrated), and that the melody would go on for as long as the button was pressed. (A pretext that need not be discussed was used here also.)

Thus, there were four dependent measures: Number and duration of blasts of noise delivered to the accomplice, and number and duration of simple melodies which subjects delivered to themselves. Note that the experiment did not involve choice between aggression and listening to simple melodies: Occasions on which subjects could deliver a blast of noise to the accomplice and those on which they would expose themselves to a simple melody were governed by two independent, nonoverlapping sequences of light signals. Subjects were given the opportunity to deliver up to 25 blasts of noise to the accomplice and to expose themselves up to 25 times to a simple melody; each time they pressed a button (to obtain either outcome), they could keep it pressed for as long as 6 seconds.

Conditions 2 and 3 were identical to Condition 1 except for what happened in Stage A. In Condition 2, after being angered by the accomplice, subjects were exposed to simple melodies for 3 minutes continously. In Condition 3, after being angered, subjects neither aggressed nor listened to the melodies; instead, they sat by themselves alone in the room. Conditions 4–6 differed from Conditions 1–3 in that there was no first anger induction. Other aspects of these

conditions were identical to those in Conditions 1–3. Finally, Conditions 7–9 differed from Conditions 1–3 and 4–6 in that subjects were not angered at any point in the experiment.

The main results are presented in Table VI and Figs. 4 and 5. The twice-angered subjects (Conditions 1–3) delivered a greater number of noise blasts to the accomplice than did the once-angered subjects (Conditions 4–6), who, in turn, delivered a greater number of noise blasts than did the nonangered subjects (Conditions 7–9; see Panel B in Table VI); all this was also true for the total duration of noise blasts. (No such pattern was evident for the number or duration of melodies.) The most important aspect of the results, however, is that angered subjects who has been exposed to simple melodies following the first anger induction (Condition 2) delivered fewer blast of noise than did equally angered subjects who had not listened to the melodies (Condition 3), and, especially, than did angered subjects who had expressed aggression following the first anger induction (Condition 1). In fact, angered subjects who had had the opportunity to express aggression following the first anger induction subsequently delivered a greater number of noise blasts than did subjects in any other condition in the experiment. (This was also true in terms of the total duration of noise blasts.) Thus, having listened to simple melodies immediately after the first anger induc-

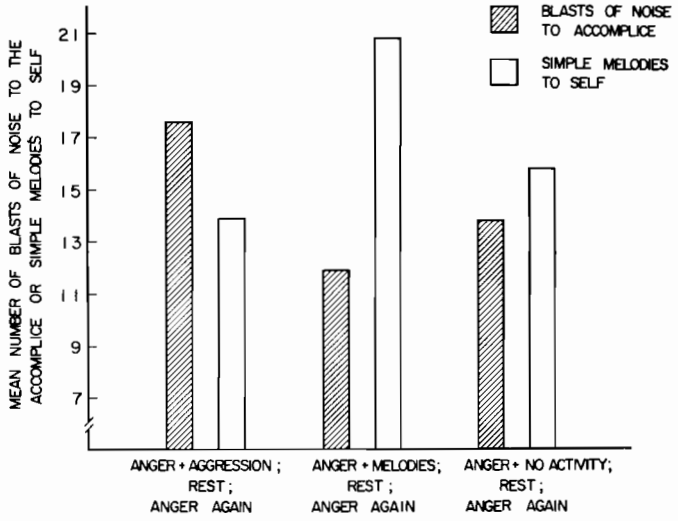

FIG. 4. Mean number of blasts of noise, that subjects delivered to the accomplice, and of simple melodies, that they delivered to themselves (independent responses). The data are from Conditions 1–3 (see Table VI).

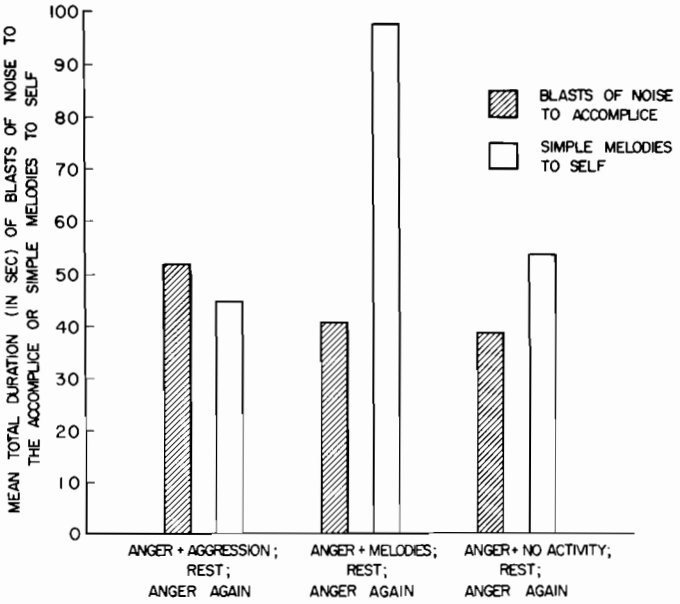

FIG. 5. Mean total duration of blasts of noise (in seconds), that subjects delivered to the accomplice, and of simple melodies, that they delivered to themselves (independent responses). The data are from Conditions 1-3 (see Table VI).

tion had decreased the number of punishments which subjects inflicted upon the accomplice when anger was induced again later.

An entirely different picture was obtained with regard to the dependent measures involving subjects' self-exposure to simple melodies. Here, subjects in Condition 2 (who had listened to simple melodies after the first induction of anger) subsequently chose to listen to simple melodies far more often and far longer than did subjects in any other condition (see columns 2 and 4 in Panel A of Table VI, as well as Figs. 4 and 5).

The above results generally confirm the notion that subjects who experience a highly aversive, negative emotional state, such as anger, are likely to engage in activities that have in the past successfully accelerated the recovery from such a state. When aggression was experimentally allowed to produce a speedy dissipation of anger, subjects resorted to this behavior when they were made angry again, presumably in order to bring about another fast arousal-level decrease (and the correlated reduction in the degree of anger.) However, results also showed—and this is even more important for our present concerns—that exposure to simple melodies, to soothing stimuli of aesthetic nature, had a powerful effect on subjects' behavior at the time of the next anger induction. Subjects who had experienced that simple melodies could successfully decrease their anger

(i.e., faster than simply the passage of time), listened to such melodies a great deal when angered again. These subjects were far less prone to engage in aggression in order to produce the same outcome (i.e., a fast decrease of arousal and anger).

One might wonder why did Conditions 2 and 3 not differ from each other to a greater extent in terms of the number of blasts of noise and, especially, the mean total duration of blasts of noise (where a reversal actually occurred). A possible reason for this is that the real-life contingencies of subjects who were in Condition 2 also presumably favor aggression over other activities for the purpose of eliminating noxious stimuli os social nature, and thus for the purpose of reducing the level of arousal and anger. If this were true, one could not realistically expect that the brief experimental manipulations would completely erase the cumulative effects of these people's real-life experiences. However, it was clearly demonstrated that exposure to simple, soothing melodies decreased the amount of angered subjects' subsequent aggression, in comparison to a condition where anger had initially been reduced by aggression.

In the present experiment, for several reasons, I did not place subjects in a situation where they had to choose, on each trial, between the delivery of a punishment to the accomplice and listening to a simple melody. It is possible, however, that future research using a choice dependent measure will, in fact, find that subjects can be taught to resort to simple melodies, rather than to aggression, for the purpose of decreasing their arousal and anger.

C. Delayed Effects on Aesthetic Choice and Aggression of Reducing Fear by Simple Melodies and Aggressive Actions

In the experiment reported in Section III,B, it was hypothesized that the large amount of aggression in Condition 1 was not due simply to the temporal pairing of aggression with a decrease in the negative emotional state, but rather to the fact that aggression accelerated the emotional "recovery," that is, actively decreased the degree of anger. In other words, aggressive behavior presumably contributed to the dissipation of anger, rather than being simply paired with it. The relative increase in the amount of aggression following the second anger induction was presumably due to that very attribute of aggressive behavior–its ability to decrease the degree of anger faster than do the time-dependent homeostatic processes. As has been pointed out, a possible reason for this is that the real-life contingencies favor aggressive responses when anger is induced, because aggression may be particularly efficient in eliminating noxious anger-inducing social stimulation.

It follows from the above that one would not expect similar results when the negative emotion in question is not anger, but rather a different negative emotion,

for example, fear. In real life, fear appears to be seldom followed by aggression; even in cases when it is, fear-produced aggression may not be particularly successful in removing the source of fear.[9] If real-life contingencies indeed do not favor aggression in the presence of fear, and there is thus no relationship between aggression and the removal of noxious stimulation which produces fear, then there would also be no relationship between agression and the decrease in the level of arousal and the associated emotion (labeled fear). Given the absence of the latter real-life relationship, even the temporal pairing of aggression with an experimentally produced decrease in fear would not necessarily lead to an increase in the amount of aggression when fear is induced on a future occasion, because there is ample evidence from the research on both human and animal subjects that temporal contiguity by itself is seldom sufficient to produce learning (e.g., Bolles, 1972; Kamin, 1969; Leger & Rule, 1976; Rescorla, 1972; Testa, 1974).

Whereas the above prediction may be accurate for the situation where subjects are simply allowed to aggress while their fear is subsiding, the state of affairs could presumably be altered by artificially establishing a contingency, that is, by convincing subjects through instructions that their expression of aggression is instrumental in reducing the degree of their fear. In the latter case, subjects might display a considerable amount of aggression in a future instance of fear, presumably because a relationship has now been established between aggression and fear reduction which did not exist in real life. If the amount of aggression following the second instance of fear induction were to increase for subjects who had been initially told that aggression would decrease their fear, and if such an increase were not to occur in a condition where the "contingency" was not experimentally established, these findings would complement the anger restuls reported in Section II,8, from both theoretical and empirical points of view.

Whereas a distinction must be made between the relationship of aggression and anger, on one hand, and aggression and fear, on the other, the effect of simple melodies on emotional states (and on the amount of subsequent aggression) should be less affected by which emotional state is involved, so long as the state in question is negative. Namely, only in the case of a negative emotional state can the soothing attribute of the simple melodies presumably be fully "appreciated" by subjects, for this attribute acts to reduce the intensity of the state (cf. Konečni & Sargent-Pollock, 1977). This would mean that subjects whose fear had previously been reduced by simple melodies would seek exposure to such melodies to a greater degree—in a future instance of fear—than would

[9]Whereas it would seem clear that fear is followed by aggression far less often than is anger, one must not disregard the fact that fear is an aversive emotional state (often produced by social stimuli), and that it may therefore result in a certain amount of aggression, particularly in situations where the more "appropriate" behaviors (such as escape) are not possible.

subjects in various control conditions (this prediction is, of course, analogous to that made for Condition 2 in the experiment reported in Section III,B).[10]

The design of a previously unpublished experiment by Konečni and Day (1977), which investigated these issues, is shown in Table VII. Conditions 3–10 were analogous to Conditions 2–9 in Konečni (1977b), reported in Section III,B. In addition, the present Condition 1 was very similar to Condition 1 in Section III,B, in that subjects had not been told anything about the effect of aggression on the reduction of the negative emotional state in question. The only condition in the present experiment which was not analogous to any of the treatments in Section III,B was Condition 2, where subjects were led to believe that hurting the confederate could decrease the level of their fear (more on this below).

A few words are in order about the experimental manipulations. In Stage A, fear was induced (Conditions 1–4) by telling subjects that over a 4-minute period they may be exposed to some extremely loud and aversive blasts of noise. In order to produce a gradual decrease in the degree of fear and make the situation analogous to that in Section III,B (where the accomplice was removed immediately after the insult procedure and thus subjects' anger presumably gradually subsided over time), subjects in the present experiment were told that the "computer program" which [supposedly] governed the delivery of blasts of noise took passage of time into account in such a way that the longer the period free of blasts of noise, the smaller the probability that any blasts would be delivered in the remaining period. Subjects were, in fact, explicitly told that because of the nature of the computer program, the longer the period free of blasts of noise, the less afraid they should feel. Thus, it was hoped that a gradual decrease in the degree of fear over the 4-minute period would be achieved, roughly paralleling the time course of the reduction of anger in the experiment reported in Section III,B.

In Condition 1, subjects ostensibly delivered a fixed number of blasts of noise to the accomplice (again in the context of a pseudo-learning task) during the 4-minute period previously described; no mention was made of any connection between subjects' aggression and their fear. In contrast, in Condition 2, subjects were told that "the computer program [supposedly] took the errors made by the accomplice on the learning task into account," and that "the greater the number of such errors, the less likely it would be that she [the subject] would receive blasts of noise." Subjects were explicitly told that the greater the number of

[10]Subjects who listened to simple melodies following the first induction of fear may not only seek a good deal of exposure to these melodies when they are made afraid again, but can also be expected to deliver relatively few punishments to the accomplice. In reducing the degree of fear (following the first fear induction), the melodies may also reduce the likelihood of aggressive thoughts and implicit or displaced aggressive actions (see also footnote 9), and thus decrease the number of actual aggressive acts when fear is induced the second time.

TABLE VII

PANEL A: MEAN NUMBER AND TOTAL DURATION (IN SECONDS) OF BLASTS OF NOISE TO THE ACCOMPLICE AND SIMPLE TONES TO SELF BY EXPERIMENTAL CONDITION[a]

			Stage D (dependent measures)			
Stage A	Stage B	Stage C	Number of noise blasts	Number of melodies	Duration of noise blasts	Duration of melodies
1. Fear + aggression (noncontingent)[b]	15-min rest	Fear	8.90	13.10	12.30	48.20
2. Fear + aggression (contingent)[b]	15-min rest	Fear	14.30	13.50	22.95	52.40
3. Fear + melodies[c]	15-min rest	Fear	6.40	17.30	9.20	73.10
4. Fear + no activity	15-min rest	Fear	8.60	14.40	14.65	45.80
5. No fear + aggression	15-min rest	Fear	7.40	14.00	12.35	47.05
6. No fear + melodies[c]	15-min rest	Fear	8.20	14.20	14.05	44.60
7. No fear + no activity	15-min rest	Fear	7.20	12.70	15.95	39.30
8. No fear + aggression	15-min rest	No fear	8.40	13.40	13.90	37.70
9. No fear + melodies[c]	15-min rest	No fear	9.00	13.60	15.10	47.40
10. No fear + no activity	15-min rest	No fear	6.80	14.00	13.10	34.40

PANEL B: MEAN NUMBER OF NOISE BLASTS BY EXPERIMENTAL CONDITION

	Activity in Stage A		
Condition	Aggression	Melodies	None
Fear twice	14.30	6.40	8.60
Fear once	7.40	8.20	7.20
No fear	8.40	9.00	6.80

[a] $N = 10$. The data in panel B are the same as those in the column for number of noise blasts of panel A, but presented in the form of a 3×3 design.

[b] In Condition 1, no mention was made to subjects about a connection between aggression and fear reduction. In Condition 2, subjects were told that the expression of aggression may reduce their fear.

[c] 4.00 Bits/tone, 73 dB(A).

errors made by the accomplice, and, thus, the greater the number of punishments they inflicted on this person (punishments could supposedly also further increase the number of the accomplice's errors), the less afraid they ought to feel. In this way, subjects' aggression was explicitly related to a reduction in their fear. Neither in Condition 1, nor in Condition 2, did subjects ever actually receive any blasts of noise.

In Condition 3, subjects were, on a pretext, exposed to several minutes of continuous simple melodies, as in Condition 2 of the experiment reported in Section III,B. The remaining conditions (4–10) were analogous to the corresponding conditions in Section III,B (3–9). The second fear induction (Conditions 1–7) was similar to the first in that subjects were again threatened with very loud and unpleasant blasts of noise, but did not, in fact, receive any noise. The dependent measures were identical to those in the experiment reported in Section III,B.

Results of the experiment are shown in Table VII and Figs. 6 and 7. As can be seen, subjects in Condition 2 delivered by far the greatest number of punishments. These subjects' aggression had not only been originally temporally paired with the decreasing fear (due to the passage of time free of blasts of noise), but was also directly linked to fear reduction by subjects' experimentally-induced belief that aggression increased the number of the accomplice's errors, which, in turn, supposedly decreased the probability that subjects themselves would re-

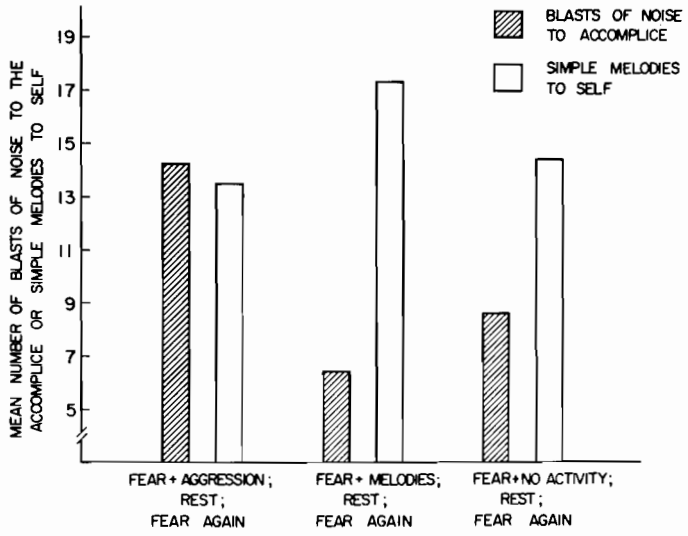

FIG. 6. Mean number of blasts of noise, that subjects delivered to the accomplice, and of simple melodies, that they delivered to themselves (independent responses). The data are from Conditions 2–4 (see Table VII).

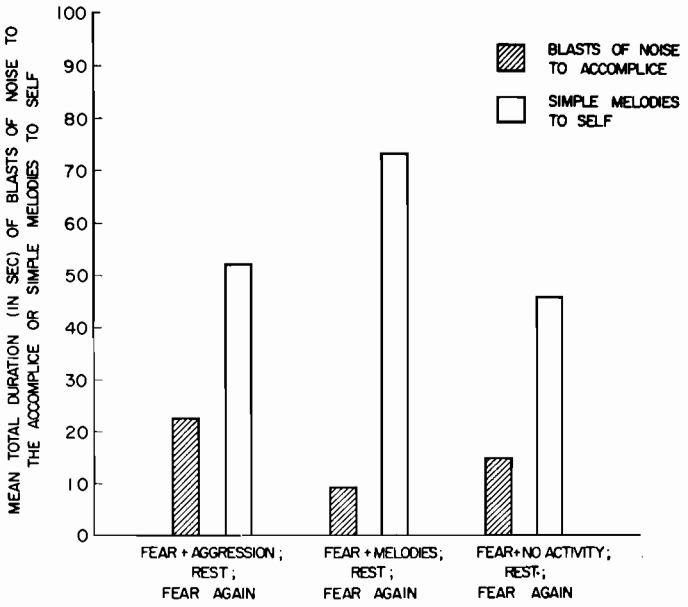

FIG. 7. Mean total duration of blasts of noise (in seconds), that subjects delivered to the accomplice, and of simple melodies, that they delivered to themselves (independent responses). The data are from Conditions 2-4 (see Table VII).

ceive blasts of noise. In contrast, the number of punishments inflicted by subjects in Condition 1—for whom aggression had originally been only temporally paired with a fear decrease—was significantly smaller. Most importantly, and just as predicted, subjects in Condition 3, whose fear in Stage A had presumably been decreased by simple melodies, subsequently delivered very few punishments to the accomplice; instead, they exposed themselves to simple melodies for much longer periods of time than did subjects in any other experimental treatment.

Overall, the pattern of results was very similar to that in the experiment reported in Section III,B, when one considers the present Condition 2 as theoretically analogous to Condition 1 in Section III,B. Just as has been hypothesized, in the case of fear (unlike anger), a connection had to be experimentally (artificially) established between aggression and the reduction in the intensity of the emotional state. When such a link was not established (Condition 1), no increase in the number of punishments occurred.

As predicted, simple melodies had a soothing, aggression-decreasing effect in the case of fear just as they did in the case of anger, without a connection between these melodies and fear reduction having to be artificially established. Thus, simple melodies appear to have a general and powerful effect on negative emotions in that they decrease the intensity of such emotions. From Figs. 6 and

7, it can be seen that subjects in Condition 3 displayed less aggression than those in Conditions 2 and 4 (see footnotes 9 and 10), and also exposed themselves more to simple melodies. In conclusion, unlike other nonaggressive activities (cf. Konečni, 1975a), listening to simple melodies appears to actively reduce the amount of aggression, presumably because of the melodies' soothing effect.

Overall, the three experiments presented in Section III showed that some aesthetic stimuli (such as the simple melodies) can reduce the amount of aggression and apparently accelerate the recovery from high levels of anger and fear, whereas other stimuli (such as the complex melodies), particularly when presented at a very loud level, increase the amount of aggression, but only if subjects had previously adopted an appropriate emotional label (i.e., anger).

IV. General Discussion

The research that I have described can be discussed from several points of view. In terms of empirical relationships, the experiments have revealed new antecedents and mediators of changes in aesthetic preference and choice, and provided good evidence that aesthetic stimuli may affect emotional states and various behaviors related to these states.

With regard to heuristic value, the approach may prove to be useful in that it has related aesthetic choice to various aspects of social behavior and linked areas of research that had not been conversant with each other. In addition, the present research confirmed the usefulness of classifying aesthetic stimuli on collative dimensions, such as complexity, a position long advocated by Berlyne (e.g., 1971). It should be noted that these dimensions have now been shown to be important in the construction of both dependent and independent variables. [A similar point was made by Sargent-Pollock and Konečni (1977) for visual aesthetic stimuli, that is, paintings from different historical periods.]

However, perhaps the most significant feature of the reported research is that it has facilitated the development of a relatively comprehensive theoretical approach to aesthetic preference and choice, a model that may be provisionally labeled "cognitive-emotional." Despite the fact that this model is still in a rudimentary form, it seems to fare quite well when compared to other theoretical positions and can account for a variety of findings in this area. A few words of elaboration are in order here.

A. Theoretical Implications: An Emerging Cognitive-Emotional Model

The present research has cast serious doubts on the validity of a simple arousal-level model of aesthetic preference. By this I certainly do not mean to

imply that the concept of arousal is superfluous, but rather that the arousal model ignores several important factors that can improve prediction to a considerable degree. One of these factors is the type of emotional label that people appear to assign under certain conditions to the perceived fluctuations in the level of their physiological arousal. The labels are presumably arrived at after a consideration of at least (a) the social and nonsocial variables which led to the fluctuations, and (b) the feedback from one's own (arousal-related) behavior directed at other people (cf. Section II,B). In addition, the arousal model largely ignores the effects of information-processing variables on aesthetic choice. It has now been experimentally demonstrated that certain cognitive tasks produce changes in the aesthetic choice behavior without having any effect on the level of arousal. Moreover, I have presented some evidence in favor of the idea that the effect on aesthetic choice of a high level of arousal is itself mediated by a decrease in the available processing capacity.

From the preceding remarks and the experimental results that have been reviewed, a rather obvious but nevertheless important point emerges, namely, that even a very elementary type of aesthetic choice (with which I have been dealing in this chapter) is multiply determined. Three types of stimuli that affect the choice between melodies differing in complexity have been uncovered by the present research (and this is almost certainly not an exhaustive list). More importantly, the effects of these different classes of stimuli on aesthetic choice seem to be mediated in quite different ways, in terms of both the kind and number of the mediating mechanisms. A brief outline of the model will suffice for the present purposes.

First, certain intellectually demanding tasks appear to influence choice by virtue of decreasing the amount of processing capacity available for dealing with the chosen aesthetic stimuli. Since the effect of these cognitive tasks does not appear to be mediated by anything but the available processing capacity, it is convenient to think of such tasks as being "one step removed" from choice. Second, other types of nonsocial stimuli, such as aversive auditory stimulation, seem to affect choice through their effect on the level of arousal—without the emotion-labeling processes being involved—which, in turn, affects processing capacity and, therefore, choice. This type of nonsocial stimulation can thus be considered as being two steps removed from choice. In contrast, the third class of stimuli that has been examined in the present research seems to be several steps removed from choice. For social stimuli (such as insulting remarks) to have an effect on choice, an "interpretive" stage presumably has to occur first, in which the stimuli and the situation in which they occur are evaluated. Given certain outcomes of the interpretive stage, the level of arousal may be affected and an emotional label assigned to these fluctuations. The last mediator in the chain would again be processing capacity. From this standpoint, the effects on aesthetic choice of all three classes of stimuli that I have mentioned (other classificatory

schemes are, of course, possible) are seen as being mediated by processing capacity, but whereas in the case of some types of stimuli, emotional states and/or fluctuations in the level of arousal may be implicated; this may not be true in the case of other types of stimuli.

In attempting to account for aesthetic choice, the present model thus stresses attentional processes, cognitive factors involved in the interpretation of stimuli and the labeling of affect, and the differential implications of various types and intensities of affect. A similar theoretical emphasis has guided the complementary thrust of the present research, namely, the investigation of effects of aesthetic stimuli on emotional states and associated behaviors, such as aggression. Although the amount of aggression is strongly affected by the level of arousal, the degree of anger, and the prior expression of aggression (or lack of it), it is rather remarkable to what extent it can be modified by certain aesthetic stimuli.

Various influential theoretical positions concerned with aesthetic preference, such as Berlyne's, may eventually be shown to have very limited predictive power because they tend to rely exclusively on antecedent stimulus conditions or global concepts, such as the level of arousal. The present experimental approach and theoretical model attempt to avoid such overreliance on a single concept or mechanism; rather, the cognitive-emotional model is a loose unifying scheme that links several distinct theoretical principles. Although it lacks the elegance often associated with simplicity, the model appears to make relatively precise and sometimes counterintuitive predictions. Its multiprocess character and comprehensiveness perhaps more realistically reflect the complexities evident in the domain of aesthetic preference than do models which rely on fewer or simpler concepts.

B. Some Thoughts on Future Research Directions

Despite the fact that the psychology of art is clearly a growing field, it nevertheless seems somewhat isolated from other subdisciplines within psychology—notably social/personality, cognitive, and environmental psychology—with which it ought to be intimately related because of its subject matter. It would seem that the understanding of art and its effects would be greatly improved if art appreciation were explicitly brought into the mainstream of the more established branches of psychology. This chapter's emphasis on the role of social, emotional, and cognitive factors in aesthetic choice is a modest attempt to bring about such a rapprochement. It is hoped that future research will pay greater attention to the social-emotional context in which art is appreciated, as well as the cognitive factors involved.

As was mentioned earlier, the psychology of art and experimental aesthetics have almost completely ignored the common, everyday forms of aesthetic enjoyment, despite the fact that art appreciation seems nowadays to take place

predominantly in informal social settings not specifically designed for the purpose of enjoying art, and is likely to be accompanied by routine behaviors and common emotional states. Yet, we know very little about people's everyday aesthetic choices and how these are influenced by (a) the setting (e.g., home, automobile, office, and so on), (b) emotional state (e.g., happiness, depression), (c) information load (what do people listen to on their car radios or tape decks in rush-hour traffic?), (d) physical state (e.g., fatigue, illness), and (e) effects of the presence of other people. Aesthetic stimuli clearly play an important role in human life, but we are not likely to understand this role unless aesthetic appreciation and choice are studied where they occur and in the forms in which they occur. Indeed, a strong argument can be made that further progress in the psychology of art hinges on the success of investigations of mundane types of aesthetic appreciation and choice. Of course, the research in naturalistic settings is often beset by logistical and methodological problems. However, the number of useful and often ingenious observational and other techniques for research in the field has been steadily growing, largely through the efforts of social/personality psychologists.

Whereas the research I have described clearly falls short of the goals mentioned above, it can perhaps be regarded as a compromise in that some of the experiments were guided by questions that appear to be highly relevant to real-life aesthetic choices. In addition, several of the experimental manipulations were designed in such a way as to incorporate real-life elements (e.g., the insult manipulation) or, at least, to be analogous to real-life variables. In addition, several projects concerned with aesthetic appreciation and choice in naturalistic situations are now in progrss, one of which includes changes in aesthetic choice behavior of suburban automobile drivers (i.e., which radio station they listen to in their automobiles, and how loud) as a function of traffic conditions, time of day and the direction of the commute (i.e., from home to work or vice versa), the degree of "impedance" (Novaco, Stokols, Campbell, & Stokols, 1978; Stokols, Novaco, Stokols, & Campbell, in press), the presence of passengers and their relationship to the driver, and so on. In addition to studying a mundane type of aesthetic choice, this type of project serves the useful function of investigating concurrently social/personality, cognitive, emotional, environmental, and aesthetic-appreciation issues.

Finally, the present research has demonstrated that there is an intimate relationship between exposure to and choice of aesthetic stimuli, on one hand, and emotional states, on the other. For example, simple melodies were found to reduce the amount of aggression and to accelerate recovery from the high levels of negative emotional states, such as anger and fear. In contrast, complex melodies increased the amount of aggression displayed by subjects who had labeled themselves angry. Although it would obviously be naive and presumptuous to envision therapeutic applications on the basis of these results, such find-

ings, coupled with an applied orientation, may eventually help bridge the existing gap between the laboratory and clinical research approaches to aesthetic stimuli and their effects.

References

Allen, R. B., Hammerbeck, J. A., & Konečni, V. J. *Planning an auditory aesthetic environment: Listeners' sequencing of musical and non-musical stimuli.* Paper presented at the 58th Annual Convention of the Western Psychological Association, San Francisco, Calif., 1978.

Altman, I. *The environment and social behavior.* Monterey, Calif.: Brooks/Cole, 1975.

Arnheim, R. *Picasso's Guernica.* Berkeley, Calif.: University of California Press, 1962.

Arnheim, R. *Toward a psychology of art.* Berkeley, Calif.: University of California Press, 1966.

Arnold, M. Music therapy in a transactional analysis setting. *Journal of Music Therapy,* 1975, **12,** 104–120.

Bandura, A. *Aggression: A social learning analysis.* New York: Prentice-Hall, 1973.

Berlyne, D. E. *Conflict, arousal and curiosity.* New York: McGraw-Hill, 1960.

Berlyne, D. E. Arousal and reinforcement. In D. Levine (Ed.), *Nebraska symposium on motivation* (Vol. 15). Lincoln: University of Nebraska Press, 1967.

Berlyne, D. E. *Aesthetics and psychobiology.* New York: Appleton, 1971.

Berlyne, D. E. The new experimental aesthetics. In D. E. Berlyne (Ed.), *Studies in the new experimental aesthetics.* New York: Wiley, 1974.

Berlyne, D. E., & Lewis, J. L. Effects of heightened arousal on human exploratory behavior. *Canadian Journal of Psychology,* 1963, **17,** 398–411.

Berlyne, D. E., & Ogilvie, J. C. Dimensions of perceptions of paintings In D. E. Berlyne (Ed.), *Studies in the new experimental aesthetics.* New York: Wiley, 1974.

Berlyne, D. E., Craw, M. A., Salapatek, P. H., & Lewis, J. L. Novelty, complexity, incongruity, extrinsic motivation, and the GSR. *Journal of Experimental Psychology,* 1963, **66,** 560–567.

Blatt, S. J. Patterns of cariac arousal during complex mental activity. *Journal of Abnormal and Social Psychology,* 1961, **63,** 272–282.

Bolles, R. C. Reinforcement, expectancy, and learning. *Psychological Review,* 1972, **79,** 394–409.

Bonny, H. I. Music and consciousness. *Journal of Music Therapy,* 1975, **12,** 121–135.

Broadbent, D. E. *Perception and communication.* London: Pergamon, 1958.

Broadbent, D. E. *Decision and stress.* London: Academic Press, 1971.

Bryson, J. B., & Driver, M. J. Conceptual complexity and internal arousal. *Psychonomic Science,* 1969, **17,** 71–72.

Canter, D. (Ed.), *Environmental interaction.* New York: International Universities Press, 1975.

Cantor, J. R., & Zillmann, D. The effect of affective state and emotional arousal on music appreciation. *Journal of General Psychology,* 1973, **89,** 97–108.

Carter, A. L. An analysis of the use of contemporary Black literature and music and its effects upon self-concept in group counseling procedures. *Dissertation Abstracts International,* 1975, **35,** 7052–7053.

Chapman, A. J., & Williams, A. R. Prestige effects and aesthetic experiences: Adolescents' reactions to music. *British Journal of Social and Clinical Psychology,* 1976, **15,** 61–72.

Child, I. L. *Esthetics.* In G. Lindzey & E. Aronson (Eds.), *The handbook of social psychology* (Vol. 3)(2nd ed.). Reading, Mass.: Addison-Wesley, 1969.

Crozier, J. B. Verbal and exploratory responses to sound sequences varying in uncertainty level. In D. E. Berlyne (Ed.), *Studies in the new experimental aesthetics.* New York: Wiley, 1974.

Day, H. I. Evaluation of subjective complexity, pleasingness, and interestingness, for a series of random polygons varying in complexity. *Perception and Psychophysics,* 1967, **2,** 281–286.

Doob, A. N., & Wood, L. Catharsis and aggression: The effects of annoyance and retaliation on aggressive behavior. *Journal of Personality and Social Psychology,* 1972, **22,** 156–162.

Easterbrook, J. A. The effect of emotion on cue utilization and the organization of behavior. *Psychological Review,* 1959, **66,** 183–201.

Ebbesen, E. B., Duncan, B., & Konečni, V. J. Effects of content of verbal aggression on future verbal aggression: A field experiment. *Journal of Experimental Social Psychology,* 1975, **11,** 192–204.

Ekman, P., Friesen, W. V., & Ellsworth, P. C. *Emotion in the human face: Guidelines for research and an integration of findings.* New York: Pergamon, 1972.

Farnsworth, P. R., & Beaumont, H. Suggestion in pictures. *Journal of General Psychology,* 1929, **2,** 362–366.

Feshbach, S. Aggression. In P. H. Mussen (Ed.), *Carmichael's manual of child psychology* (Vol. 2). New York: Wiley, 1970.

Foulke, W. E., & Keller, T. W. The art experience in addict rehabilitation. *American Journal of Art Therapy,* 1976, **15,** 75–80.

Francès, R. Limites et nature des effets de prestige: II. Notoriété de l'auteur et jugement de l'oeuvre. *Journal de Psychologie Normale et Pathologique,* 1963, **60,** 437–456.

Gambaro, S., & Rabin, A. I. Diastolic blood pressure responses following direct and displaced aggression after anger arousal in high- and low-guilt subjects. *Journal of Personality and Social Psychology,* 1969, **12,** 87–94.

Garner, W. R. *Uncertainty and structure as psychological concepts.* New York: Wiley, 1962.

Gonick-Barris, S. E. Art for children with minimal brain dysfunction. *American Journal of Art Therapy,* 1976, **15,** 67–73.

Gunzenhäuser, R. *Ästhetisches Mass und Ästhetische Information.* Quickborn bei Hamburg, West Germany: Schnelle, 1962.

Heimstra, N. W., & McFarling, L. H. *Environmental psychology.* Monterey, Calif.: Brooks/Cole, 1974.

Hokanson, J. E., & Shetler, S. The effect of overt aggression on psysiological arousal level. *Journal of Abnormal and Social Psychology,* 1961, **63,** 446–448.

Hokanson, J. E., Burgess, M., & Cohen, M. F. Effects of displaced aggression on systolic blood pressure. *Journal of Abnormal and Social Psychology,* 1963, **67,** 214–218.

Izard, D. E. *Human emotions.* New York: Plenum Press, 1977.

Kahneman, D. *Attention and effort.* New York: Prentice-Hall, 1973.

Kamin, L. J. Predictability, surprise, attention, and conditioning. In B. A. Campbell & R. M. Church (Eds.), *Punishment and aversive behavior.* New York: Appleton, 1969.

Konečni, V. J. *Experimental studies in human aggression: The "cathartic effect."* Unpublished doctoral dissertation, University of Toronto, 1973.

Konečni, V. J. Self-arousal, dissipation of anger, and aggression. *Personality and Social Psychology Bulletin,* 1974, **1,** 192–194.

Konečni, V. J. Annoyance, type and duration of postannoyance activity, and aggression: The "cathartic effect." *Journal of Experimental Psychology: General,* 1975, **104,** 76–102. (a)

Konečni, V. J. The mediation of aggressive behavior: Arousal level vs anger and cognitive labeling. *Journal of Personality and social Psychology,* 1975, **32,** 706–712. (b)

Konečni, V. J. *Effects on agression of arousal- and anger-relevant feedback from aggressive activity.* In preparation. University of California at San Diego, 1977. (a)

Konečni, V. J. *Pairing of anger-reduction with aggressive and non-aggressive activities: Effects on the choice of activity in future cases of anger induction.* In preparation. University of California at San Diego, 1977. (b)

Konečni, V. J. Components of aesthetic "episodes": Antecedents and consequences of aesthetic choice. Paper presented in a symposium entitled *New directions in experimental aesthetics.*

Symposium held at the 86th Annual Convention of the American Psychological Association, Toronto, Canada, 1978. (a)

Konečni, V. J. *Social interaction and musical preference.* In D. Deutsch (Ed.), *Psychology of music.* In preparation. University of California at San Diego, 1978. (b)

Konečni, V. J., & Day, J. *Fear reduction, contingent and noncontingent aggression, and subsequent aggression.* In preparation. University of California at San Deigo, 1977.

Konečni, V. J., & Doob, A. N. Catharsis through displacement of aggression. *Journal of Personality and Social Psychology,* 1972, **23,** 379-387.

Konečni, V. J., & Ebbesen, E. B. Disinhibition vs the cathartic effect: Artifact and substance. *Journal of Personality and Social Psychology,* 1976, **34,** 352-365.

Konečni, V. J., & Sargent-Pollock, D. Choice between melodies differing in complexity under divided-attention conditions. *Journal of Experimental Psychology: Human Perception and Performance,* 1976, **2,** 347-356.

Konečni, V. J., & Sargent-Pollock, D. Arousal, positive and negative affect, and preference for Renaissance and 20th century paintings. *Motivation and Emotion,* 1977, **1,** 75-93.

Konečni, V. J., Crozier, J. B., & Doob, A. N. Anger and expression of aggression: Effects on aesthetic preference. *Scientific Aesthetics/Sciences de l'Art,* 1976, **1,** 47-55.

Kreitler, H., & Kreitler, S. *Psychology of the arts.* Durham, N.C.: Duke University Press, 1972.

Lacey, J. I., & Lacey, B. C. On heart rate responses and behavior: A reply to Elliott. *Journal of Personality and Social Psychology,* 1974, **30,** 1-18.

Leger, G. J., & Rule, B. G. *The relationship between causal attributions and classical conditioning in human aggression.* Paper presented at the workshop entitled *Cognitive processes and behavior* at the Canadian Psychological Association Meetings, Toronto, Canada, 1976.

Levick, M., & Herring, J. Family dynamics as seen through art therapy. *Art Psychotherapy,* 1973, **1,** 45-54.

Meyer, L. B. *Emotion and meaning in music.* Chicago: University of Chicago Press, 1956.

Moles, A. *Thèorie de l'information et perception esthètique.* Paris: Flammarion, 1958.

Moray, N. *Attention.* London: Hutchinson Educational, 1969.

Morris, C. Significance, signification and painting. In R. Lepley (Ed.), *The language of value.* New York: Columbia University Press, 1957.

Munsinger, H. L., & Kessen, W. Uncertainty, structure, and preference. *Psychological Monographs,* 1964, **78,** (9, Whole No. 586).

Neboschick, M. R. A treatment of the psychopathology of depression through inducement of appropriate mood changes by a combination of music and comparable colors with complementary couseling. *Dissertation Abstracts International,* 1975, **35,** 5088.

Novaco, R. W., Stokols, D., Campbell, J., & Stokols, J. *Transportation, stress, and community psychology.* Unpublished manuscript, University of California at Irvine, 1978.

Perkins, D., & Leondar, B. *The arts and cognition.* Baltimore: Johns Hopkins Unversity Press, 1977.

Posner, M. I. Psychobiology of attention. In M. S. Gazzaniga & C. Blakemore (Eds.), *Handbook of Psychology.* New York: Academic Press, 1975.

Rescorla, R. A. Informational variables in Pavlovian conditioning. In G. Bower (Ed.), *The psychology of learning and motivation* (Vol. 6). New York: Academic Press, 1972.

Sargent-Pollock, D., & Konečni, V. J. Evaluative and skin-conductance responses to Renaissance and 20th century paintings. *Behavior Research Methods and Instrumentation,* 1977, **9,** 291-296.

Schachter, S., & Singer, J. E. Cognitive, social and physiological determinants of emotional state. *Psychological Review,* 1962, **69,** 379-399.

Sherif, M. An experimental study of stereotypes. *Journal of Abnormal and Social Psychology,* 1935, **29,** 371-375.

Stokols, D. Environmental psychology. *Annual Review of Psychology,* 1978, **29,** 253–295.

Stokols, D., Novaco, R. W., Stokols, J., & Campbell, J. Traffic congestion, type-A behavior, and stress. *Journal of Applied Psychology,* in press.

Testa, T. J. Causal relationships and the acquisition of avoidance responses. *Psychological Review,* 1974, **81,** 491–505.

Tomkins, S. S. *Affect, imagery, consciousness. Vol. I. The positive affects.* New York: Springer, 1962.

Tomkins, S. S. *Affect, imagery, consciousness. Vol. II. The negative affects.* New York: Springer, 1963.

Treisman, A. Selective attention in man. *British Medical Bulletin,* 1964, **20,** 12–16.

Vitz, P. C. Affect as a function of stimulus variation. *Journal of Experimental Psychology,* 1966, **71,** 74–79.

Wilson, C. V. The use of rock music as a reward in behavior therapy with children. *Journal of Music Therapy,* 1976, **13,** 39–48.