1971

The Effect of Physical Activity and Emotional State on Aggression

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THE EFFECT OF PHYSICAL ACTIVITY AND
EMOTIONAL STATE ON AGGRESSION

BY

ROBERT STEVEN FRAZIER

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF
MASTER OF ARTS
IN
PSYCHOLOGY

UNIVERSITY OF RHODE ISLAND

1971

✓

The psychological literature on hostility catharsis contains two versions which would predict different outcomes of cathartic activity. The most common version of the catharsis hypothesis states that the performance of an aggressive act reduces the instigation to further aggression, assuming that there is no additional frustration. The decrease in frequency of aggressive responses is supposedly due to the reduction of physiological or psychological tension. The revised version of the catharsis hypothesis maintains that anger must be present for the reduction in aggression to occur while the earlier catharsis hypothesis states that any aggressive activity will reduce subsequent aggression.

To test these hypotheses, four groups of juvenile delinquents were tested in four conditions. Two of the groups were angered, two groups nonangered. One angered group and one non-angered group swam while the other two angered and nonangered groups watched a neutral movie. The angered group which swam showed a significant decrease in anger and tendency to aggression. The method used to arouse anger in the subjects was found to be effective and implications for further research were discussed.

ACKNOWLEDGEMENTS

I wish to express my sincere thanks to the many people who made this research possible. I am grateful to the Rhode Island Training School and Mr. Joseph Devine who allowed me to conduct my studies at the training school, as well as the many staff members who helped me in solving the practical problems of running the experiment.

I am especially grateful to the members of my thesis committee who devoted many hours of their time to helping me, my committee chairman Dr. Albert J. Lott and Dr. James Prochaska, Dr. Allan Berman and Dr. Alfred Pascale.

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CHAPTER I

INTRODUCTION

The present experiment studied some aspects of the hostility catharsis hypothesis. More specifically, it investigated the effect of physical activity and state of emotional arousal on a person's tendency to aggress. The most common version of the catharsis hypothesis in the psychological literature maintains that performance of an aggressive act reduces the instigation to further aggression, assuming that there is no further frustration. This decrease in the frequency of aggressive responses is supposedly due to the reduction of physiological or psychological tension. Orthodox psychoanalysts, together with Dollard and his colleagues (1939, p. 50) insist that expression of aggression results in at least a momentary reduction of instigation to aggression regardless of the hostile act's effectiveness in removing the obstacle to the goal directed activity. The expression of aggression is called "catharsis" and the diminution in tendency to aggress as a consequence of such expression of aggression is called the "cathartic effect."

Dollard, Doob, Miller, Mowrer and Sears (1939) defined it in this way: "The expression of an act of aggression is

a catharsis that reduces the instigation to all other acts of aggression." The largely negative experimental findings (e.g., Bandura & Walters, 1963; Berkowitz, 1962), however, have led to a change in the original statement. Buss (1961) and Feshbach (1961, 1964) contend that the cathartic or drive-reducing function of behavior only occurs under certain specified conditions. This revision grew out of the work on modeling of aggressive person stimuli. Witnessing the behavior of an aggressive model supposedly produces decrements in subsequent aggression when the observer has been aggressively aroused at time of exposure to the model. If, on the other hand, the observer's aggressive drive has not been activated during the period of vicarious participation, such exposure augments ensuing aggressive responses. The revised catharsis hypothesis thus presupposes that functional properties of modeling stimuli can be radically altered by transitory emotional states of the observer.

The main difference then, between the old and new catharsis hypothesis is that the first predicts catharsis after the performance of any aggressive act, assuming there is no further frustration. The revised hypothesis requires presence of anger arousal in the subject for catharsis to take place. Without anger arousal, the performance of the aggressive act, or observation of another performing such an act, increases the likelihood of increased aggression.

Studies on catharsis with and without anger arousal (Kenny, 1952; Feshbach, 1956, 1958; Buss & Folliart, 1958)

show that, in the absence of anger, vicarious expression of aggression increases the tendency to aggress and in the presence of anger, vicarious aggression decreases the tendency to aggress. Hornberger (1959) insulted his subjects to anger them and found no differences between angered and nonangered subjects in either fantasy or physical catharsis. Feshbach (1955) also used insult and found that the effect of telling aggressive stories in the presence of anger was to lower the tendency to aggress. Thibaut and Coules (1952) used insulting notes to anger their subjects but found no differences between experimental and control groups. The explanation offered was that the experimental subjects had only minimal opportunities to cathart. Rosenbaum and DeCharms (1960) followed up the Thibaut and Coules study. They were unable to anger half of their subjects using an insult procedure and the results from the other half of the subjects who were angered could not be explained by the catharsis hypothesis. Pirojnikoff (1958) found that with insulted subjects the catharsis group had higher aggression on an attitude questionnaire than the control group. Most of the above mentioned studies found no difference between angered and nonangered groups rather than an increase in aggression in the catharsis group. A widespread problem in studies of this type has been the difficulty in arousing anger as well as demonstrating that anger has been aroused in all the subjects who were supposed to have been angered.

The majority of the studies reviewed show inconsistent

results. One of the factors that might account for the inconsistency is that since anger is only a transient reaction, time is an important variable in catharsis (Buss, 1961). Anger slowly dissipates whether or not aggression occurs, and as the tension state of anger diminishes, the tendency to aggress also diminishes. There is a cathartic effect only so long as anger is present; when sufficient time has elapsed for anger to subside, there is no longer the possibility of a cathartic effect. Since anger is an emotional response, the cathartic effect must involve a lowering of physiological tension. Buss (1961) stated that no study has measured the effect of an aggressive response on the subject's physiological state, and such a study would seem to be an important step in the investigation of catharsis. A later study by Hokanson (1963), however, found that among frustrated subjects the expression of aggression directly to the frustrator resulted in a significant degree of "physiological tension" reduction as measured by diastolic blood pressure (DBP). Baker (1967) found that overt or direct communication of counteraggression to the instigator was the most effective way of achieving physiological reduction of tension as measured by decreases in DBP.

If a catharsis takes place when an act of aggression is expressed it seems likely that the area of competitive sports would be one place to study the effects of catharsis. Berkowitz (1962) attempted to demonstrate the need for an examination of the effects of combative sports on the

instigation to aggression. He stated that, despite the lack of data, or perhaps because of it, many psychiatrists, psychologists, and recreation leaders insist that competitive athletic contests provide a necessary release for pent up aggressive impulses. Berkowitz gives an example of this view as expressed by two prominent psychiatrists speaking within a few years of each other on the topic of mental health. Both G. E. Gardiner (1952) and William Menninger (1948) stated that play brings about a needed release from tensions created by "instinctive" aggressive impulses.

Two studies of aggression in college students attempted to relate TAT aggression to athletic activity. Husman (1955) had boxers, wrestlers, cross-country runners, and nonathletes take the TAT before and after the athletic season (not immediately before and after an athletic contest). The TAT protocols were scored for both amount and direction of aggression. The amount of aggression increased from before to after the season in all the athletes but not in the nonathletes. It may be assumed that all the athletes were reinforced during the season in that they received praise and perhaps, victory and the increased habit strength was reflected in their higher postseason TAT aggression scores.

The boxers had significantly less TAT aggression, in general, than the other three groups. One could argue that the low aggression of the boxers indicates that their aggressive urges were being drained off by aggressive athletic activity, assuming that boxing is more aggressive than

wrestling or track. However, if this were correct, the boxers' TAT aggression from before to after the season would be lowered like the other athletes. It might be fruitful, according to Buss (1961), to regard the boxers as being more aware of the intensely aggressive nature of boxing and defensive about their own aggressive tendencies. This would lead to a decrease in the amount of TAT aggression and to a greater turning inward of TAT aggression, both of which occurred in the boxers.

The study by Stone (1950) investigated TAT aggression in football players and matched controls but obtained different results from those of Husman. During the season, athletes and nonathletes did not differ in TAT aggression, but after the season the football players showed significantly less aggression on the TAT. There are several difficulties in interpreting these results as supporting or not supporting a catharsis hypothesis. First of all, it is possible that anger is more a part of football than other sports and so one might find a cathartic effect in football but not in boxing, wrestling or running. Since the investigators did not measure presence of anger in any of the athletes it is impossible to tell. A second problem is that the studies were on effects over a full athletic season rather than immediately after a game which would be more appropriate for measuring a possible cathartic effect. Finally, in both studies the person who scored TAT protocols knew when they had been administered, and there may have been unconscious bias in scoring for

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aggression.

Ryan (1970) used number of times a subject administered shock to another person as a dependent variable and concluded that vigorous motor activity was not an effective means of lessening aggressive tendencies. However, Ryan failed to demonstrate that the subjects in his anger conditions were actually angered and he may not have allowed sufficient time and opportunity to engage in enough physical activity (the cathartic activity was ten blows with a hammer) for his angered subjects to cathart even if they were actually angered.

Since there is so little experimental research in the area, it seems that a study on the immediate effects of physical activity on the lessening of aggressive responses would be a valuable addition to the field of aggression research. If catharsis takes place when a tension reducing type of behavior is performed, then an activity which reduces tension should effect a catharsis. Assuming that physical activity reduces physiological tension, a person's tendency to aggress and the accompanying physiological tension should be reduced by physical activity according to the early catharsis hypothesis. The later catharsis hypothesis states that there must be anger in order to produce a reduction in tension and if there is no anger present, the level of aggression should remain the same.

Since the present study used adolescents as subjects, it is important to look at the results of a group of studies investigating aggression in adolescents. Since these studies used the TAT to measure aggression, it is also possible to

comment on the usefulness of this testing instrument with this particular population. The results of studies by Miller (1953), Heymann (1955), and Jensen (1957) that attempted to relate TAT indices of fantasy aggression to behavioral aggression were inconclusive. Only one study (Mussen and Naylor, 1954) found a positive relationship between overt and fantasy aggressive behavior. So it seems that although the TAT is a useful indicant of aggressiveness in other populations, it appears to be of little use in assessing aggressiveness in adolescents.

The adolescents used in the present study were juvenile delinquents detained at the Rhode Island Training School for Boys (RITSB). Since sports are used as part of the rehabilitative treatment program, the results of this study may be helpful in evaluating the effect of physical activities on the tendency to aggress. These youths are considered to be generally more aggressive than a normal population of adolescents.

In the present study, two inventories were used to measure the level of aggression and hostility that existed in the subjects. One of these, the Buss-Durkee (1957) inventory, is more of a trait measure of aggression, i.e., a measure of a subject's general and more stable level of aggression. The Multiple Affect Adjective Check List (MAACL) (Zuckerman, M., Lubin, B., Vogel, L., & Valeribus, 1964) is a state measure of aggression, i.e., a measure of how

aggressive a subject feels in the present situation (Spielberger, 1966).

Two independent variables were investigated; presence or absence of physical activity and emotional state of subjects. The physical activity was swimming and the subjects were either experimentally angered or nonangered. The boys in the residential cottages at the RITSB swim at least once during the week. The two experimental swimming groups were run on the night that they ordinarily went to the gymnasium to swim. This was done to keep the experimental conditions as close as possible to the real life conditions at the Training School. Thus, by being in a natural setting, the subjects are less likely to monitor their responses and may be more spontaneous in their behavior.

The dependent variable was the difference between the pretest and posttest MAACL scores. The hypotheses to be tested were that:

- 1) Angered subjects who engage in swimming will decrease in their tendency to aggress more than angered subjects who viewed a neutral move.
- 2) Angered groups, in general, will show a decreased tendency to aggress following either swimming or movie viewing when compared with nonangered groups.
- 3) Nonangered subjects who engage in either swimming or movie viewing will not change significantly in their tendency to aggress.

CHAPTER II

METHOD

Subjects

Seventy delinquents from the Rhode Island Training School for Boys (RITSB) participated in the study. The boys ranged in age from 13 to 18 years. The population contained both Caucasian and Negro youths from a predominantly lower class socio-economic background.

Inventories

Buss-Durkee Hostility Inventory. Hostility inventories typically are of the self-report variety with the content of the items being undisguised. The Buss-Durkee is the most commonly used inventory for measuring the trait of hostility. It is used to get a measure of a person's tendency to be hostile in certain situations. The Buss-Durkee Hostility Inventory consists of 56 items in questionnaire form which subjects mark T (true) or F (false). The items are self-report items which concern the way subjects generally behave in certain situations where they may or may not perceive their actions to be culturally unacceptable. The scoring yields seven subclasses of hostile, aggressive behavior as well as a total summary hostility score. This study used the summary score.

Multiple Affect Adjective Check List. The MAACL was

designed to fill the need for a self-administered test which would provide valid measures of three of the clinically relevant negative affects: anxiety, depression and hostility. The MAACL, as the name implies, is a list of 89 adjectives which the subject is asked to consider and check if he feels that way. Items checked are scored plus and items not checked are scored minus. This test grew out of the Affect Adjective Check List (AACL) measure of anxiety which was developed by Zuckerman (1960) in response to a need for a test instrument designed to measure changes in verbalizable "anxiety". The AACL was expanded by adding scales for depression and hostility by Zuckerman, et al. (1964). The reliability correlations reported show a predictable pattern of high internal reliability coefficients (.90) and low test retest correlations (.15) for the Today form of the test. This form instructs the subjects to answer as they feel "right now" and one would not necessarily expect significant correlations between how a subject feels "right now" and how he feels at some later time. The Buss-Durkee MAACL hostility scores correlated significantly with a questionnaire measure of hostility (.67) and TAT hostility scores (.48). Other data have been reported which attest to the instrument's high reliability and validity (Zuckerman & Lubin, 1965).

Zuckerman and Lubin (1965) report that two important response sets, social desirability and acquiescence, do not appear to be important influences in the MAACL and particularly not in the Today forms of these tests. Zuckerman and

Lubin also suggests that the MAACL is valuable for stress experiments requiring before and after measures of affect.

Minnesota Clerical Test. The Minnesota Clerical Test (MCT) consists of a series of sets of numbers (Andrew, Peterson, & Longstaff, 1933). The subject is instructed to make a check mark on the line between the numbers if they are exactly the same; if they are different, no mark is made. The instructions stress the need for speed and accuracy. Subjects are told to work as fast as possible without making mistakes. The normal time limit is seven minutes. The subjects in the present study will be allowed three minutes.

Procedure

Since there were four cottages at the RITSB and approximately 20 boys in each cottage, these four cottages were used for the four experimental groups. The two activity groups swam while the two control groups engaged in a neutral task (watching a movie). One activity group and one control group made up the two angered groups. The other two groups made up the nonangered groups. The design is represented in Figure 1.

ANGERED		NONANGERED
ACTIVITY (Swimming)	N=19	N=16
CONTROL (Movie Viewing)	N=18	N=17

Fig. 1: A representation of the independent variables interacting in a factorial design.

One week before the experimental sessions, the subjects were administered the Buss-Durkee Hostility Inventory. The Buss-Durkee scores were used to determine whether or not the groups differed in initial aggressive tendencies. At the beginning of each experimental session one week later, the groups took the Minnesota Clerical Test (MCT) but with different instructions to the angered and nonangered groups to begin the experimental manipulation of anger. The two angered groups were told at this point that they would receive a reward if they did well on the MCT. After the MCT was administered, the angered groups were required to wait in silence for five minutes while the tests were corrected, and they were told that they did not succeed and would not get the promised reward. The anger instructions also included the experimenter expressing his own anger and disappointment to the subjects for their poor performance. Care was taken to employ an experimenter who was a stranger to the boys, and so, initially at least, could be perceived by the subjects as a neutral figure. Verbatim accounts of the anger and nonangered instructions and a summary of the procedural steps may be found in Appendix A.

After the subjects were angered, they took the Multiple Affect Adjective Check List (MAACL) as a pretest measure of the effect of the anger instructions. One group then went to the gymnasium for the swimming while the control group watched the movie. The movie used for this study has been rated with respect to its aggressive and hostile content.

The film, "Alaska, Land of Promise", was judged to be a neutral stimulus by three raters who have worked closely with boys at the RITSB. The nonangered groups took the MAACL five minutes after the MCT but were not promised a reward and not deliberately angered. The purpose of the five minute delay was to equate these two groups with the angered groups who also had to wait five minutes between the MAACL and MCT. The posttest MAACL was administered to all groups after the physical activity or movie. The time interval between pretest and posttest MAACL were the same for all groups, thirty-five minutes.

Each subject produced a pretest and posttest score on the MAACL. The difference between the MAACL scores for each subject is the score considered in the analysis of group differences. A two way analysis of variance for unequal n's was employed to test the differences among the groups. In order to minimize the effect of the adjectives checked on the pretest MAACL with the posttest MAACL, the experimenter stressed that the subjects should focus on how they felt "at this moment" and not try to remember how they answered before. At the end of the study, all Ss were rewarded, praised, and the purpose of the experiment explained to them.

CHAPTER III

RESULTS

To test initial differences in hostility, the Buss-Durkee scores (Hostility Inventory), were analyzed for the four groups. The means of the Buss-Durkee scores are shown in Table 1. The subjects' scores ranged from a low of 15 to a high of 75. Table 2 presents the results of a one-way analysis of variance comparing the means presented in Table 1. It can be seen that there were no significant differences among the four experimental groups in their initial level of hostility as measured by the Buss-Durkee Hostility Inventory.

TABLE 1

MEANS OF BUSS-DURKEE HOSTILITY SCORES
FOR THE FOUR EXPERIMENTAL CONDITIONS

	Angered	Nonangered
Swimming	37.5714	43.1250
Movie	41.2142	42.7894

TABLE 2

SUMMARY OF THE ANALYSIS OF VARIANCE
FOR BUSS-DURKEE HOSTILITY SCORES
FOR FOUR EXPERIMENTAL CONDITIONS

Source	SS	df	MS	F	p
Total	5,053.604	62	---	---	---
Between	289.909	3	96.636	1.196	---
Within	4,763.695	59	80.740	---	---

TABLE 3

MEAN AGES IN YEARS OF SUBJECTS IN
FOUR EXPERIMENTAL CONDITIONS

	Angered	Nonangered
Swimming	15.3157	15.9528
Movie	14.7777	13.8695

TABLE 4

SUMMARY OF ANALYSIS OF VARIANCE FOR AGES
OF SUBJECTS FOR FOUR EXPERIMENTAL
CONDITIONS

Source	SS	df	MS	F	p
Total	280.899	78	-	-	-
Between	23.440	3	7.813	2.27	-
Within	257.459	75	3.432	-	-

Table 4 represents the results of a one-way analysis of variance comparing the means presented in Table 3. There are no significant differences among the subjects' ages in the four experimental groups. On the Minnesota Clerical Test the results of t-tests comparing the means of the two angered groups, the two nonangered groups and the angered versus nonangered groups revealed no significant differences between these groups.

TABLE 5
MEANS FOR MINNESOTA CLERICAL TEST SCORES
FOR FOUR EXPERIMENTAL CONDITIONS

	Angered	Nonangered
Swimming	17.7368	16.0625
Movie	18.8333	15.7058

TABLE 6

MEANS FOR PRETEST AND POSTTEST MAACL SCORES FOR
FOUR EXPERIMENTAL CONDITIONS

		Angered	Nonangered
Swimming	Pretest	15.736	10.812
	Posttest	12.684	10.937
Movie	Pretest	14.944	12.170
	Posttest	13.722	11.411

TABLE 7

MEANS FOR THE CHANGE SCORE ON MAACL FOR FOUR
EXPERIMENTAL CONDITIONS

		Angered	Nonangered
Swimming		7.0526	3.8750
Movie		5.2222	4.7647

A t-test comparing the means of the pretest MAACL scores for the angered versus the nonangered groups showed a difference at the .001 level of significance ($t=4.48$), with the angered groups being significantly more hostile than the nonangered groups. An analysis of the pretest scores for the two angered groups found no significant differences, nor was there a significant difference between pretest scores of the nonangered groups. The results of t-tests comparing the pretest and posttest means for each of the four groups separately showed a significant difference only between the means of the angered

swimming groups, with the posttest score being lower (less hostile) than the pretest scores.

Table 7 shows the means for the change scores for the four groups. A change score was obtained for each subject by subtracting the posttest MAACL score from the pretest MAACL score and adding a constant of +4. The addition of the constant was necessary because in some cases the posttest score was larger than the pretest score and a negative number was obtained from the subtraction procedure. The addition of a constant number (+4) insured that the lowest possible score a subject would have was zero, and thus the higher the change score, the greater the reduction in anger. The highest change score a subject obtained was 13, his absolute score being 9.

TABLE 8

SUMMARY OF ANALYSIS OF THE VARIANCE FOR MAACL CHANGE SCORES FOR THE FOUR EXPERIMENTAL CONDITIONS

Source	SS	DF	MS	F	<u>P</u>
Total	506.70	69	--	-	-
Emotion (E)	58.34	1	58.34	9.37	.005
Activity (A)	6.30	1	6.30	1.01	-
E X A	31.19	1	31.19	5.01	.05
Error	410.87	66	6.22	-	-

These results show a significant difference for anger and a significant interaction effect. Thus, the two angered groups had significantly higher MAACL scores than the non-angered groups. This indicates that there was a greater

reduction in anger for the two angered groups in the half-hour between MAACL pretest and posttest than there was for the nonangered groups, because the higher change score indicates a greater reduction in anger.

There is evidence, from the fact that a significant interaction effect was obtained, that a subject in the angered swimming group showed the greatest reduction in anger of the four groups. The next largest reduction occurred in the angered movie group. It is interesting to note that the mean changes score for the nonangered swimming group is less than 4. Considering the addition of the constant (4), this suggests the possibility of a slight increase in anger following swimming when a subject was not aggressively aroused.

The results of t-tests comparing the means for the MAACL change scores show a significant difference between the angered and nonangered swimming groups ($p < .01$) but no other significant differences were found.

CHAPTER IV

DISCUSSION

The results of this study are rather complex. On one hand, physical activity, in the form of swimming, appears to produce a cathartic effect since the angered swimming group showed a greater reduction in anger than the nonangered swimming group. However, if swimming alone was accounting for the cathartic effect, then the angered swimming group should have reported significantly greater reduction in anger than the angered movie group, but this was not the case.

Therefore, the results suggest that swimming, combined with the passage of one half-hour of time, seems to be the variable producing a significant cathartic effect. This conclusion would further explain the significant interaction found in this study. The passage of time alone was not enough to produce a significant cathartic effect since the angered movie group did not report a greater reduction in anger than the nonangered movie group.

It seems from the findings that, since the angered groups reported significantly greater anger reduction, emotional arousal is the important variable in catharsis. The results of this study support the predictions of the revised catharsis hypothesis (Buss, 1961; Feshbach 1961, 1964; Berkowitz, 1962;

Bandura & Walters, 1963) which states that there must be anger in order to produce a reduction in tension. The early catharsis hypothesis is not supported because there was no significant tension reduction in the nonangered groups. The physical activity of swimming apparently reduced the tendency to aggress, perhaps by reducing the physiological tension accompanying the aggressive tendencies.

In order to discuss a cathartic effect it is important to demonstrate that the angered groups were actually angered. This is especially important because of the failure of previous studies (Thibaut & Coules, 1952; Rosenbaum & de Charms, 1960; Ryan, 1970) to demonstrate that their subjects were really angered before the experimental manipulations designed to produce a cathartic effect were performed. The fact that, in this study, the pretest MAACL scores of the angered groups were significantly higher than those of the nonangered groups provides support for the statement that the anger instructions were effective in angering the subjects.

To be confident that it was the anger instructions that worked and the subjects were not already angry at the time of the experiment, it is important to look at the results of the trait measure of anger, the Buss-Durkee Hostility Inventory. The subjects' initial level of hostility might have influenced the outcome of the experiment and possibly contaminated the results. If one group of boys was more hostile and angry than another, then it is logical to assume that they would have scored higher on a measure

of anger such as the MAACL than a less angry group of boys. Since the MAACL was administered after the experimental manipulation of anger (consisting of the subjects' frustration and the anger instructions) it was important to take precautions against initial levels of anger or aggressive tendencies having an influence on the pretest MAACL measure. The finding that the groups were not different in initial level of aggression, i.e., no significant differences in the subjects' Buss-Durkee scores, provides further support for the statement that it was the anger instructions that resulted in the angered groups being more angry than the nonangered groups. Since these instructions produced demonstrable anger, they may be useful in future studies which need to provoke anger in their subjects.

A finding of additional importance is that pretest MAACL scores of the angered groups were not significantly different, indicating that the two groups were equally angered. In addition, the pretest MAACL scores of the nonangered groups were not significantly different suggesting that these groups also were less angry than the two angered groups. These results further suggest that the experimental manipulations were carried out in a standardized, consistent way for the four groups.

Another variable that could have contaminated the results was age but the groups were found not to be significantly different in average age of the subjects. Still another variable that might have affected the results was motivation. Since the MCT was administered to the subjects in the angered groups after they were promised a reward for doing well, the

results of the MCT might be considered a crude indicator of the subjects' motivations to do well on the task. It is possible also to see the MCT scores from the nonangered groups as indicators of their motivation to perform on the task and cooperate in the experiment. If this way of looking at the MCT scores is valid, then the finding of no difference among the four groups on the MCT provides support for the statement that the four experimental groups did not differ in initial level of motivation for performance in this experiment. When this is considered, along with the findings that there exists valid reason to treat the groups as independent with regard to at least some of the variables which might have necessitated matching the subjects or employing an analysis of covariance technique.

Although time is an important variable in catharsis, according to Buss (1961), in this study it was the interaction of time and physical activity which produced the cathartic effect, time alone did not. This suggests that a future study, manipulating the effects of time, would be a valuable addition to the research literature. By shortening and lengthening the amounts of time during which the physical activity is performed and by providing appropriate control groups it should be possible to discover a length of time which would be sufficient to allow anger to dissipate without a physical activity being performed. Also, since it is impossible to have subjects engage in a physical activity without the passage of time, it would be helpful to find a point

at which the maximum is reached, i.e., where the most anger is reduced by swimming and not by time alone.

Another implication from this study is that future studies, investigating the effect of aggressive activities and competitive sports in reducing a person's tendency to aggress (e.g., Husman (1955); Stone, 1950) must control for the effects of physical activity alone.

CHAPTER V

SUMMARY

While the results of this study are rather complex, it is clear that the physical activity, swimming, combined with the one half-hour of time produced a cathartic effect. Time alone did not produce a catharsis, but future studies investigating the effect of greater amounts of time may be successful in demonstrating that anger does dissipate over a period of time. The combination of passage of time and physiological tension reduction was effective in producing a cathartic effect. Future studies are cautioned to control for effects of physical activity when investigating the effect of competitive sports and aggressive activities on catharsis. The anger instructions developed to produce anger in the subjects for this experiment were found to be effective.

The hypothesis that angered subjects who swim would decrease in their tendency to aggress more than those who view a movie was not supported. The hypothesis that angered subjects would show a greater reduction in anger than non-angered subjects was supported as well as the hypothesis that nonangered subjects would not change significantly in their tendency to aggress.

APPENDIX A
ANGER INSTRUCTIONS

Steps for Anger Conditions

Tell subjects: "O.K., there are two tests for you to take. This next test is a hard one. I want you to try your hardest and, if you do well, you will get a reward. This is a good reward so I am sure that you will want to try your hardest. I am sure that you will do well on this test."

Hand out MCT sheets face down. Read instructions to subjects. When everyone has a sheet and understands the instructions, tell them to turn the paper over and begin. Allow subjects three minutes. Collect MCT.

Take papers up to desk at front of room. Tell subjects to remain silent. Spend five minutes looking at the MCT papers and pretending to correct them. Tell subjects: "Well, you guys didn't even try on this. You really screwed it up. I gave this same test to kids at a Massachusetts training school and they did twice as good as you. I am really pissed off at you guys for doing such a lousy job so you can forget about that reward I promised you. You didn't try so just forget about it. Here, take this test and get out." Expand and paraphrase instructions.

Hand out MAACL - instruct subjects to mark how they feel right now.

After swimming or movie is over hand out MAACL again. Instruct subjects to check the adjectives that describe how

they feel at this moment and not try and remember how they checked them before.

E Steps for Nonanger Conditions

- 1) Hand out MCT, face down and read instructions making sure instructions are understood. Have subjects turn paper over and begin. Allow subjects three minutes to work. Collect MCT and spend five minutes pretending to correct them.
- 2) Hand out MAACL. Instruct subjects to check the adjectives that describe how they feel right now.
- 3) After swimming or movie re-administer MAACL. Instruct subjects to check adjectives that describe how they feel at this moment and not to try and remember how they checked it before.

APPENDIX B

RAW SCORES FOR EACH CONDITION

Angered Swimming Group

<u>S</u>	Buss-Durkee	MAACL	
		Pretest	Posttest
1	37	14	14
2	44	20	13
3	40	16	12
4	33	14	12
5	28	10	7
6	32	20	14
7	15	18	17
8	50	15	8
9	31	9	11
10	22	17	16
11	56	13	13
12	54	18	9
13	55	21	12
14	29	15	13
15	37	18	18
16	37	14	11
17	38	12	8
18	37	19	17
19	38	11	16

Nonangered Swimming Group

<u>S</u>	Buss-Durkee	MAACL	
		Pretest	Posttest
1	47	10	12
2	52	15	9
3	44	3	3
4	39	6	8
5	38	6	10
6	30	10	11
7	43	8	9
8	22	14	12
9	50	12	13
10	46	13	12
11	42	14	13
12	52	8	12
13	50	13	15
14	49	14	12
15	42	16	12
16	44	11	12

Angered Movie Group

<u>S</u>	Buss-Durkee	MAACL	
		Pretest	Posttest
1	40	15	14
2	43	18	19
3	40	15	17
4	40	16	15
5	43	21	20
6	45	11	7
7	50	18	15
8	38	18	12
9	29	16	16
10	34	14	13
11	29	9	11
12	43	19	17
13	51	8	8
14	53	14	13
15	41	10	10
16	41	20	20
17	41	11	9
18	41	16	11

Nonangered Movie Group

<u>S</u>	Buss-Durkee	MAACL	
		Pretest	Posttest
1	41	15	15
2	43	11	11
3	37	11	10
4	42	14	14
5	48	10	10
6	40	12	11
7	54	12	12
8	37	13	13
9	42	15	13
10	52	10	12
11	53	15	11
12	45	11	9
13	43	8	6
14	37	14	14
15	49	15	13
16	25	8	9
17	47	13	11

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