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# An Analysis of Weather-Related Factors & Non-Productive Learning Behaviors of Fourth-Fifth & Sixth Grade Students

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Cheser,

Donald Bruce

1977

AN ANALYSIS OF WEATHER-RELATED  
FACTORS AND NON-PRODUCTIVE  
LEARNING BEHAVIORS OF  
FOURTH-FIFTH AND  
SIXTH GRADE  
STUDENTS

A Project  
Presented to  
the Faculty of the  
Department of Counselor Education  
Western Kentucky University  
Bowling Green, Kentucky

In Partial Fulfillment  
of the Requirements for the  
Educational Specialist Degree

by  
Donald Bruce Cheser

July, 1977

AN ANALYSIS OF WEATHER-RELATED  
FACTORS AND NON-PRODUCTIVE  
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SIXTH GRADE  
STUDENTS

Recommended

7/25/77  
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AN ANALYSIS OF WEATHER-RELATED FACTORS AND NON-  
PRODUCTIVE LEARNING BEHAVIORS OF FOURTH-  
FIFTH AND SIXTH GRADE STUDENTS

Donald Bruce Cheser

July 1977

83 pages

Directed by: Emmett D. Burkeen, Stephen B. Schnacke, and  
Delbert J. Hayden

Department of Counselor Education Western Kentucky University

This project is a study of the relationships of weather variables and non-productive classroom behaviors. Four observers recorded behaviors of over one hundred elementary students for a period of fifty days.

The weather variables used in this study may be divided into two major categories; visible and invisible atmospheric conditions. Visible atmospheric conditions included classifying the atmosphere as sunny, fair, cloudy, stormy, rainy, and phases of the moon. Invisible conditions recorded were temperature and barometric pressure.

The non-productive behavior variables included were aggression, arguing, attitude, annoying, bathroom abuse, cheating, destructive, clowning, disobedient, disruptive, ill-mannered, inattentive, lying, name calling, playing, rule breaking, vulgar language, and wasting time. Other variables considered were absenteeism and days of the week.

Several significant relationships existed, but only one null hypothesis was rejected. There was a moderately predictive relationship between absenteeism and temperature.

Recommendations were made which may assist other investigators of weather and behavior relationships.

## CHAPTER I

### INTRODUCTION

This study was concerned with determining if a relationship existed between various atmospheric conditions and non-productive (adverse) learning behaviors within the classroom. Chapter I presents the background and significance of the study, statement of the problem, objectives, terms used, limitations and assumptions of the study.

#### Statement of the Problem

The primary problem was to determine if there were relationships between atmospheric conditions and adverse classroom behaviors. A secondary problem was to determine if interrelationships existed among atmospheric conditions and/or adverse behaviors.

There appeared to be limited research dealing with atmospheric conditions and their relationship to human behavior. Specific research evidence could not be found that dealt with uncontrolled atmospheric conditions and their relationship to non-productive classroom learning behaviors. The related research literature available provided background and information from which the study was approached.

### Background and Significance of the Study

Atmospheric conditions have been hypothesized by educators as one of the chief reasons for day-to-day behavioral changes, but little or no empirical data have been produced by these persons to support their hypothesis. The writer's curiosity to determine if atmospheric conditions do relate to student behavior was a very strong motive for this study.

When discussing atmospheric conditions most will readily generalize that rainy days cause depression and conversely moods are gay when the sun is shining. This writer saw a need to objectively observe student behaviors and simultaneously record current atmospheric conditions to specifically determine if atmospheric conditions do in fact relate to student behavior.

Persons with rheumatism and similar ailments often say that their aches increase on the approach of bad weather (decrease in barometric pressure). Galton hypothesized that the decreased pressure of the air in the cells of the body tend to exert an increased outward pressure against the cell walls; this pressure causes pain in the sensitive tissues of rheumatic persons. He also writes that shifts in barometric pressure could possibly cause despondency, irritability, and other behaviors due to the constricting blood vessels within the brain.<sup>1</sup>

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<sup>1</sup>Lawrence Galton, How Long Will I Live? (New York: MacMillan Publishing Co., 1976), p. 88.

If there is no significant relationship between atmospheric conditions and adverse classroom behaviors then educators should look to other variables for relationships to gain knowledge about behavior. If there is a significant relationship between atmospheric conditions and adverse classroom behaviors then teachers should be made aware of this relationship as they manipulate their classroom environment to provide an optimum educational environment for learning processes to flourish.

This study will be of special interest to most educators who are sensitive to the behavioral changes of their students. A possible elimination of generalizations about weather/behavior will probably be the greatest asset of this study.

Perhaps one should not overlook the possible significance of the moon's relationship to the earth's environment. The tides move with the apparent revolution of the moon around the earth. The gravitation of the passing moon pulls the nearest water a little away from the solid earth beneath it, and at the same time it pulls the whole earth a little away from the water on the farthest side. Thus, the moon sets up two tidal bulges on opposite sides of the earth at the same time. These tides travel around the earth, following the moon except where land stops them.

Many superstitions exist concerning the influence that the moon has on human behavior, especially the new and full moon phases. These superstitions are prevalent even

among many attendants and nurses in today's American hospitals.<sup>2</sup> Arago supports some of these beliefs by stating "that the human nervous system might be affected by the feeble rays of moonlight."<sup>3</sup> Others who have studied human behavior relationships, such as Foissac, attack these superstitions and believe that the moon has no control over the human body.<sup>4</sup>

Past studies have shown that temperature has an effect upon learning efficiency. Lane discovered that learning efficiency in a controlled thermal environment is higher than in a non-controlled one.<sup>5</sup> If indoor temperature demonstrates a significant relationship to student learning efficiency then temperature could also in some way relate to student behavior.

Classroom teachers have accepted as fact that when a storm is coming (fall in barometric pressure) student behavior begins to change from a settled to an unsettled state. Balfour found that the fall of barometric pressure in a controlled environment did affect physiological pro-

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<sup>2</sup>Douglas Kelly, "Mania and the Moon," Psychoanalytic Review 29 (1942): 406.

<sup>3</sup>Ibid., p. 411.

<sup>4</sup>Ibid.

<sup>5</sup>W. R. Lane, Thermal Environment and Learning (Iowa City, Iowa: ERIC Document Reproduction Service, ED 019 816, 1966), p. 7.

cesses and mood.<sup>6</sup> If barometric pressure in a controlled environment can affect persons then barometric pressure in an uncontrolled environment may also affect persons, although maybe more subtly.

Wyon found that certain temperatures evoke high levels of arousal while others dull attention.<sup>7</sup> An improper thermal environment can alter growth, development, and learning.<sup>8</sup> Gilliland states there is reason to believe that for every degree the temperature rises above the optimum (68-72 degrees Fahrenheit), approximately a 2 percent reduction in learning ability occurs.<sup>9</sup>

These studies suggest that there is a relationship between atmospheric conditions and behavior. There is sufficient evidence to warrant further investigation into the relationships of weather and student behavior in a field setting.

The purpose of this study was to create an awareness of weather's relationship to student behavior.

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<sup>6</sup>Malcolm Balfour, "How Weather Can Make You Depressed, Put on Weight and Suffer Health Problems," Enquirer, 2 November 1976, p. 5.

<sup>7</sup>D. P. Wyon, "Studies of Children Under Imposed Noise and Heat Stress," Ergonomics 13 (1970): 604.

<sup>8</sup>Darell Boyd Harmon, Controlling the Thermal Environment of the Co-ordinated Classroom (Minneapolis, Minn.: ERIC Document Reproduction Service, Ed 033 531, 1953), p. 1.

<sup>9</sup>J. W. Gilliland, "How Environment Affects Learning," American School and University 42 (1969): 48.

### Definition of Terms

The phrase adverse (non-productive) classroom behaviors throughout this study refers inclusively to the following terms.

Aggressive: ruthless desire to dominate; starting fights or quarrels; needling and provoking; intentional bumping, nudging; physical struggle.

Arguing: expressing differences of opinion in a loud, disruptive, and angry tone of voice; dispute implying anger in debate.

Attitude: negative or unpleasant manner of acting; feeling, or thinking that shows one's negative disposition, opinion, etc.

Annoying: interfering with the performance of others; to worry, trouble or harass; bothers others

Bathroom Abuse: use of bathroom when physiologically unnecessary; any activity that disturbs others or involves improper use of bathroom facilities

Cheating: practicing fraud or deception; deceive by tricking; copying from student's paper or teacher's keys

Clowning: playing of practical jokes, acting silly; entertaining with antics, tricks, etc.

Destructive: destroying or mutilating other's belongings; damaging or destroying school property

Disobedient: refusing or failing to obey a direct request of the teacher; challenging authority by refusing to carry out instructions



Disruptive: behavior causing a break in the normal pursuit of an experience; rend asunder

Ill-mannered: nonconformance of socially accepted behaviorisms; having bad manners, rude, impolite

Inattentive: so dreamy or lost in thought as not to pay attention to what one is doing, or what is going on around one; aimless wandering of mind away from the immediate situation

Lying: not truthful; telling of a lie or lies; intent to deceive; anything that gives or is meant to give a false impression; consciously denying the truth

Name calling: using language in an abusive manner, swear at; sexual or racial language

Playing: playing with toys or objects during inappropriate time

Rule breaking: not abiding to a decision made by the group or authority in a nondefiant manner; unintentional breaking of rule (forgetfulness)

Vulgar language: language characterized by a lack of culture, refinement, taste, sensitivity; language which is offensive to one's esthetic or moral sense; obscene as offensive to decency or modesty and implies lewdness (obscene gestures); ribald jokes

Wasting time: not engaging in productive activity related to classroom work; doing nothing

Moon phases: there are eight phases, or appearances, that are used to identify the position of the moon and its

relationship to the sun and the earth. Most almanacs, calendars, and people interested in moon phases use only four of these relative position relationships as the moon waxes from new moon to full moon and wanes from full moon back to new moon:

1. new moon - earth's view of the moon is dark due to the earth's blocking the sun's rays to the moon,
2. attendance - refers to the number of students that are present in the population group being observed,
3. special activity - includes those activities in which the entire population is involved.

#### Hypotheses

The basic research hypotheses of this study were as follows:

1. A significant relationship exists between outside temperature and non-productive classroom behaviors
2. A significant relationship exists between barometric pressure and non-productive classroom behaviors
3. A significant relationship exists between the phases of the moon and non-productive classroom behavior
4. A significant relationship exists between visible atmospheric conditions and non-productive classroom behaviors
5. A significant relationship exists between the days of the week and non-productive classroom behaviors
6. A significant relationship exists between

weather and absenteeism

7. A significant relationship exists between the days of the week and absenteeism

#### Basic Assumptions

It was assumed in this study that:

1. The observers objectively recorded all adverse behaviors of which they were aware
2. The observer maintained an alertness and consistency in observing and recording behaviors
3. The observers were trained to recognize defined adverse behaviors
4. No generalizations regarding weather/behavior patterns were allowed to influence the observers
5. The instruments for measuring invisible atmospheric conditions were accurate
6. The observations of the visible atmospheric conditions were accurate and consistent throughout the study
7. The data collected were recorded correctly without intentional manipulation by recorders

#### Limitations of the Study

The limitation that this is a correlation study will possibly influence some readers to accept the findings as a cause and effect relationship. Because no independent variables were manipulated by the writer there can be no inferences made to causations, and all findings are limited to the population used in the study.

A limitation regarding facilities in which the observations took place may possibly be the greatest limitation of the study. The facility consisted of a large area with approximately 3600 square feet of floor space. The area had automatic temperature control with restricted visibility to the outdoors; four windows, each having approximately twenty square feet of clear glass. There were two such windows within four feet of each other located near the center of the east wall (thirty feet from north and south walls). Opposite these two windows were two more on the west wall which is approximately sixty feet across the area. The sound of thunder and/or rain could not be heard from inside the observation area. The exterior conditions of weather or the change of these conditions may not have been apparent to the subject because of this classroom environment.

The restroom facilities were located outside the observation area. This resulted in the subjects having to leave the area and pass through a foyer of approximately fifteen feet by thirty feet. The foyer had approximately one-hundred fifty square feet of clear glass which allowed one to see out the east side of the building. The restroom break would allow the subject to observe the outside weather conditions.

Although the adverse classroom behaviors have been listed and defined by the observers, there is reason to believe that since some behaviors might conceivably be classified under one or more behaviors the behavior classifi-

cation might be subjective. This limitation related only to correlating atmospheric conditions with a specific behavior; the hypothesis concerning weather/behavior used only the total of undesirable behaviors for the day.

A limitation of not using focal subject scoring existed in this study. The observers did not record behaviors of specific individuals during the time of data collection. The subjects (groups of thirty) were observed and adverse behaviors were recorded by the observer in charge of that group at a given time. Three observers were simultaneously recording behaviors, each with a group of thirty students. After a period of approximately one hour the observers rotated groups to begin another observation period with a different group. This continued each day of the study so that each observer recorded behaviors for each group for each of the fifty days of the study. The observers quite possibly were unaware of many behaviors that existed due to the large number of subjects being observed.

Statistical judgments, with reservations, can be made concerning only the population considered for this study. Judgments are proposed that should be useful for further study of pertinent weather phenomena and behavior relationships.

## CHAPTER II

### A REVIEW OF LITERATURE

The purpose of Chapter II was to review the literature related to the study. A sparsity of literature regarding the relationships of weather and behavior seemed to exist. Literature involving related phases of weather and behavior have been included in this review.

#### Exterior Atmospheric Conditions

Bernstein reported fluctuations in activity patterns in a pigtail monkey group relating to weather and seasonal influences. The study covered a period of four years and involved forty-eight pigtail monkeys: no animals were added except by birth. The group was provided protection from extreme weather conditions. Each individual monkey was observed and scored for occurrences of defined responses at specific times of the day.<sup>1</sup>

Some implications from animal behavior, that might be generalized to student behavior are that the monkeys were less active in hot temperatures, were more self-directed in

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<sup>1</sup>I. S. Bernstein, "Daily Activity Cycles and Weather Influences on a Pigtail Monkey Group," Folia Primatologia 18 (1972): p. 391-2.

cold temperatures and traveled more during rainy weather.<sup>2</sup>  
Also non-contact aggression was more pronounced during colder temperatures and contact aggression was equal during rain and cold but less noted during hot conditions.<sup>3</sup>

Play was more pronounced during rainy weather.  
Antagonistic behaviors were noted to occur more frequently at weather extremes and during rainy weather.

Violent physical demonstrations such as cage shaking were never very frequent or excessive except at sunset and during rainy weather.<sup>4</sup>

Rainy weather and cold periods were clearly periods of greater vocal activity with frequencies of three or four times greater than at other times.<sup>5</sup>

A clear diurnal pattern influencing several major activity categories was demonstrated. Many activities peaked at sunset and several showed clear influences of weather extremes.<sup>6</sup>

Goldstein explored relationships between mood and weather involving twenty-two college students by using rating sheets during specified days of the week and specified times of the day. The students recorded their feelings, or mood, wherever they might be. Weather variables included barometric pressure and temperature deviations.

Only seven of the students completed mood ratings for at least seven of the eleven days of the study. Positive

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<sup>2</sup>Ibid., p. 397.

<sup>3</sup>Ibid., p. 396.

<sup>4</sup>Ibid., p. 401.

<sup>5</sup>Ibid., p. 402.

<sup>6</sup>Ibid., p. 413.

evaluation of mood was significantly related to high barometric pressure ( $r=.82$ ), and high activity ratings were also related to high barometric pressure ( $r=.82$ ).<sup>7</sup>

Three of the four males in the study had higher belief in external-control scores and accounted for eight of the significant correlation, suggesting that sex, belief in external control or both,<sup>8</sup> may be related to reactivity to the weather.

Faust, Weidmann, and Wehner randomly selected 1600 pupils between thirteen and twenty years of age to participate in a subjective weather-sensitive project. The study mainly concentrated on recording of subjective feelings during changes of weather. Of the subjects in the study, 23 percent claim to be sensitive to the weather; weather changes affect them either psychologically or physiologically (e.g. fatigue, dysphoric moods, pressure sensations, tendency to make mistakes, insomnia, dislike of work, discomfort, irritability, restlessness, headaches, nervousness, moist palms, and lack of concentration).<sup>9</sup>

More than one-half of the subjects classed as weather-sensitive reported that they were sensitive a few hours before a change of weather. Infants were reported to be influenced by changing weather. Females were found to be affected more than males by weather changes.

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<sup>7</sup>Kenneth M. Goldstein, "Weather, Mood, and Internal-External Control," Perceptual and Motor Skills 35 (1972):p.786.

<sup>8</sup>Ibid.

<sup>9</sup>V. Faust, M. Weidman, and W. Wehner, "The Influence of Meteorological Factors on Children and Youths," Acta Paedopsychiatrica 40 (1970): p. 155.



One quarter of all young people claim changes of well-being due to meteorological circumstances. This fact should be known to clinics, homes and schools. Many incomprehensive reactions can be explained very well by knowing this. One should not be influenced by common idioms, "it's just the weather", and overlook the fact mentioned.<sup>10</sup>

Hour-by-hour weather data was obtained during the evening hours of greatest concentration of homicides (7:00 PM to 2:00 AM) by Pokorny and Davis. Eleven weather variables were used as dependent variables and a list of homicides were obtained from the Houston Police Department. Apparent correlation led to some high correlations but true correlations were worked out to evidence a low correlation.<sup>11</sup> No single significant relationship was found. Month and season showed no significant relationship. It was concluded that homicide is not significantly related to weather phenomena.

Balfour indicated that weather influences people psychologically and physiologically. A drop in atmospheric pressure can result in weight gain by the fact that due to this pressure decrease, liquids leave the intestinal tract to travel into the body tissues which causes persons to drink more fluids to replace the lost ones, thereby causing persons to gain weight and not know why.<sup>12</sup>

Job performance, in a fifty year study, was adversely

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<sup>10</sup> Ibid., p. 154.

<sup>11</sup> Alex D. Pokorny and Fred Davis, "Homicide and Weather," American Journal of Psychiatry 120 (1964): p. 808.

<sup>12</sup> Malcom Balfour, "How Weather Can Make You Depressed, Put on Weight and Suffer Health Problems," Enquirer, 2 November 1976, p. 5.

affected during low barometric pressure readings: seventy-four percent of all serious accidents occurred during low readings. Balfour states that as the barometer rises so does our ability to think and feel happy. Conditions that precede a rainstorm were duplicated in a laboratory climate chamber, and into this chamber were placed arthritic patients who within minutes complained of increased pain and stiff and swollen joints.<sup>13</sup>

Galton states in his book that when weather changes the body has to make an adjustment; most of the time adjustments are easy and automatic.

One of the most dramatic changes is the swelling and unswelling of tissues with barometric shifts. Tissue swelling increases pressure within the brain which may squeeze the blood vessels against the skull and restrict the flow of blood leading to despondency, irritability, and loss of mental acuity. Life becomes rosier and mental acuity rises again when atmospheric pressure, rises and extra water is squeezed out of the tissues.<sup>14</sup>

Arthritic patients, in a climate chamber, experienced pains; and joints became stiff and swollen when investigators duplicated atmospheric conditions preceding a rainstorm. Galton believes that weather can weaken resistance to diseases; for example, a sudden drop in temperature seems to affect asthma patients.

Weather can make people excited, blue, lazy, ambitious, nervous, or calm. It's almost as if

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<sup>13</sup>Ibid.

<sup>14</sup>Lawrence Galton, How Long Will I Live? (New York: Macmillan Publishing Company, 1976), p. 88.

man were kind of a barometer.<sup>15</sup>

Police records in large cities indicate that more acts of violence, including suicides, occur when barometric pressure falls below 30.00 inches. A fifty year study in one large industrial plant revealed that 74 percent of all lost-time accidents took place when the pressure was under 30.00 inches.<sup>16</sup>

Galton states that people are often less mentally efficient on foggy days than on fair days, and cites an example from England where the Bank of England's important files were locked on very foggy days because of the high percentage of errors occurring on such days.

The best bet is to learn to live with the weather. Find out, by keeping a record for a time, the kind of weather that gets you down. Even if you can't avoid it, you can take it into account.<sup>17</sup>

#### Atmospheric Pressure

Williams and Cohen conducted a pilot study relating to atmospheric pressure changes and bodily discomfort for purposes of determining thresholds for perception of change. The pressure changes could be detected when decreased by .042 psi and increased by .038 psi.<sup>18</sup>

Thresholds for the detection of the direction of pressure changes were .062 for decreases and .046 psi for increases. Reports from subjects indicated that the ears are the primary and most sensitive

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<sup>15</sup> Ibid., p. 92.

<sup>16</sup> Ibid., p. 93.

<sup>17</sup> Ibid., p. 94.

<sup>18</sup> Douglas H. Williams and Edwin Cohen, "Human Thresholds for Perceiving Sudden Change in Atmospheric Pressure," Perceptual and Motor Skills 35 (1972): p. 438.

detector of pressure change; larger pressure changes are also sensed by the body as a whole.<sup>19</sup>

Dockery conducted a study to determine if atmospheric conditions affect behavior. Three schools, each with a different design, three teachers, and twenty-nine students were videotape-recorded twice each during the months of January and April: once during stable atmospheric conditions and once during unstable conditions. Trained observers then viewed the recordings and categorized the behaviors into nineteen indices. No significant differences were noted in behavior between stable and unstable conditions, but the data indicated that students were more attentive during stable conditions. Better work habits were exhibited during stable conditions in the schools with windows.<sup>20</sup>

Seitz states that more attention has been given to student comfort-level environment than to the influences upon student behavior. Temperature has in particular been studied while atmospheric pressure has tended to be ignored. Some educators are suggesting that school buildings be pressurized, without proper research to substantiate such elaborate undertakings. Seitz's research hypothesis is "that man is either pressure adaptable or pressure immune within normal

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<sup>19</sup>Ibid.

<sup>20</sup>Eaton Ray Dockery, "A Study of the Effects of Atmospheric Conditions Related to Teacher and Student Behaviors" (Ph.D. Dissertation, University of Tennessee, 1975), p. 5018.

ranges."<sup>21</sup> Normal ranges were not defined in the abstract. Control and experimental groups consisting of Negro college students were measured on task of authentic computation, skilled clerical, and immediate memory under normally rising and falling atmospheric pressure. Seitz's research hypothesis was not rejected.<sup>22</sup>

Smyth and Cowley subjected various samplings of mice to increased barometric pressures and found that this increase adversely affects performances in a Y maze. The results also showed that a high mortality rate existed among the mice that were subjected to increased barometric pressure.<sup>23</sup>

#### Moon Relationships

A study by Blackman and Cataline was prompted by superstitions of an emergency room staff in a mental health center. Admissions to the center were compared with the moon phases. A higher admission rate was found to be on full-moon days.<sup>24</sup>

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<sup>21</sup>C. H. Seitz, "Classroom Performances on Three Intellectual Tasks Under Normal Fluctuations in Atmospheric Pressure" (Ph.D. Dissertation, University of Tennessee, 1975), p. 5018.

<sup>22</sup>Ibid.

<sup>23</sup>S. A. Smyth and J. J. Cowley, "The Effects of an Increase in Barometric Pressure at an Early Age on the Ability of Mice to Learn Y Maze," Psychologia Africana 16 (1975): p. 7-9.

<sup>24</sup>Shelton Blackman and Don Catalina, "The Moon and the Emergency Room," Perceptual and Motor Skills 37 (1973): p. 624-5.

That there was no difference in numbers between the days of the full moon and the period afterwards may be the result of a residual full-moon effect, that gradually dissipate.<sup>25</sup>

Pokorny found, despite the apparent positive relationship of the moon and suicide proposed by Tholuck and Spann, that there is no relationship between moon phases and suicide. Pokorny conducted a study which covered three years and 2497 suicides and 2017 homicides. He found that both the suicides and homicides occurred equally among the phases.<sup>26</sup>

Kelly began a study in an attempt to understand the reason for lunar superstitions. Many psychological and physiological disorders were cited that were proposed to have happened due to the positions and influences of the moon. Kelly firmly suggests alternate causes of such behaviors:

. . . the moon is an excellent clock, and if not the cause of many surprising occurrences, it gives just indication of them.<sup>27</sup>

#### Interior Atmospheric Conditions

Lane discovered that there is a significant relationship between the thermal environment and efficient learning. Lane's major purpose when he began his study was

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<sup>25</sup>Ibid.

<sup>26</sup>Alez D. Pokorny, "Moon Phases, Suicide, and Homicide," American Journal of Psychiatry 121 (1964): p. 66-7.

<sup>27</sup>Douglas Kelly, "Mania and the Moon," Psycho-analytic Review 29 (1942): p. 416.

to try and discover interrelationships among thermal conditions, intelligence, and learning efficiency. Two kinds of environment were selected: marginal and model. The marginal environment classroom limits of temperature, humidity, and air movement were determined by instrument readings in the classroom. There was no more control of these conditions than there would be in a regular classroom.

In the model classroom the temperature was maintained between 70 to 74 degrees Fahrenheit and the air movement between 30 and 40 feet per minute in the occupied area. Several times weekly both groups were given tasks involving clerical, routine, and reasoning activities. The subjects in the model environment improved more than the control group in the marginal environment. Also it was discovered that the learning efficiency of high ability students was more positively affected by a model environment than that of low ability students.<sup>28</sup>

. . . energy sources, light reflectances, color heat, humidity, air movements, density of surface materials, and the like could alter or interfere with optimum psycho-physical and physiological efficiency in task performance. . .<sup>29</sup>

Harmon conducted a study which was primarily concerned with the thermal environment within the classroom, but his statement above is relevant to this study. Harmon

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<sup>28</sup>W. R. Lane. Thermal Environment and Learning (Iowa City, Iowa: ERIC Document Reproduction Service, ED 019 816, 1966), p. 41.

<sup>29</sup>Darrell Boyd Harmon. Controlling the Thermal Environment of the Co-ordinated Classroom (Minneapolis, Minn.: ERIC Document Reproduction Service, ED 033 531, 1953), p. 6.

views external factors (e.g. temperature) as a force with which the human organism constantly strives to equalize, and thereby maintaining internal and external equilibrium.

It is essential to the life of the organism to maintain certain constant energy states, but in using its tools in response to environmental stimulation it is continuously losing energy in all directions.<sup>30</sup>

Gilliland assumes that when temperatures are not within a comfort range then children react in physiological or psychological ways instead of a practical manner. "The human organism is highly complex and does not function well at high or low temperatures."<sup>31</sup>

Gilliland stresses the importance of providing an optimum thermal environment that allows the student sound conditions for a good learning environment.

There is some indication that students may experience approximately two percent reduction in learning ability for every degree that the room temperature rises above the optimum temperature range of 70 to 75 degrees Fahrenheit.<sup>32</sup>

Rohles conducted a study as an effort to determine a comfort range of air (dry-bulb) temperature range. Subjects (1600) were placed in various temperature conditions. The selected modal comfort envelope for temperatures was between 75.9 and 79.7 degrees Fahrenheit.

Within this envelope 94 percent of the subjects were either slightly cool, comfortable, or

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<sup>30</sup>Ibid., p. 18.

<sup>31</sup>J. W. Gilliland, "How Environment Affects Learning," American School and University 42 (1969): p. 48.

<sup>32</sup>Ibid.



slightly warm; 3 percent were cool and 3 percent were warm; and none were hot or cold.<sup>33</sup>

Wyon, in a study, intended to focus on human reactions to minor changes in the environment. His available literature provided no grounds for believing that performance would be affected below an air temperature of 36 degrees centigrade.

. . . yet it is commonplace among teachers that school performance does deteriorate on even moderately warm days.<sup>34</sup>

Observations indicated that successive changes in posture occurred with increasing temperature. Temperature changes also resulted in less efficiency of multiplication processes.

All of the experiments, using simple tasks very similar to ordinary school work, did show quite marked effects due to temperatures that occur quite frequently in occupied classrooms.<sup>35</sup>

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<sup>33</sup>Fredrick H. Rohles, "The Modal Comfort Envelope and its Use in Current Standards," Human Factors 16 (1974): p. 314.

<sup>34</sup>D. P. Wyon, "Studies of Children Under Imposed Noise and Heat Stress," Ergonomics 13 (1970): p. 604.

<sup>35</sup>Ibid., p. 607.

## CHAPTER III

### SUBJECTS AND PROCEDURES

#### Subjects

The subjects in this study were the total population of a four-classroom, open-concept, educational unit housed in a temperature-controlled, carpeted facility having approximately 3600 square feet of floor space. The population consisted of an intact group of 120 elementary students ages eight to twelve. They were heterogeneously grouped and comprised all three of the school's fifth grades and the overflow of the fourth and sixth grades of the same school.

The subjects were able to see, hear, and be aware of other subjects outside their class area because there were no walls separating four class areas. The subjects moved from one class area to another from 0850 until 1300 hours, i.e., each subject visited each area on a rotating basis. Each subject was with each of the observers for a minimum of one hour: homeroom approximately three hours.

#### Procedures in Development of Behavioral Instrument

The teachers in charge of this unit acted as observers for the study. All four teachers had one year of prior experience within this unit. The four observers,

with combined teaching experience of thirty years, acted as a committee to compile a list of behaviors that they viewed as adverse. The book Classroom Behavior from A to Z, by Dale Rice, was used as a general guide to supplement the list of behaviors compiled by this committee.

Each behavior listed was defined by the committee members with the aid of the dictionary and the book Classroom Behavior from A to Z. This list was then made available to the entire school teaching staff. The staff was asked to comment and to suggest changes in the form of clarification, eliminations, and/or additions. The teachers' revisions were considered by the committee. The next meeting of this committee was devoted to the further clarification of each listed behavior. After finalizing the list it was then approved for use in the study.

Each observer submitted to the author of this study a list enumerating types of behaviors observed from 0850 hours until 1500 hours of each day that school was in session. This observance continued for a period of fifty days of regular school session. The author then collated the behaviors and frequencies of occurrences and recorded them on a summary form used for the statistical analysis.

#### Procedures in Gathering Weather Data

The author personally read and recorded barometric pressure readings from a barometer of the aneroid type, which reacts to slight changes in atmospheric pressure. It

was located in the author's home approximately one-half mile from the facility at which the study took place. The barometer was calibrated with the local weather station's barometric readings. There was a weekly check with the weather station to ascertain the accuracy of the barometer.

Each day at 0800 and 1600 hours the barometric pressure was noted and recorded on a summary form for the day. The change of pressure was recorded on the summary as change. The readings were recorded in millibars. The change was prefixed by a plus sign if the pressure had risen and by a minus sign if the pressure had lowered. A zero indicated no change from 0800 to 1600 hours.

Temperature readings used in this study were taken from local radio broadcasts at 0800 and 1200 hours. These temperature readings were recorded on the daily summary form.

Visible atmospheric conditions were classified and recorded on the summary form at 0800 and 1200 hours. Other recordings made on the summary form at the end of the day were day of the week, attendance, and phase of the moon.

#### Procedures for Treatment of Data

The statistical analysis for this study involved the use of the SPSS (Statistical Package for Social Sciences) computer service procedure. The data collected was punched on fifty cards, one for each day of the study.

There were twenty-eight variables which included

weather and behavior observations, and other pertinent information.

1. variable 1 . . . . . date
2. variables 2-8 . . . . . weather
3. variable 9 . . . . . day
4. variables 10-27 . . . . . behavior
5. variable 28 . . . . . absentees

General frequency distributions with all statistics were run on each of the variables to determine means, variances, standard deviations, and means of observing possibly meaningful frequencies. Frequencies were also run on both the changes in temperature and barometric pressure between the hours of recording.

A Pearson correlation was computed to determine relationships among the variables of weather and behavior then between each of the weather variables to each of the behavior variables. The .05 level of significance was accepted for existence of significant correlational relationships. The changes in barometric pressure and the changes in temperature were correlated with each of the behavior and attendance variables. The sum of all behaviors were correlated with each of the weather variables.

Variables 10 through 28 were factored to determine possible groupings of behavior. The factoring process was vari-max rotation. Regression of the factors was also computed. The factors determined were dependent variables for a correlational matrix with the weather variables;

variables 2-9.

Each of the variables six through nine has divisions within itself, therefore an analysis of variance was computed of the total of the behavior variables and each of the behavior variables and variables 6-9. The factored behavior variables were also analyzed for variance with variables 6-9. The .05 level of significance was used. For purposes of this research the .05 level of significance was used. Those relationships that approach this level of significance, but do not cross above, were considered as to their possible importance to the topic.

In the event that a relationship to .05 was found between any one of the atmospheric indicators and adverse behavior, it was assumed that a rather significant relationship does exist. If none of the independent variables (weather) reaches the required level of significance in their comparison with the measures of behavior, but there does seem to be some pattern of association, this pattern was reported and suggestions made as to its relevance. A reliability analysis to determine the variation of recordings among the observers was computed.

Upon examination of results from aforementioned procedures other statistical computations were necessary to further determine relationships between weather and behavior which will be discussed in Chapter IV.

## CHAPTER IV

### FINDINGS OF THE STUDY

#### Presentation of the Data

Frequency distributions were constructed on all weather behavior data. The following information concerning the weather frequencies is intended to familiarize the reader with the weather conditions that existed during the study.

The distributions of barometric pressure as read at 0800 hours revealed that the most frequent readings, in millibars, were 1019(7), 1024(5), and 1023(4). At 1600 hours the readings that were most frequent were 1023(9), 1019(6), 1016(5), and 1024(4). Pressure readings were recorded from a range of 1110 millibars to 1055 millibars, which yielded a mean pressure of 1023, a median of 1023, and a standard deviation of 8.16 millibars.

Fahrenheit temperature readings at 0800 hours revealed that temperatures 42 to 43(8) degrees were most frequently recorded. At 1200 hours 69(5) degrees temperature was the most frequent and the temperatures 45, 48, and 74 were recorded the next most frequent with three (3) occurrences each. The 0800 hours temperature range was from 21 degrees to 72 degrees with a mean of 48.5, a median

of 46.5, and a standard deviation of 13.4 degrees of Fahrenheit. The 1200 hours temperature range was from 34 degrees to 85 degrees with a mean of 61.9, a median of 65.6, and a standard deviation of 14.8 degrees Fahrenheit.

Conditions of the atmosphere at 0800 hours were recorded as cloudy (24), rainy (4), and fair (22). At 1200 hours these conditions were recorded as sunny (22), cloudy (9), rainy (3), and fair (16). These conditions are ordinal, therefore the statistics of mean, median, and standard deviation would be inaccurate if computed.

The distribution of moon phases during the fifty-day period of study were as follows: first quarter (15), full moon (16), last quarter (10), and new moon (9). The days of the week over the same period recorded Monday (10), Tuesday (9), Wednesday (11), Thursday (11) and Friday (9).

TABLE 1  
FREQUENCIES OF BEHAVIOR INDICES  
USED BY OBSERVERS

Behavior	Number	Behavior	Number
Aggression	31	Disruptive	274
Arguing	3	Ill-mannered	26
Attitude	3	Inattentive	19
Annoying	71	Lying	5
Bath. Abuse	42	Name Calling	5
Cheating	2	Playing	16
Clowning	163	Rule Breaking	215
Destructive	11	Vulgar Lang.	3
Disobedient	153	Wasting Time	359

Table 1 uses the behavior indices that were used to record the observations as occurred. Table 2 uses the behavior indices of combinations of the behavior dependent



variables as factored by the vari-max rotation statistic procedure.

Table 3 illustrates the frequencies of behaviors when certain behaviors are grouped into four behavioral categories.

TABLE 2

FREQUENCIES OF BEHAVIOR INDICES BY  
VARI-MAX ROTATION FACTORING

Behaviors	Factor	Number
Annoying	ANNOYI	71
Arguing, Name Calling	ARGNAM	8
Attitude, Cheating	ATTCHE	5
Disruptive, Playing	DISPLA	290
Destructive, Ill-mannered	DESILL	37
Wasting Time	WASTIN	359
Lying, Rule Breaking	LYRULE	220
Disobedient, Inattentive	DISOIN	172
Bath. Abuse, Vulgar Lang.	BATVUL	45
Aggression, Clowning	AGGCLO	194

TABLE 3

FREQUENCIES OF BEHAVIOR INDICES  
BY AUTHOR'S GROUPINGS

Behaviors	Number
Aggressive (aggression, arguing, disobedient, name calling, vulgar language) AGGRES	305
Goofing (annoying, clowning, playing, wasting time) GOOFIN	609
Anti-Social (cheating, destructive, ill-mannered, lying, rule breaking) ANSOCL	259
Learning Climate (attitude, bathroom abuse, disruptive, inattentive, absenteeism) LEACLI	328

The changes in barometric pressure readings from 0800 and 1600 hours were recorded in millibars as no change (0), rise (+), and fall (-). Thirty-four of the fifty changes recorded were centered around no change and one millibar changes: ten days (-1), sixteen days (0), and eight days (+). A mean of .32, a median of .06, and a standard deviation of 2.48 millibars was computed for these changes.

Outside temperature changes were calculated from the 0800 hours and 1200 hours Fahrenheit readings in degrees. There was one recorded drop in temperature from 0800 to 1200 hours; a drop of two degrees. The changes in temperature ranged from a two-degrees drop to a twenty-nine degree rise. The most frequent changes of the study period were sixteen degrees (5), fourteen degrees (4), twelve degrees (12), and eight degrees (4). For these changes a mean of 13.5, median of 13.5, and a standard deviation of 7.68 degrees was calculated.

#### Analysis of Data

A Pearson correlation was used to determine relationships between each of the independent variables (weather), between each of the dependent variables (behavior) and between each of the independent variables and each of the dependent variables. Table 4 illustrates the significant relationships between each of the independent variables. The correlation shown in Table 4 illustrates that barometric pressure and outside temperature have a significant inverse relationship;

TABLE 4  
SIGNIFICANT CORRELATION COEFFICIENTS  
BETWEEN WEATHER VARIABLES

Variables	r	P
Pressure (0800), Temperature (0800)	-.23	.052
Pressure (1600), Temperature (0800)	-.25	.040
Pressure, Moon Phases	.24	.049
Temperature (0800), Temperature (1200)	.86	.001

that is, when the temperature rises, pressure decreases and as pressure increases, temperatures dropped during the study period. Since the correlations are not very high and these variables were not grouped for further analysis this information was used only to familiarize the readers.

#### Barometric Pressure

There was a significant correlation between the behavior variables aggression and arguing ( $r=.29$ ,  $P=.020$ ) and between arguing and name calling ( $r=.66$ ,  $P=.001$ ). As Table 5 illustrates these three dependent variables are significantly correlated to the independent variables of barometric pressure. As the barometric pressure increased so did the occurrences of the three behaviors of aggression, arguing, and name calling.

Seventy-three percent (1019 occurrences) of all behavior recorded occurred within the barometric pressure readings 1024 and 1014 millibars. The mean barometric pressure for the study was 1023 millibars. Since thirty-six of the fifty days (72 percent) had barometric pressure readings in this lower range these relationships have no

TABLE 5

SIGNIFICANT CORRELATION COEFFICIENTS BETWEEN  
BAROMETRIC PRESSURE AND BEHAVIOR VARIABLES

Behavior variables	0800 r	Recordings P	1600 r	Recordings P
Aggression	.23	.052	.24	.045
Arguing	.55	.001	.53	.001
Name Calling	.38	.003	.41	.002

significance when more fully analyzed. The highest significant daily average for behavior recordings did occur at the pressure readings between 1010 to 1014 millibars. (See Table 32 in Appendix A).

When the dependent variables attitude, bathroom abuse, disruptive, inattentive, and absenteeism were grouped as the variable learning climate (LEACLI) and this variable correlated with barometric pressure change a positive correlation of .40, with a significance level of .002 was computed. Also the vari-max factor analysis variable DISPLA (disruptive and playing) showed a positive correlation of .40, significance level of .002 when correlated with pressure change. The variable, disruptive, also showed a significant correlation ( $r=.41$ ,  $P=.002$ ).

More behaviors were recorded for a proportionate time when the barometer rose five millibars from 0800 to 1600 hours than any other change in barometric pressure. Nine percent of the behaviors were recorded for 6 percent of the time. The change that recorded the least proportionate behaviors was the one millibar rise from 0800 to 1600.

This range recorded 11 percent of the behaviors in 14 percent of the study's duration.

Of the total behaviors recorded, the positive change in barometric pressure indicated 32 percent of recorded behaviors for 34 percent of length of study, whereas the negative change in barometric pressure indicated 35 percent of recorded behaviors for 34 percent of length of study.

The dependent variables AGGRES (aggression, arguing, name calling, disobedient, and vulgar language) when correlated with barometric pressure, a significant positive relationship was computed. Barometric pressure recordings at 0800 had a positive correlation of .30 with a significance level of .016 with the variable AGGRES. Pressure recorded at 1600 when correlated also had a positive correlation of .29, with a significance level of .022 with the variable AGGRES.

#### Temperature

No significant relationships were found between annoying and disruptive, annoying and rule breaking, and disruptive and rule breaking. These three behavior variables, as illustrated in Table 6, are significantly correlated to the weather variable of outside temperature at both the 0800 and 1200 recording times. The inverse relationships of the variables annoying and disruptive indicate that in this study that as the temperature rose the occurrences of these behaviors decreased and as the tempera-

TABLE 6

SIGNIFICANT CORRELATION COEFFICIENTS BETWEEN  
OUTSIDE TEMPERATURE AND BEHAVIOR VARIABLES

Behavior variables	0800 r	Recordings P	1600 r	Recordings P
Annoying	.23	.051	.28	.023
Disruptive	-.37	.004	-.46	.001
Rule breaking	-.27	.030	-.27	.028

ture dropped the occurrences of these variables increased.

As Table 6 illustrates the dependent variable annoying has a significant positive relationship to outside temperature. This indicates that as the temperature rose the occurrences of annoying behaviors were increased. As the temperature of the atmosphere increased the occurrences of annoying behaviors increased and the occurrences of disruptive and rule breaking behaviors decreased, and vice versa.

The temperature range of 67 to 73 degrees Fahrenheit recorded at 0800 had the least behaviors recorded in relationship to the time period of the temperatures. There were 9 percent of the behaviors recorded between 67-73 degrees which was recorded for 12 percent of the time. The temperature range of 39-45 degrees recorded at 0800 had 27 percent of the behaviors recorded for 22 percent of the study period.

At the 1200 hours recording the least behaviors recorded in relation to time period was the range of 60-66 degrees Fahrenheit. Eight percent of the behaviors for 10 percent of the study period was recorded. The range of 67-73

degrees recorded 25 percent of the behaviors for 20 percent of the study period (See Table 36 in Appendix A).

When the dependent variables attitude, bathroom abuse, disruptive, inattentive, and absenteeism were grouped as the variable learning climate (LEACLI), and this variable correlated with temperature change, a negative correlation of .27, with a significance level of .029 was computed. Temperature change had significant correlations with variables destructive ( $r=.23$ ,  $P=.052$ ), disruptive ( $r=.24$ ,  $P=.045$ ), and inattentive ( $r=.28$ ,  $P=.023$ ).

The temperature change that resulted in a higher percent of behavior recordings was the range of a rise of 28-30 degrees Fahrenheit. Seven percent of the behaviors were recorded for 4 percent of the time for this range. The next closest to this was the range of 4-6 degrees with 14 percent of the behaviors occurring for a period of 12 percent of the time. The period that reflected the least amount of behaviors for the study was the temperature range of 16-18 degree rise; 11 percent of the behaviors were recorded for 14 percent of the time of the study. The outside temperature readings at 1200 hours, when correlated with the sum of the dependent variables computed a negative correlation of .23 at the significance level of .051.

As shown in Table 7 outside temperature readings recorded at 1200 hours computed a positive correlation of .23 at the significance level of .055 when correlated with the dependent variable AGGRES. A negative correlation was

TABLE 7  
CORRELATION COEFFICIENTS OF TEMPERATURE  
AND GROUPED DEPENDENT VARIABLES

Variable	Time	Coefficient	Significance
AGGRES	0800	.21	.067
AGGRES	1200	.23	.055
GOOFIN	0800	-.03	.417
GOOFIN	1200	.01	.486
ANSOCL	0800	-.25	.039
ANSOCL	1200	-.23	.054
LEACLI	0800	-.51	.001
LEACLI	1200	-.61	.001

found to exist between both outside temperature recording times and the dependent variables ANSOCL (cheating, destructive, ill-mannered, lying and rule breaking) and LEACLI (attitude, bathroom abuse, disruptive, inattentive, and absenteeism).

#### Moon Phases

The Pearson correlation computed positive relationships between the moon phases and three dependent variables; aggression ( $r=.26$ ,  $P=.032$ ), destructive ( $r=.25$ ,  $P=.038$ ), and disruptive ( $r=.25$ ,  $P=.043$ ). A negative relationship was found between the moon and lying; ( $r=-.23$ ,  $P=.050$ ). No significant relationships existed among these dependent variables. An analysis of variance of the variable aggression and the moon phases showed a F ratio of 2.9 and a probability of .031 level of significance. The new moon phase had the highest mean of 1.33 with a 95 percent interval range of .47 to 2.19 occurrences of aggressive behavior. The highest mean (36.1) was found to exist for the new moon



phase when all behavior variables were considered together.

TABLE 8  
BEHAVIOR OCCURRENCES AS RELATED TO  
THE PHASES OF THE MOON

Moon phases	Behaviors		Daily Mean	Time %
	No.	%		
First Quarter	430	31	28.6	30
Full moon	386	28	24.1	32
Last quarter	261	19	25.9	20
New moon	324	23	36.1	18

Table 8 illustrates the total behavior recordings during the moon's phases. As Table 8 indicates the new-moon phase has a greater proportion of recorded behaviors than the other three phases. This phase has 23 percent of recorded behaviors that occurred, during 18 percent of the study's duration. The full-moon phase recorded 28 percent of the behaviors in 32 percent of the study's length.

#### Atmospheric Conditions

An analysis of variance of the total of the dependent variables and atmospheric conditions, of each of the factored dependent variables and atmospheric conditions computed no significant relationships at the .05 level. Of the fifty-day study period, at 0800 hours, twenty-four days were cloudy, four days were rainy, and twenty-two days were fair. At the 1200 hours recording twenty-two days were sunny, nine were cloudy, three were rainy, and sixteen days were fair.

During conditions described as fair, at both 0800

and 1200 hours, an average of a 2 percent difference was noted between the number of behaviors and amount of times fair conditions existed. Thirty-six percent of the behaviors were recorded during 38 percent of the time of study. Cloudy conditions at 1200 hours yielded the highest recordings (21%) in relationship to times of this atmospheric condition's occurrence (18%).

As the atmospheric conditions changed from 0800 to 1200 hours several relationships were noted between these changes and its relationship to behavior. The change from cloudy to rainy yielded a 2 percent proportionate increase in adverse behavior occurrences as did the change from rainy to cloudy.

A 1 percent proportionate decrease in behavior was noted when the conditions of the atmosphere changed rainy to fair and when there was no change during fair conditions. Table 9 lists the total behaviors recorded during each of the conditions of the atmosphere.

TABLE 9  
OCCURRENCES OF BEHAVIOR DURING VISIBLE  
ATMOSPHERIC CONDITIONS

Condition	0800			1200		
	mean	conf.	interval	mean	conf.	interval
Sunny	0	0	0	26.9	27.5	to 32.3
Cloudy	28.8	25.1	to 32.6	31.9	24.1	to 39.7
Rainy	29.8	11.8	to 47.7	34.7	18.1	to 51.2
Stormy	0	0	0	0	0	0
Fair	26.8	20.7	to 32.9	26.0	20.2	to 31.9
Total	28.8	24.8	to 31.2	28.0	24.8	to 31.2

## Days of Week

The days of the week and the number of occurrences during the study period were as listed: Mondays (10), Tuesdays (9), Wednesdays (11), Thursdays (11), and Fridays (9). These days were consecutive throughout the study except for days when school was dismissed or when more than 50 percent of the subjects were involved on a field trip.

A negative correlation of .29 at the .019 level of significance was computed between the use of vulgar language and days of the week. There were three recordings of vulgar language, all on Monday. No other correlation was found to exist between each of the independent and each of the dependent variables. Table 10 illustrates the behavior variables grouped and divided according to the days of the week.

TABLE 10

MEANS AND PERCENTAGES OF BEHAVIOR VARIABLES  
OCCURRING ON DAYS OF THE WEEK

Week Days	AGGRES		GOOFIN		ANSOCL		LEACLI	
	%	m	%	m	%	m	%	m
M (20%)	25	4.8	21	13.7	13	3.4	23	12.9
T (18%)	13	2.9	22	15.2	19	5.1	26	10.8
W (22%)	21	3.7	14	7.7	31	7.2	15	8.0
Th(22%)	25	4.4	25	13.2	23	5.4	27	13.1
F (18%)	16	3.4	18	12.4	14	4.1	15	9.3

## Absenteeism

The Pearson correlation computed a negative correlation of .60, with a level of significance at .001, between the outside temperatures at 088 and 1200 hours and absenteeism.

An analysis of variance computation revealed that the mean of absentees was higher for rainy days at 0800 hours than any other time. The results for rainy days showed a standard error of 1.44, and a 95 percent confidence interval for the mean of 1.68 to 10.8. There was no significant relationships found between absenteeism and atmospheric conditions.

TABLE 11  
MEANS AND PERCENTAGES OF ABSENTEES  
OCCURRING SIMULTANEOUSLY WITH  
VARIOUS ATMOSPHERIC  
CONDITIONS

Atmospheric Conditions	0800 hours			1200 hours		
	absenteeism %	time m	time %	absenteeism %	time m	time %
Sunny	0	0	0	49	4.6	44
Cloudy	41	3.5	48	23	5.2	18
Rainy	12	6.3	8	3	2.0	6
Stormy	0	0	0	0	0	0
Fair	47	4.4	44	25	3.3	32

The highest rate of absenteeism for any day was ten, of which there were three such days; 12, 41, and 49. When these three days were compared with pressure, pressure changes, temperature, temperature changes, atmospheric conditions, atmospheric changes, day of the week, and phases of the moon, no relationships were found.

Mondays had the highest mean of absenteeism of 5.7; Thursdays were next with a mean of 4.1. Wednesdays and Fridays both had a mean absenteeism of 3.9 and Tuesdays had the lowest mean of 3.2 absentees per day.

### Observers

The Cronbach method of reliability was computed among the observer's recordings. A standardized item alpha reliability coefficient of .41 was found to exist among the four observers. The raw data for each of the observations are in Appendix A.

## CHAPTER V

### CONCLUSIONS AND RECOMMENDATIONS

#### Conclusions

This study was concerned with determining if a relationship existed between various atmospheric conditions and nonproductive (adverse) behaviors within the classroom. The primary problem was to determine if there were relationships between atmospheric conditions and adverse classroom behaviors.

There was a limited amount of related research that could be found by the author, but enough literature was available to provide background for the study. The study was significant in that sufficient weather/behavior data were collected for an intensive statistical analysis.

The literature illustrated various views concerning weather influences and relationships to human and animal behavior. Various null hypotheses tested concerning these relationships were found to be about equal in the count of "rejecting" and "fail to reject." The literature yielded no concrete evidence that would clarify the question of weather/behavior relationships. Many superstitions and disbeliefs were found that centered around various weather conditions and moon positions.

Seven basic research hypotheses were stated by the writer. Each hypothesis was tested by statistical procedure as outlined in Chapter III. A detailed analysis of the data collected was conducted; the results of which can be found in Chapter IV.

The basic research hypothesis relating to temperature was that a significant relationship exists between outside temperature and non-productive classroom behaviors. The null hypothesis was rejected. Atmospheric temperature related moderately to annoying, disruptive, rule breaking, AGGRES, ANSOCL, LEACLI, and absenteeism. Absenteeism and LEACLI were inverse correlations ( $r = -.60$ ). These correlations were significant and were found to be of a predictive nature. It was found that as the temperature lowers one unit (six degrees; SE 10.8) the occurrence of absenteeism can be expected to increase by three ( $b = .291$ ). Sixty-one percent of the cases fall between  $\pm 1_{esty}$  (See Table 12 in Appendix A).

Eighteen percent of variance in disruptive behavior can be explained by outside temperature change. Disruptive behavior decreased as the temperature rose. For every rise in one unit of temperature (6 degrees; SE 13.3) an average decrease of one disruptive behavior might be expected to occur. The behavior variable LEACLI was found to decrease by approximately one (SE 11.6) when the temperature increased by one unit. Thirty-two percent of the variance in LEACLI can be explained by the temperature outside (See Table 13 in

Appendix A).

The basic research hypothesis relating to barometric pressure was that a significant relationship exists between barometric pressure and non-productive classroom behaviors. The null hypothesis failed to be rejected. The variable arguing, when correlated with pressure, yielded the highest correlation between variables of behavior and pressure ( $r=.55$ ,  $P=.001$ ). Since the occurrence of this behavior was only three times throughout the fifty-day period, and amounted to .002 percent of the behavior recordings, there would be no useful value in further analysis of this relationship. There were no strong relationships found between any of the specific pressure readings and a specific behavior variable (See Table 14 in Appendix A).

Three behavior variables, disruptive, LEACLI, and DISPLA have significant ( $r=.40$ ) relationships to the change in barometric pressure. Sixteen percent of the variance in the occurrences of the behaviors can be explained by the change in barometric pressure. More occurrences of these adverse behaviors were recorded when the barometer rose five millibars during the day than at any other time. These changes were only slight, therefore, the author fails to reject the null hypothesis (See Table 15 in Appendix A).

The basic research hypothesis relating to moon phases was that a significant relationship exists between moon phases and non-productive classroom behaviors. The three behavior variables aggression, distructive, and disruptive



correlated moderately with the phases but indicate only an average of 6 percent variance of these behavior occurrences in relationship to the moon. More occurrences of adverse behaviors did occur during the new moon phase than any other of the phases (See Table 16 in Appendix A). The null hypothesis failed to be rejected.

The null hypotheses relating to atmospheric conditions, days of the week, and absenteeism and their relationship to adverse classroom behavior failed to be rejected. There are tables in Appendix A that illustrate the results of these data calculations.

#### Recommendations

In view of the conclusions derived from this study the author offers several recommendations that might possibly add to the worth of the study.

The author recommends a replication of the study with several modifications in methods and procedures of data collection. The method of using focal subject scoring is suggested for the replication. This technique would replace the large group scoring procedures as used in this study. Using this procedure the observers would score on randomly selected subjects at predetermined times, thus somewhat alleviating the overwhelming task of observing large groups.

It is suggested that the number of observers be reduced to no more than two. Using focal subject scoring would allow this reduction in observers. An intensive training period for the observers is recommended. The objective

is for the observers to identically define the same observable behavior. It is recommended that a reliability coefficient of .70 be obtained between observers before the study begins. An intensive training period would allow this standard to develop.

The author recommends that the weather variables be divided into two, highly defined, general categories such as "stable" and "unstable". A vari-max rotation, factor analysis of the weather variables would yield at least two such conditions. Also the replication might be benefited by using only randomly selected days to record weather and behavior variables which could include the entire school year. The various sessions could thus be taken into account, as well as the time adjustment factor within the affective realm of pupil to teacher personalities.

It is suggested that a facility with maximum exterior visibility be used in the replication to compare results with a facility of minimal exterior visibility. The author suspects significant differences in the amount and type of behavioral recordings between the two facilities.

Although this study showed no great relationships between weather and behavior, the author doesn't disregard the "feelings" of teachers; that there is a definable change in behavior as the weather changes. The author therefore recommends that educators be receptive to perceived mood changes in pupils, and themselves, and adapt to the new situation a positive manner conducive to facilitating the learning processes.

APPENDIX A

TABLE 12

STATISTICS OF SIGNIFICANT CORRELATIONS BETWEEN  
OUTSIDE TEMPERATURE AND ADVERSE BEHAVIORS

Time	Mean	Behavior	Mean	r	r <sup>2</sup>	P	b
0800	48.48	annoying	1.36	.23	.05	.051	1.67
0800	48.48	disruptive	5.40	-.37	.14	.004	-.99
0800	48.48	rule break.	4.30	-.27	.07	.030	-.77
0800	48.48	absenteeism	4.14	-.60	.36	.001	-2.92
0800	48.48	ANSOCL	5.10	-.25	.06	.039	-.64
0800	48.48	LEACLI	10.84	-.51	.26	.001	-1.04
1200	61.98	annoying	1.36	.28	.08	.023	2.24
1200	61.98	disruptive	5.40	-.46	.21	.001	-1.38
1200	61.98	rule break.	4.30	-.27	.07	.028	-.87
1200	61.98	absenteeism	4.14	-.60	.37	.001	-3.26
1200	61.98	AGGRES	3.88	.23	.05	.055	.94
1200	61.98	ANSOCL	5.10	-.23	.05	.053	-.65
1200	61.98	LEACLI	10.84	-.61	.37	.001	-1.37

TABLE 13

STATISTICS OF SIGNIFICANT CORRELATIONS BETWEEN  
TEMPERATURE CHANGES AND ADVERSE BEHAVIORS

Mean	Behavior	Mean	r	r <sup>2</sup>	P	b
13.5	Destructive	.22	.23	.05	.052	.02
13.5	Disruptive	5.40	-.24	.06	.045	-.16
13.5	Inattentive	.42	-.28	.08	.023	-.03
13.5	LEACLI	10.84	-.27	.07	.029	-.31
13.5	DISPLA	5.72	-.22	.05	.062	-.31

TABLE 14

STATISTICS OF SIGNIFICANT CORRELATIONS BETWEEN  
BAROMETRIC PRESSURE AND ADVERSE BEHAVIORS

Time	Mean	Behavior	Mean	r	r <sup>2</sup>	P	b
0800	1022.86	Aggression	.62	.23	.05	.052	1.99
0800	1022.86	Arguing	.06	.55	.31	.001	13.98
0800	1022.86	Name Calling	.10	.38	.14	.003	8.26
0800	1022.86	AGGRES	3.88	.30	.09	.016	.67
1600	1023.18	Aggression	.62	.24	.06	.045	2.21
1600	1023.18	Arguing	.06	.53	.28	.001	14.20
1600	1023.18	Name Calling	.10	.41	.17	.001	9.40
1600	1023.18	AGGRES	3.88	.29	.08	.022	.67

TABLE 15

STATISTICS OF SIGNIFICANT CORRELATIONS BETWEEN  
PRESSURE CHANGES AND ADVERSE BEHAVIORS

Mean	Behavior	Mean	r	r <sup>2</sup>	P	b
.32	Disruptive	5.40	.41	.17	.001	1.08
.32	LEACLI	10.84	.40	.16	.002	.11
.32	DISPLA	5.72	.40	.16	.002	.14
.32	DISOIN	3.48	-.22	.05	.065	-.11

TABLE 16

STATISTICS OF SIGNIFICANT CORRELATIONS BETWEEN  
MOON PHASES AND ADVERSE BEHAVIORS

Mean	Behavior	Mean	r	r <sup>2</sup>	P	b
2.26	Aggression	.62	.26	.07	.032	.31
2.26	Destructive	.22	.25	.06	.038	.40
2.26	Disruptive	5.40	.24	.06	.043	.05
2.26	Lying	.10	-.23	.06	.050	-.50

TABLE 17

## WEATHER-BEHAVIOR DATA (A) 9-1-76/9-15-76

Day	1	2	3	4	5	6	7	8	9	10
1. Barometric pressure 0800 hours	1023	1023	1022	1025	1027	1025	1023	1028	1026	1024
2. Barometric pressure 1600 hours	1023	1022	1023	1026	1027	1024	1026	1027	1026	1023
3. Barometric pressure change 0800-1600	00	-01	+01	+01	00	-01	+03	-01	00	-01
4. Outside temperature 0800 hours	72	66	69	63	61	65	59	56	67	68
5. Outside temperature 1200 hours	74	72	75	81	69	69	64	78	85	82
6. Outside temperature change 0800-1200	02	06	06	17	08	04	05	22	18	14
7. Atmosphere 0800 hours (1-sunny, 2-cloudy, 3-rainy, 4-stormy, 5-fair)	2	5	2	2	2	2	2	5	5	5
8. Atmosphere 1200 hours	3	5	1	5	2	3	5	1	1	1
9. Day of the week (1-M, 2-T, 3-W, 4-T, 5-F)	3	4	5	2	3	4	5	1	2	3
10. Absentees	01	03	03	01	00	00	01	02	02	03
11. Special activity (1-no, 2-yes)	1	1	2	1	1	1	1	2	1	2
12. Phase of moon (1-1st.qtr., 2-full, 3-last, 4-new)	1	1	1	1	1	2	2	2	2	2
Date	0901	0902	0903	0907	0908	0909	0910	0913	0914	0915

TABLE 18

## WEATHER-BEHAVIOR DATA (B) 9-1-76/9-15-76

Day	1	2	3	4	5	6	7	8	9	10
13. Aggression	02	01	00	02	00	00	00	00	02	00
14. Arguing	00	00	00	00	00	00	00	00	01	00
15. Attitude	00	00	00	00	00	00	00	00	01	00
16. Annoying	01	01	04	09	01	01	00	03	03	00
17. Bathroom abuse	02	04	00	01	01	02	05	01	00	00
18. Cheating	00	00	00	00	00	00	00	00	00	00
19. Clowning	05	01	05	00	02	00	05	02	04	00
20. Destructive	00	00	00	00	00	00	00	00	00	00
21. Disobedient	14	11	00	01	00	03	05	04	01	07
22. Disruptive	00	05	01	03	03	13	02	01	01	02
23. Ill-mannered	02	00	00	01	00	00	00	00	00	00
24. Inattentive	01	04	00	00	01	03	00	00	00	00
25. Lying	00	00	00	00	00	00	00	00	00	00
26. Name calling	00	00	00	00	00	00	00	00	00	00
27. Playing	00	00	00	02	00	00	00	00	00	00
28. Rule breaking	04	06	00	00	05	02	00	00	01	00
29. Vulgar language	00	00	00	00	00	00	00	00	00	00
30. Wasting time	08	05	09	03	05	14	08	06	01	06
31. Daily total of undesirable behaviors	39	38	19	22	18	38	25	17	15	15

TABLE 19

WEATHER-BEHAVIOR DATA (A)		9-16-76/9-29-76									
Day		11	12	13	14	15	16	17	18	19	20
1. Barometric pressure 0800 hrs.		1022	1019	1014	1013	1016	1049	1059	1013	1019	1019
2. Barometric pressure 1600 hrs.		1022	1018	1014	1014	1017	1054	1056	1013	1019	1019
3. Barometric pressure change 0800-1600		00	-01	00	+01	+01	+05	-03	00	00	00
4. Outside temperature 0800 hrs.		68	62	63	58	47	42	51	53	42	50
5. Outside temperature 1200 hrs.		80	83	71	69	63	68	74	69	71	73
6. Outside temperature change 0800-1200		12	21	08	11	16	26	23	16	29	23
7. Atmosphere 0800 hrs. (1-sunny, 2-cloudy, 3-rainy, 4-stormy, 5-fair)		2	5	3	2	5	5	2	3	5	2
8. Atmosphere 1200 hrs.		5	1	2	5	5	1	1	2	1	5
9. Day of week (1-M, 2-T, 3-W, 4-T, 5-F)		4	5	1	2	3	4	5	1	2	3
10. Absentees		3	0	10	1	3	3	1	6	5	2
11. Special Activity (1-no, 2-yes)		1	2	1	1	1	1	1	1	1	1
12. Phase of moon (1-1st. qtr., 2-full, 3-last, 4-new)		3	3	3	3	3	4	4	4	4	4
Date		0916	0917	0920	0921	0922	0923	0924	0927	0928	0929



TABLE 20

WEATHER-BEHAVIOR DATA (B)		9-16-76/9-29-76									
Day		11	12	13	14	15	16	17	18	19	20
13.	Aggression	00	00	03	01	00	02	02	00	00	02
14.	Arguing	00	00	00	00	00	00	02	00	00	00
15.	Attitude	00	00	00	00	00	00	00	00	00	00
16.	Annoying	00	01	01	03	00	02	02	00	00	02
17.	Bathroom abuse	00	00	00	01	00	00	00	00	00	00
18.	Cheating	00	00	00	00	00	00	00	00	00	00
19.	Clowning	00	02	11	03	00	03	02	04	06	00
20.	Destructive	00	00	00	00	00	00	00	01	00	04
21.	Disobedient	07	02	02	01	00	08	02	05	00	08
22.	Disruptive	02	00	13	01	00	16	03	10	09	01
23.	Ill-mannered	00	00	01	00	00	00	00	02	00	03
24.	Inattentive	00	00	02	00	00	00	00	00	00	00
25.	Lying	00	00	00	00	00	00	00	00	00	00
26.	Name-calling	00	00	00	00	00	00	02	00	00	00
27.	Playing	00	00	02	00	00	00	01	00	00	00
28.	Rule breaking	00	00	00	04	01	07	09	10	04	11
29.	Vulgar language	00	00	00	00	00	00	00	00	00	00
30.	Wasting time	06	08	08	07	00	16	02	01	28	03
31.	Daily total of undesirable behaviors	15	13	43	21	01	54	27	33	47	34

TABLE 21

## WEATHER-BEHAVIOR DATA (A)

Day	21	22	23	24	25	26	27	28	29	30
1. Barometric pressure 0800 hrs.	1018	1016	1019	1018	1010	1021	1024	1024	1020	1019
2. Barometric pressure 1600 hrs.	1019	1016	1018	1016	1016	1021	1024	1023	1019	1018
3. Barometric pressure change 0800-1600	+01	00	-01	-02	-06	00	00	-01	-01	-01
4. Outside temperature 0800 hrs.	55	57	52	67	62	43	42	44	50	42
5. Outside temperature 1200 hrs.	74	76	82	79	78	70	58	60	69	65
6. Outside temperature change 0800-1200	19	19	30	12	16	27	16	16	19	23
7. Atmosphere 0800 hrs. (1-sunny, 2-cloudy, 3-rainy, 4-stormy, 5-fair)	2	5	5	5	3	5	5	5	5	2
8. Atmosphere 1200 hrs.	1	1	1	2	5	1	5	5	1	1
9. Day of week (1-M, 2-T, 3-W, 4-T, 5-F)	4	5	1	2	3	4	1	2	3	4
10. Absentees	3	4	2	3	3	2	4	4	8	3
11. Special Activity (1-no, 2-yes)	1	1	2	1	1	1	1	1	1	1
12. Phase of moon (1-1st. qtr., 2-full, 3-last, 4-new)	1	1	1	1	1	1	1	1	1	1
Date	0930	1001	1004	1005	1006	1007	1010	1012	1013	1014

TABLE 22

## WEATHER-BEHAVIOR DATA (B)

Day	21	22	23	24	25	26	27	28	29	30
13. Aggression	01	02	00	00	01	00	00	00	00	00
14. Arguing	00	00	00	00	00	00	00	00	00	00
15. Attitude	01	00	00	00	00	00	00	00	00	00
16. Annoying	00	08	04	01	00	00	00	00	01	01
17. Bathroom abuse	00	01	06	00	00	00	00	01	00	00
18. Cheating	02	00	00	00	00	00	00	00	00	00
19. Clowning	07	03	06	00	01	04	03	06	00	00
20. Destructive	00	00	01	00	00	00	00	01	00	00
21. Disobedient	02	04	03	01	02	03	01	08	03	00
22. Disruptive	02	00	05	04	01	00	05	03	03	00
23. Ill-mannered	00	01	00	00	00	00	00	03	00	03
24. Inattentive	02	00	00	00	00	00	00	02	00	00
25. Lying	00	02	00	00	00	00	00	00	00	00
26. Name-calling	00	00	00	00	01	00	01	00	00	00
27. Playing	00	00	02	00	00	00	00	00	00	01
28. Rule breaking	04	03	01	04	07	01	00	00	00	10
29. Vulgar language	00	00	01	00	00	00	00	00	00	00
30. Wasting time	18	04	17	09	03	01	12	15	06	04
31. Daily total of undesirable behaviors	39	28	46	19	16	09	22	39	10	24

TABLE 23

## WEATHER-BEHAVIOR DATA (A)

Day	31	32	33	34	35	36	37	38	39	40
1. Barometric pressure 0800 hrs.	1014	1033	1029	1016	1021	1026	1015	1021	1031	1031
2. Barometric pressure 1600 hrs.	1016	1033	1023	1016	1021	1021	1012	1024	1033	1036
3. Barometric pressure change 0800-1600	+02	00	-06	00	00	-05	-03	+03	+02	+05
4. Outside temperature 0800 hrs.	46	34	42	46	37	30	52	43	35	28
5. Outside temperature 1200 hrs.	60	48	45	49	47	42	50	47	45	48
6. Outside temperature change 0800-1200	14	14	03	03	10	12	02	04	10	20
7. Atmosphere 0800 hrs. (1-sunny, 2-cloudy, 3-rainy, 4-stormy, 5-fair)	2	2	2	3	2	2	2	2	5	5
8. Atmosphere 1200 hrs.	5	5	2	3	5	5	2	2	5	1
9. Day of week (1-M, 2-T, 3-W, 4-T, 5-F)	5	1	2	3	4	5	1	2	3	4
10. Absentees	5	2	3	6	4	4	7	3	5	9
11. Special Activity (1-no, 2-yes)	1	1	1	1	1	1	1	1	1	1
12. Phase of moon (1-1st. qtr., 2-full, 3-last, 4-new)	2	3	3	3	3	3	4	4	4	4
Date	1015	1018	1019	1020	1021	1022	1025	1026	1027	1028

TABLE 24

## WEATHER-BEHAVIOR DATA (B)

Day	31	32	33	34	35	36	37	38	39	40
13. Aggression	00	00	02	00	00	01	01	02	00	03
14. Arguing	00	00	00	00	00	00	00	00	00	00
15. Attitude	00	00	00	00	00	00	00	00	00	00
16. Annoying	00	03	00	01	00	02	02	02	03	00
17. Bathroom abuse	00	00	00	00	00	06	00	01	01	05
18. Cheating	00	00	00	00	00	00	00	00	00	00
19. Clowning	06	04	04	09	13	03	04	02	02	11
20. Destructive	00	00	00	00	02	01	00	00	00	00
21. Disobedient	02	07	00	01	00	04	01	04	01	01
22. Disruptive	08	06	12	02	10	05	03	19	04	07
23. Ill-mannered	00	00	02	02	00	02	00	00	00	00
24. Inattentive	00	02	00	00	00	00	00	00	01	00
25. Lying	00	00	00	00	00	00	00	00	00	00
26. Name-calling	00	00	00	00	00	00	00	00	00	00
27. Playing	00	00	00	00	02	00	00	00	00	00
28. Rule breaking	00	02	05	02	04	11	04	03	11	03
29. Vulgar language	00	00	00	00	00	00	01	00	00	00
30. Wasting time	04	02	10	10	06	08	10	15	01	01
31. Daily total of undesirable behaviors	20	26	35	27	37	43	26	48	24	31

TABLE 25

## WEATHER-BEHAVIOR DATA (A) 11-1-76/11-15-76

Day	41	42	43	44	45	46	47	48	49	50
1. Barometric pressure 0800 hrs.	1029	1023	1019	1026	1024	1019	1017	1024	1029	1022
2. Barometric pressure 1600 hrs.	1019	1019	1024	1023	1023	1019	1023	1025	1033	1023
3. Barometric pressure change 0800-1600	00	-04	+05	-03	-01	00	+06	+01	+04	+01
4. Outside temperature 0800 hrs.	32	45	30	32	21	40	43	33	23	36
5. Outside temperature 1200 hrs.	46	56	38	40	34	52	48	36	45	42
6. Outside temperature change 0800-1200	14	11	08	12	13	12	05	03	22	06
7. Atmosphere 0800 hrs. (1-sunny, 2-cloudy, 3-rainy, 4-stormy, 5-fair)	5	5	5	2	5	2	5	2	2	2
8. Atmosphere 1200 hrs.	1	1	2	5	1	1	1	2	1	1
9. Day of week (1-M, 2-T, 3-W, 4-T, 5-F)	1	3	4	5	1	2	3	4	1	1
10. Absentees	10	6	7	7	7	7	5	8	10	7
11. Special Activity (1-no, 2-yes)	1	1	1	2	1	1	1	1	1	1
12. Phase of moon (1-1st. qtr. 2-full, 3-last, 4-new)	1	1	1	1	2	2	2	2	2	2
Date	1101	1103	1104	1105	1108	1109	1110	1111	1112	1115

TABLE 26

## WEATHER-BEHAVIOR DATA (A) 11-1-76/11-15-76

Day	41	42	43	44	45	46	47	48	49	50
13. Aggression	00	00	00	01	00	00	00	00	00	00
14. Arguing	00	00	00	00	00	00	00	00	00	00
15. Attitude	00	00	00	00	01	00	00	00	00	00
16. Annoying	00	01	01	02	01	00	00	00	00	01
17. Bathroom Abuse	01	00	00	00	00	00	00	00	00	01
18. Cheating	00	00	00	00	00	00	00	00	00	00
19. Clowning	02	03	00	06	01	00	04	00	01	02
20. Destructive	00	00	00	00	00	00	00	00	01	00
21. Disobedient	11	00	00	01	06	00	02	00	01	01
22. Disruptive	02	08	13	13	10	09	16	08	05	01
23. Ill-mannered	00	00	02	00	00	00	00	00	00	00
24. Inattentive	00	00	02	00	00	00	00	00	00	01
25. Lying	00	03	00	00	00	00	00	00	00	00
26. Name calling	00	00	00	00	00	00	00	01	00	00
27. Playing	00	03	00	00	00	00	00	00	00	00
28. Rule breaking	04	18	01	03	01	20	06	12	04	07
29. Vulgar language	00	00	00	00	00	00	00	00	00	00
30. Wasting time	07	05	16	05	08	04	02	07	08	08
31. Daily total of undesirable behaviors	27	38	38	34	28	33	30	28	20	22

TABLE 27

MOON PHASES AND OCCURRENCES OF  
ADVERSE CLASSROOM BEHAVIORS

Moon Phase	Adverse Behaviors			
	total	% beh.	mean	% time
First quarter	430	31	28.6	30
Full moon	386	28	24.1	32
Last quarter	261	19	26.1	20
New Moon	324	23	36.0	18

TABLE 28

DAY OF THE WEEK AND THE OCCURRENCES  
OF ADVERSE CLASSROOM BEHAVIORS

Day of the Week	Adverse Behaviors			
	total	% beh.	mean	% time
Monday	290	21	29.0	20
Tuesday	279	20	31.0	18
Wednesday	252	18	22.8	22
Thursday	351	25	31.9	22
Friday	229	17	25.4	18

TABLE 29

VISIBLE ATMOSPHERIC CONDITIONS AT 0800 HOURS  
AND ADVERSE CLASSROOM BEHAVIORS

Atmospheric Condition	Adverse Behaviors			
	total	% beh.	mean	% time
Sunny	0	0	0	0
Cloudy	693	49	28.9	48
Rainy	119	9	29.8	8
Stormy	0	0	0	0
Fair	589	42	26.8	44



TABLE 30

VISIBLE ATMOSPHERIC CONDITIONS AT 1200 HOURS  
AND ADVERSE CLASSROOM BEHAVIORS

Atmospheric Condition	Adverse Behaviors			
	total	% beh.	mean	% time
Sunny	592	43	26.9	44
Cloudy	288	21	32.0	18
Rainy	104	8	34.7	6
Stormy	0	0	0	0
Fair	417	30	26.1	32

TABLE 31

CHANGES IN VISIBLE ATMOSPHERIC CONDITIONS  
AND ADVERSE CLASSROOM BEHAVIORS

Atmospheric Changes	Adverse Behaviors			
	total	% beh.	mean	% time
Cloudy/Rainy	77	6	38.5	4
Cloudy/Sunny	184	14	26.3	14
Cloudy/Fair	277	20	27.7	20
Cloudy/Cloudy	155	11	31.0	10
Fair /Fair	124	9	24.8	10
Fair /Sunny	408	30	27.2	30
Fair /Cloudy	57	4	28.5	4
Rain /Rain	27	2	27.0	2
Rain /Cloudy	76	6	38.0	4
Rain /Fair	16	1	16.0	2

TABLE 32

GROUPED BAROMETRIC PRESSURE READINGS AT 0800  
HOURS AND ADVERSE CLASSROOM BEHAVIORS

Pressure in Millibars	Adverse Behaviors			
	total	% beh.	mean	% time
1055 - 1059	27	2	27.0	2
1050 - 1054	0	0	0	0
1045 - 1049	54	4	54.0	2
1040 - 1044	0	0	0	0
1035 - 1039	0	0	0	0
1030 - 1034	81	6	27.0	6
1025 - 1029	269	20	26.9	20
1020 - 1024	432	31	27.0	32
1015 - 1019	405	29	28.9	28
1010 - 1014	133	10	26.6	10

TABLE 33

GROUPED BAROMETRIC PRESSURE READINGS AT 1600  
HOURS AND ADVERSE CLASSROOM BEHAVIORS

Pressure in Millibars	Adverse Behaviors			
	total	% beh.	mean	% time
1055 - 1059	27	2	27.0	2
1050 - 1054	54	4	54.0	2
1045 - 1049	0	0	0	0
1040 - 1044	0	0	0	0
1035 - 1039	31	3	31.0	2
1030 - 1034	70	5	23.3	6
1025 - 1029	152	11	21.7	14
1020 - 1024	549	40	30.5	36
1015 - 1019	395	29	26.3	30
1010 - 1014	123	9	41.0	6

TABLE 34

CHANGE IN BAROMETRIC PRESSURE AND  
ADVERSE CLASSROOM BEHAVIORS

Pressure in Millibars	Adverse Behaviors			
	total	% beh.	mean	% time
+6	46	3	23.0	4
+5	123	9	41.0	6
+4	20	1	20.0	2
+3	73	5	36.5	4
+2	44	3	22.0	4
+1	152	11	21.7	14
0	453	32	28.3	32
-1	268	19	26.8	20
-2	19	1	19.0	2
-3	87	6	29.0	6
-4	38	3	38.0	2
-5	43	3	43.0	2
-6	35	3	35.0	2

TABLE 35

GROUPED TEMPERATURE READINGS AT 0800 HOURS  
AND ADVERSE CLASSROOM BEHAVIORS

Temperature in Fahrenheit	total	Adverse Behaviors % beh.	mean	% time
81 - 87	0	0	0	0
74 - 80	0	0	0	0
67 - 73	122	9	20.3	12
60 - 66	188	14	26.9	14
53 - 59	163	12	27.2	12
46 - 52	191	14	23.9	16
39 - 45	379	27	34.5	22
32 - 38	198	15	28.3	14
25 - 31	112	8	37.3	6
18 - 24	48	4	24.0	4

TABLE 36

GROUPED TEMPERATURE READINGS AT 1200 HOURS  
AND ADVERSE CLASSROOM BEHAVIORS

Temperature in Fahrenheit	total	Adverse Behaviors % beh.	mean	% time
81 - 87	108	8	27.0	8
74 - 80	219	16	27.4	16
67 - 73	345	25	31.3	22
60 - 66	109	8	21.8	10
53 - 59	60	5	30.0	4
46 - 52	309	22	30.9	20
39 - 45	154	11	30.8	10
32 - 38	97	7	31.3	6
25 - 31	0	0	0	0
18 - 24	0	0	0	0

TABLE 37

CHANGE IN OUTSIDE TEMPERATURES AND  
ADVERSE CLASSROOM BEHAVIORS

Temperature in Fahrenheit	total	Adverse Behaviors % beh.	mean	% time
+28 - 30	93	7	46.5	4
+25 - 27	63	5	31.5	4
+22 - 24	122	9	24.4	10
+19 - 21	121	9	24.2	10
+16 - 18	148	11	21.1	14
+13 - 15	116	8	23.2	10
+10 - 12	264	19	29.3	18
+ 7 - 9	121	9	30.3	8
+ 4 - 6	198	14	33.0	12
+ 1 - 3	155	11	31.0	10

TABLE 38

## OBSERVER'S RATINGS OF BEHAVIORS BY DAYS

Day Observers	1				2				3				4				5			
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
Behaviors																				
Aggression	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0
Arguing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Attitude	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Annoying	0	0	0	1	1	0	0	0	1	0	3	0	0	2	3	4	0	1	0	0
Bathroom Abuse	0	0	2	0	0	3	1	0	0	0	0	0	0	0	1	0	0	0	1	0
Cheating	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clowning	0	5	0	0	0	1	0	0	5	0	0	0	2	0	0	0	0	0	0	0
Destructive	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Disobedient	11	1	0	2	6	2	3	0	0	0	0	1	0	1	0	0	0	0	0	0
Disruptive	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	3	0	0	0	3
Ill-Mannered	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Inattentive	0	0	0	1	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	1
Lying	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Name Calling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Playing	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Rule Breaking	0	0	4	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	5	0
Vulgar Language	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wasting Time	3	3	2	0	5	0	0	0	7	0	0	2	0	1	0	2	0	1	0	3
Date	0901				0902				0903				0907				0908			

TABLE 39

## OBSERVER'S RATINGS OF BEHAVIORS BY DAYS

Day	6				7				8				9				10			
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
Observers																				
Behaviors																				
Aggression	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
Arguing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Attitude	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Annoying	0	1	0	0	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0
Bathroom Abuse	2	0	0	0	0	0	2	3	0	0	1	0	0	0	0	0	0	0	0	0
Cheating	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clowning	0	0	0	0	0	5	0	0	0	0	2	0	0	0	4	0	0	0	0	0
Destructive	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Disobedient	1	0	1	1	0	0	0	5	1	0	0	3	1	0	0	0	3	0	3	1
Disruptive	9	0	4	0	2	0	0	0	1	0	0	0	0	0	0	1	0	0	2	0
Ill-Mannered	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Inattentive	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lying	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Name Calling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Playing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rule Breaking	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Vulgar Language	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wasting Time	4	0	9	1	3	5	0	0	3	0	0	3	0	0	1	0	0	0	0	6
Date	0909				0910				0913				0914				0915			

TABLE 40

## OBSERVER'S RATINGS OF BEHAVIORS BY DAYS

Day	11				12				13				14				15			
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
Observers																				
Behaviors																				
Aggression	0	0	0	0	0	0	0	0	0	0	0	3	0	1	0	0	0	0	0	0
Arguing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Attitude	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Annoying	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	3	0	0	0	0
Bathroom Abuse	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Cheating	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clowning	0	0	0	0	0	0	2	0	2	5	4	0	0	0	3	0	0	0	0	0
Destructive	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Disobedient	4	0	2	1	0	2	0	0	1	0	0	1	0	0	1	0	0	0	0	0
Disruptive	0	1	1	0	0	0	0	0	8	0	4	1	0	0	1	0	0	0	0	0
Ill-Mannered	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Inattentive	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
Lying	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Name Calling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Playing	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
Rule Breaking	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	1	0
Vulgar Language	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wasting Time	6	0	0	0	2	2	2	2	6	0	0	2	0	0	0	7	0	0	0	0
Date	0916				0917				0920				0921				0922			

TABLE 41

## OBSERVER'S RATINGS OF BEHAVIORS BY DAYS

Day	16				17				18				19				20			
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
Observers																				
Behaviors																				
Aggression	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0
Arguing	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Attitude	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Annoying	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	0
Bathroom Abuse	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cheating	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clowning	0	0	0	3	0	2	0	0	0	0	4	0	6	0	0	0	0	0	0	0
Destructive	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	4
Disobedient	0	0	8	0	0	0	2	0	2	0	3	0	0	0	0	0	0	8	0	0
Disruptive	0	0	1	15	3	0	0	0	1	0	0	9	2	0	3	4	0	0	1	0
Ill-Mannered	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	3	0	0	0
Inattentive	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lying	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Name Calling	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Playing	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rule Breaking	0	0	3	4	1	2	5	1	0	5	2	3	0	0	3	1	0	1	7	3
Vulgar Language	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wasting Time	9	0	2	5	2	0	0	0	1	0	0	0	8	0	0	20	0	0	3	0
Date	0923				0924				0927				0928				0929			



TABLE 42

## OBSERVER'S RATINGS OF BEHAVIORS BY DAYS

Day	21				22				23				24				25			
Observers	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
Behaviors																				
Aggression	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1
Arguing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Attitude	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Annoying	0	0	0	0	0	0	1	7	0	2	2	0	0	0	1	0	0	0	0	0
Bathroom Abuse	0	0	0	0	0	0	1	0	2	2	1	1	0	0	0	0	0	0	0	0
Cheating	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clowning	0	7	0	0	2	1	0	0	0	6	0	0	0	0	0	0	0	1	0	0
Destructive	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Disobedient	2	0	0	0	1	1	2	0	0	3	0	0	1	0	0	0	1	1	0	0
Disruptive	0	0	2	0	0	0	0	0	0	3	0	2	0	0	0	4	1	0	0	0
Ill-Mannered	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Inattentive	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lying	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Name Calling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Playing	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
Rule Breaking	1	3	0	0	0	0	3	0	0	0	1	0	0	1	3	0	0	1	6	0
Vulgar Language	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Wasting Time	6	4	8	0	3	1	0	0	11	6	0	0	0	9	0	0	3	0	0	0
Date	0930				1001				1004				1005				1006			

TABLE 43

## OBSERVER'S RATINGS OF BEHAVIORS BY DAYS

Day	26				27				28				29				30			
Observer	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
Behaviors																				
Aggression	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Arguing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Attitude	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Annoying	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0
Bathroom Abuse	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Cheating	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clowning	3	1	0	0	0	3	0	0	0	4	2	0	0	0	0	0	0	0	0	0
Destructive	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Disobedient	3	0	0	0	0	1	0	0	2	6	0	0	0	0	0	0	0	5	0	0
Disruptive	0	0	0	0	3	2	0	0	2	0	0	1	0	0	3	0	0	0	0	0
Ill-Mannered	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	3	0	0
Inattentive	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
Lying	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Name Calling	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Playing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Rule Breaking	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	8	0
Vulgar Language	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wasting Time	1	0	0	0	2	0	10	0	2	7	0	6	0	3	3	0	0	4	0	0
Date	1007				1010				1012				1013				1014			

TABLE 44

## OBSERVER'S RATINGS OF BEHAVIORS BY DAYS

Day Observer	31				32				33				34				35			
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
Behaviors																				
Aggression	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
Arguing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Attitude	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Annoying	0	0	0	0	0	2	0	1	0	0	0	0	0	1	0	0	0	0	0	0
Bathroom Abuse	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clowning	0	6	0	0	1	3	0	0	0	1	0	3	1	4	4	0	0	5	0	8
Destructive	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
Disobedient	1	1	0	0	0	6	1	0	0	0	0	0	0	1	0	0	0	0	0	0
Disruptive	1	0	0	7	1	0	5	0	1	0	0	11	1	1	0	0	0	5	0	5
Ill-Mannered	0	0	0	0	0	0	0	0	0	2	0	0	1	1	0	0	0	0	0	0
Inattentive	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Lying	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Name Calling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Playing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Rule Breaking	0	0	0	0	0	0	2	0	2	0	3	0	2	0	0	0	0	0	0	4
Vulgar Language	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wasting Time	0	4	0	0	0	1	0	1	5	2	3	0	10	0	0	0	0	6	0	0
Date	1015				1018				1019				1020				1021			

TABLE 45

## OBSERVER'S RATINGS OF BEHAVIORS BY DAYS

Day	36				37				38				39				40			
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
Observer																				
Behavior																				
Aggression	0	0	1	0	1	0	0	0	0	2	0	0	0	0	0	0	3	0	0	0
Arguing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Attitude	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Annoying	0	1	1	0	0	0	2	0	0	2	0	0	0	1	0	2	0	0	0	0
Bathroom Abuse	0	1	0	5	0	0	0	0	0	1	0	0	0	0	1	0	0	4	0	1
Cheating	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clowning	0	1	2	0	2	0	2	0	2	0	0	0	0	0	0	2	3	1	6	1
Destructive	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Disobedient	0	2	2	0	0	0	1	0	2	2	0	0	0	0	1	0	0	0	1	0
Disruptive	3	0	0	2	2	0	0	1	10	2	1	6	0	2	0	2	2	0	0	5
Ill-Mannered	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Inattentive	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Lying	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Name Calling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Playing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rule Breaking	8	0	3	0	0	0	4	0	1	1	0	1	1	0	6	4	3	0	0	0
Vulgar Language	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Wasting Time	0	2	6	0	9	0	1	0	10	4	0	1	0	0	1	0	0	0	0	1
Date	1022				1025				1026				1027				1028			

TABLE 46

## OBSERVER'S RATINGS OF BEHAVIORS BY DAYS

Day	41				42				43				44				45			
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
Observer																				
Behavior																				
Aggression	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Arguing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Attitude	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Annoying	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	1	0	1	0	0
Bathroom Abuse	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cheating	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clowning	0	2	0	0	0	0	3	0	0	0	0	0	0	4	0	2	0	1	0	0
Destructive	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Disobedient	0	11	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	6	0	0
Disruptive	2	0	0	0	3	0	0	5	10	0	3	0	0	2	0	11	4	0	2	4
Ill-Mannered	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
Inattentive	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
Lying	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Name Calling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Playing	0	0	0	0	0	0	0	0	0	3	0	0	0	3	0	0	0	0	0	0
Rule Breaking	0	0	4	0	1	0	17	0	1	0	0	0	2	0	1	0	1	0	0	0
Vulgar Language	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wasting Time	3	4	0	0	3	2	0	0	10	3	3	0	0	4	0	1	4	4	0	0
Date	1101				1103				1104				1105				1108			

TABLE 47

## OBSERVER'S RATINGS OF BEHAVIORS BY DAYS

Day Observer	46				47				48				49				50			
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
Behavior																				
Aggression	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Arguing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Attitude	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Annoying	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Bathroom Abuse	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Cheating	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clowning	0	0	0	0	0	3	0	1	0	0	0	0	0	1	0	0	0	2	0	0
Destructive	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Disobedient	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0
Disruptive	4	0	0	5	0	0	0	16	0	0	0	8	3	0	2	0	0	1	0	0
Ill-Mannered	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Inattentive	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Lying	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Name Calling	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Playing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rule Breaking	4	0	14	2	1	0	3	2	11	0	0	1	0	1	2	1	0	4	3	0
Vulgar Language	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wasting Time	4	0	0	0	0	1	0	1	7	0	0	0	7	0	0	1	0	6	2	0
Date	1109				1110				1111				1112				1115			

TABLE 48

SUMMARY OF OBSERVER'S RATINGS BY  
INDIVIDUAL BEHAVIOR VARIABLES

Adverse Behaviors	Observers			
	A	B	C	D
(10) Aggression	006	006	002	017
(11) Arguing	000	000	000	003
(12) Attitude	002	001	000	000
(13) Annoying	006	019	018	028
(14) Bathroom Abuse	004	012	014	012
(15) Cheating	000	000	002	000
(16) Clowning	030	075	036	022
(17) Destructive	000	004	003	004
(18) Disobedient	046	062	031	014
(19) Disruptive	079	021	032	142
(20) Ill-Mannered	011	012	001	002
(21) Inattentive	001	007	000	011
(22) Lying	005	000	000	000
(23) Name Calling	002	002	000	001
(24) Playing	000	013	000	003
(25) Rule Breaking	042	019	124	030
(26) Vulgar Language	000	001	001	001
(27) Wasting Time	159	080	056	064
Total	393	334	320	354

TABLE 49

SUMMARY OF OBSERVER'S RATINGS BY VARIMAX  
FACTORING OF BEHAVIOR VARIABLES

Adverse Behaviors	Observers			
	A	B	C	D
ANNOYI (13)	006	019	018	028
ARGNAM (11, 23)	002	002	000	004
ATTCHE (12, 15)	002	001	002	000
DISPLA (19, 24)	079	034	032	145
DESILL (17, 20)	011	016	004	006
LYRULE (22, 25)	047	019	124	030
DISOIN (18, 21)	047	069	031	025
BATVUL (14, 26)	004	013	015	013
AGGCLO (10, 16)	036	081	038	039
WASTIN (27)	159	080	056	064
Total	393	334	320	354

TABLE 50

SUMMARY OF OBSERVER'S RATINGS BY AUTHOR'S  
GROUPINGS OF BEHAVIOR VARIABLES

Adverse Behavior	Observer			
	A	B	C	D
AGGRES (10, 11, 18, 23, 26)	054	071	034	036
GOOFIN (13, 16, 24, 27)	195	187	110	117
ANSOCL (15, 17, 20, 22, 25)	058	035	130	036
LEACLI (12, 14, 19, 21)	086	041	046	165
Total	393	334	320	354



APPENDIX B

## Weather-Behavior Code Book

Variable	Columns	Description
1	1-4 5	Date (month, day) Card 1
2	6-9	Barometric Pressure (millibars) 0800 hours
3	10-13	1600 hours
4	14-15	Outside Temperature (fahrenheit) 0800 hours
5	16-17	1200 hours
6	18	Atmospheric Condition (0800) 1. sunny 2. cloudy 3. rainy 4. stormy 5. fair
7	19	Atmospheric Condition (1200) 1. sunny 2. cloudy 3. rainy 4. stormy 5. fair
8	20	Moon Phases 1. first quarter 2. full moon 3. last quarter 4. new moon
9	21	Day of the Week 1. Monday 2. Tuesday 3. Wednesday 4. Thursday 5. Friday
10	22-23	Behavior Index (18) aggression
11	24-25	arguing
12	26-27	attitude
13	28-29	annoying
14	30-31	bathroom abuse
15	32-33	cheating
16	34-35	clowning
17	36-37	destructive
18	38-39	disobedient
19	40-41	disruptive

Variable	Columns	Description
20	42-43	ill-mannered
21	44-45	inattentive
22	46-47	lying
23	48-49	name calling
24	50-51	playing
25	52-53	rule breaking
26	54-55	vulgar language
27	56-57	wasting time
28	58-59	absenteeism

1-4  
5

Date (month, day)  
Card 2

#### Observers

		1. aggression
OBS 1	6-7	A
OBS 2	8-9	B
OBS 3	10-11	C
OBS 4	12-13	D
		2. arguing
OBS 5	14-15	A
OBS 6	16-17	B
OBS 7	18-19	C
OBS 8	20-21	D
		3. attitude
OBS 9	22-23	A
OBS 10	24-25	B
OBS 11	26-27	C
OBS 12	28-29	D
		4. annoying
OBS 13	30-31	A
OBS 14	32-33	B
OBS 15	34-35	C
OBS 16	36-37	D
		5. bathroom abuse
OBS 17	38-39	A
OBS 18	40-41	B
OBS 19	42-43	C
OBS 20	44-45	D
		6. cheating
OBS 21	46-47	A
OBS 22	48-49	B
OBS 23	50-51	C
OBS 24	52-53	D
		7. clowning
OBS 25	54-55	A
OBS 26	56-57	B
OBS 27	58-59	C
OBS 28	60-61	D

Variable	Columns	Description
		8. destructive
OBS 29	62-63	A
OBS 30	64-65	B
OBS 31	66-67	C
OBS 32	68-69	D
		9. disobedient
OBS 33	70-71	A
OBS 34	72-73	B
OBS 35	74-75	C
OBS 36	76-77	D
	1-4	Date (month, day)
	5	Card 3
		Observers
		10. disruptive
OBS 37	6-7	A
OBS 38	8-9	B
OBS 39	10-11	C
OBS 40	12-13	D
		11. ill-mannered
OBS 41	14-15	A
OBS 42	16-17	B
OBS 43	18-19	C
OBS 44	20-21	D
		12. inattentive
OBS 45	22-23	A
OBS 46	24-25	B
OBS 47	26-27	C
OBS 48	28-29	D
		13. lying
OBS 49	30-31	A
OBS 50	32-33	B
OBS 51	34-35	C
OBS 52	36-37	D
		14. name calling
OBS 53	38-39	A
OBS 54	40-41	B
OBS 55	42-43	C
OBS 56	44-45	D
		15. playing
OBS 57	46-47	A
OBS 58	48-49	B
OBS 59	50-51	C
OBS 60	52-53	D
		16. rule breaking
OBS 61	54-55	A
OBS 62	56-57	B
OBS 63	58-59	C
OBS 64	60-61	D

Variable	Column	Description
		17. vulgar language
OBS 65	62-63	A
OBS 66	64-65	B
OBS 67	66-67	C
OBS 68	68-69	D
		18. wasting time
OBS 69	70-71	A
OBS 70	72-73	B
OBS 71	74-75	C
OBS 72	76-77	D
BPCHG	78	Barometric Pressure Change
TEMPCHG	79-80	Temperature Change

#### VARI-MAX ROTATION FACTORS

ANNOYI (13)	ATTCHE (12, 15)	LYRULE (22, 25)
WASTIN (27)	DISPLA (19, 24)	DISOIN (18, 21)
ARGNAM (11, 23)	DESILL (17, 20)	BATVUL (14, 26)
AGGCLO (10, 16)		

#### AUTHOR'S GROUPING

AGGRES (aggression-- 10, 11, 18, 23, 26)  
 GOOFIN (goofing----- 13, 16, 24, 27)  
 ANSOCL (anti-social- 15, 17, 20, 22, 25)  
 LEACLI (learning climate-- 12, 14, 19, 21, 28)

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