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Lunar Lunacy:

The Effect of the Moon on Moods and Behavior

“lu·na·cy 1. insanity; mental disorder. 2. intermittent insanity, formerly believed to be related to phases of the moon. ...”

-Random House Webster's College Dictionary, 1991

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Lunar Lunacy: The Effect of the Moon on Moods and Behavior

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INTRODUCTION

It has long been thought that the moon can influence moods and behaviors. Strange things are said to happen on the night of the full moon. Many studies have been done to test this theory. The purpose of this paper is to analyze previous research on this topic and examine the study methods finding a relationship with the lunar cycle. An in-depth review and analysis of current literature are needed to look for patterns in the methodology of the research. Using the above definition, any behavior that is connected to the changing phase of the moon could be called “lunacy”.

THEORIES

There are several different theories in literature today that describe some kind of reactions of human moods and behavior from the phase of the moon. Purposed attributed causes include: ELF (Extremely Low Frequency electromagnetic radiation) waves, Biological Tides, In many studies the mechanisms of influence were simply not given, and would have to be speculated on or inferred. In respect to the exact nature of the interaction between cause and effect, the exact mechanisms are frequently irrelevant, once the degree of connection is established. For example: We do not know exactly how mass distorts space to cause gravitational attraction. But, the resultant effects are

nonetheless predictable, and fortunately for us repeatable. Apples still fall down, and we do not get slung off our earth into space.

EFFECTS

The basis for the following beliefs is unknown as is the mechanism by which these purported effects could occur. Jones (1977) made two historical links with lunacy and the lunar cycle. First, he cites Hippocrates who said that “one who is seized with terror, fright, and madness during the night is being visited by the goddess of the moon” (p. 32). Second he cites Blackstone who told us that “A Lunatic, or non compos mentis is one who has . . . lost the use of his reason and who hath lucid intervals, sometimes enjoying his senses and sometimes not, and that frequently depending upon the changes of the moon” (p. 32). Both of these men, writing more than a thousand years apart, exhibited the belief of the power of the moon upon human madness. Neither man explains the mechanism by which this lunacy allegedly comes about. The research studied here propose many possible effect of the moon phase: Suicide, Attempted Suicide, Number of injuries resulting from traffic accidents, Number of fatalities from traffic disasters, Telephone calls to crisis centers, Telephone calls to poison centers, Telephone calls for police assistance, Misbehaviors, Arrests records, Agitation, and Absenteeism. Cole (1978) notes the lunar lunacy beliefs of the Elizabethan period. During this period in history, it was believed that the lunar phases were connected to “sexual passions, injurious dreams, and hallucinations” (p. 149). Lieber (1978) brings out some theories that connect moonlight with lunacy. In Iceland, a pregnant woman will bear a lunatic if she sits facing the moon. A similar belief exists in Brazil, where “mothers hide their newborn children to prevent the moonlight from affecting them” (p. 7). Lieber never does say if these are current beliefs or if they are now outdated. World wide theories of lunar lunacy would be a good area for further research.

MECHANISMS

Lieber (1978) gives two mechanisms by which the moon could cause an effect on human moods and behaviors. He never explains the specifics of these theories. He theorized that the moon caused shifts in the water in the human body. The shift in body water is similar to the gain of water weight in menstruating women and is theorized to cause an emotional disturbance. These shifts would be similar to the shifts in the tide. Hence, he has given this theory the name: The Biological Tides Theory. He also brought out the theory of Klaus-Peter and Margitta Ossenkopp. They theorized that extremely low frequency (ELF) electromagnetic fields, which are indirectly linked to the cycle of the moon, may cause emotional and behavioral disturbances. A significant correlation was found between self-inflicted injuries in females and the lunar cycle in their study. Klaus-Peter and Margitta Ossenkopp theorized that the female hormonal system may be sensitized to ELF electromagnetic field disturbances. This is also not explained.

METHODOLOGY

Thirty-two articles were examined. In keeping with the stated purpose, only original research was included in this analysis. Seventeen studies were eliminated from his analysis because they were not original research. The remaining fifteen studies were analyzed on the basis of: population, sample, weekend/holiday effect control, operational definition, duration of study, statistical analysis, and what relationships were found.

FINDINGS

Operational Definitions Used

A researcher must operationally define his variables. This is necessary if other researchers are to understand and/or replicate a study.

Operational definitions varied widely from study to study making accurate, direct comparisons difficult. Therefore, each study will be discussed individually. The most common definition of the moon phases was the full moon day plus or minus one or two days and the new moon phase defined likewise. The rest of the days were usually designated as the interphase.

Templer, Veleber, and Brooner (1982) and Templer, Brooner, and Corgait (1982) both had the new moon phase defined with the new moon day plus or minus 1 day, and the full moon day plus or minus 1 day for the full moon phase. They used this definition because they had seen it used in other studies that yielded a significant relationship with lunar lunacy. Temper, Brooner, and Corgait (1982) further differentiated between day and night during their study. "The night hours were again defined as from midnight to 5 A.M. and 9 P.M." (p. 993).

Jones and Jones (1977) used a similar 3-day window where the "day of a particular moon phase as well as the day before and the day after the phase" was used to determine the lunar phase "since a new moon might occur toward the end one night or the very beginning of the next day" (p. 34). They were also working within Lieber's theory of "biologic tides." As the tides have to build up to high tide, so also should the tides within our own bodies.

Odera and Klein-Schwartz (1983) defined the lunar period as the day of the lunar event plus or minus two days. "allowing two days before and after should include the rise to and the fall from the maximum effect" (p. 489).

Wagner and Almeida (1987) considered a definition of the new moon day plus or minus 2 days on either side and the full moon day plus or minus 2 days on either side as the new moon phase and the full moon phase, respectively. The last and first quarters are mentioned in the findings but are never defined. Replication would be extremely difficult since the operational definitions of all the moon phases were not spelled out. They gave no reason why they choose this operational definition. It is assumed that they had the same reason as the previous study.

Sands and Miller (1991) operationally defined the full moon period as the day of the full moon pulse or minus 3 days. This period was compared to all other days. There was no reason given for these definitions, but the methodology was very specific and easily replicated.

Hicks-Caskey and Potter (1991,1992) operationally defined the lunar period “to establish viable procedures for further exploration” as “a 24-hour period from midnight to midnight on the day of the full moon,” and misbehaviors as “those acts potentially harmful to self, to others, to property, and/or disruptive to cottage life” (p. 1878, 1991).

Cohen-Mansfield, Marx, and Werner (1989) used a very good instrument, the agitation behavior mapping instrument. It was used consistently, and it had an inter-observer agreement for each behavior of 0.93. A strength of this study was that they analyzed their data in three different manners, using three different definitions of the lunar cycle. These were the three most common measurements used by previous studies. First they used intervals dividing each lunar month into four different phases. The second analysis was by operationally defining the full moon verses all other days: The full moon, plus or minus one day, was compared to all other days. The full

moon, new moon, and interphase was the third way they defined the moon phases. They had the full moon plus or minus one day, the new moon plus or minus one day, and the interphase all other days.

DeVoge and Mikawa (1977) provided limited information on the operational definitions as “the numbers of crisis calls and suicide threat calls were obtained for the dates of the moon phases (First Quarter, Full Moon, Last Quarter, New Moon) over the two year period” (p. 388). Perhaps this means only one day from each quarter was used, but they do not spell it out. Taylor and Diespecker (1972) used the following definition: “Each admission day was assigned to a moon phase (full moon, third quarter, new moon, first quarter)” (p. 110). Neither of these studies gave an explanation for why they decided on their operational definition of the moon phases. They were both difficult to understand and therefore would be impossible to replicate.

Kelly, Lavery, and Saklofske (1990) used the operational definition of an automobile disaster as one which included 10 or more deaths. The operational definition of the lunar phase was the lunar phase day in which there was a 29.5 day cycle. Each day was given a number, and they also correlated the approximate lunar distance from the earth. The distance of the moon from the earth influences the tides; therefore, the authors think something similar may occur with traffic disasters.

Michelson, Wilson, and Michelson (1979) used a mathematical function to operationally define the phases of the moon. “A sine function was generated with 29.53 days as its period (the number of days from full moon to full moon). A sine value was assigned for each day, corresponding to that day’s ‘nearness’ or ‘distance’ from a new or full moon” (p. 420). There was no explanation given for the choice of this operational definition.

It is presumed to be similar to the definition and explanation used by Kelly, Laverty, and Saklofske (1990).

“In a further attempt to maximize any effects of the full or new moon,” Weiskott (1974) divided up the phases of the moon by having one fortnight centered around the new moon and one centered around the full moon.

Mathew, Lindsay, Shanmuganathan, and Eapen (1991) used an operational definition of the phase of the moon as the lunar cycle defined starting on the day of the new moon. The operational definition is difficult to follow. It is not clear what is meant by the new moon phase or the full moon phase or the first quarter. This would be needed if somebody were to replicate this study. The reason these researcher decided on this operational definition of the moon was not given.

Population/Sample

The researcher must first decide what portion of the population should be concentrated on for this study. He must then find an adequate sample from this population to be his focus. Where he looks and the size of this sample varies greatly from study to study.

There were 2 studies that evaluated agitation or misbehaviors. Misbehavior was defined in the operational definition section of this paper. Hicks-Caskey and Potter (1991, 1992) examined a population of twenty developmentally delayed institutionalized women. All of these women have an I Q of less than or equal to 20. There were 43 residents who had also been at this institution for at least 31 lunar months consecutively. The similarity of the population is a strength of this study. None of the patients in the study left the institution for a vacation. This study was later repeated with weekends and holidays controlled for (1992). It still showed a significant relationship with the

lunar cycle. Cohen-Mansfield, Marx, and Werner (1989) selected 24 patients to be in their study on the basis of their high level of agitation using the Cohen-Mansfield agitation instrument, so we know that they were of a similar mental state. Both of these studies had very small sample sizes, 20 and 24 respectively. This could provide inconclusive data. It would be recommended to increase the sample size.

Four studies examined poison center calls, crisis calls or counseling calls. Odera and Klein-Schwartz (1983) analyzed 22,079 calls to the Maryland Poison Center; 1,019 calls to the Crisis Center in Reno, Nevada, were analyzed by DeVoge and Mikawa (1977). Both of these studies had significant findings. There were no significant findings in the study in which Weiskott (1974) used 736 calls to a college counseling center or the study that received 36,000 calls to a Fort Lauderdale, Florida, crisis center done by Michelson, Wilson, and Michelson (1979). The sample sizes are adequate for all four of these studies. The conceptual difference in the variables measured could be the cause of the disparate findings.

Suicide or suicide attempts were examined in three studies. Jones and Jones (1977) looked at 928 suicides in Cuyohoga County, Ohio. It had reliable records for recorded suicides because all the reported suicides in the county during this 4 year period were include in the data set. This study found a significant relationship with the lunar cycle. Two other studies found no such relationship. Mathew, Lindsay, Shanmuganathan, and Eapen (1991) considered 383 attempted suicides that were presented to a large urban hospital's accident and emergency department during 12 complete lunar cycles. The location of this study is not known. Taylor and Diespecker (1972) inspected 84 suicide attempts that were obtained by records of admissions to a large hospital of the Illawara region on the south coast of New South Wales, Australia. The major difference between the study

which found a correlation, and those studies which did not was “successful” versus “attempted” respectively. A relationship between the phase of the moon and attempted suicides may be caused by the difference between suicide attempts and completed suicides, or it could have to do with smaller sample sizes.

There were two studies that looked at police calls. Templer, Brooner, and Corgait (1982) scrutinized the records of calls for police assistance to the Fresno County Sheriff's Department for 3 separate years. They had 946 days during which there were 361,580 calls. Unfortunately, they had to eliminate 150 days because of “inaccessibility of Data.” This impacted the validity of their findings which could make the results quite unreliable. Wagner and Almeida (1987) Analyzed arrest records for 5 years and city police calls for 2 years for a small northeastern city in upstate New York. The number of arrests and police calls is unknown. Neither study found a relationship with the lunar cycle. It could be that there is no relationship or it could reflect sample size in the study where the size is unknown. There was also no significant relationship found between the 3800 people killed in traffic disasters and the lunar cycle. Kelly, Lavery, and Saklofske (1990) examined world-wide traffic disasters. On average, there are 16.5 accidents a year of the type studied. This study covered a 22 year period. However, they had to leave out 16 accidents because they did not have the date. This is approximately one entire year's worth of data that was not included. Thirty-eight hundred people is quite small when it is divided by the 22 years covered in the study and the fact that the population they are taken from is the entire world.

Templer, Veleber and Brooner (1982) considered the number of injuries in traffic accidents. They used 3 different locations for this study: California with 291,939 injuries, Texas with 84,109

injuries, and Illinois with 60,815 injuries. This gave good geographical distribution to the data and had an excellent sample size.

The last study, Sands and Miller's (1991) considered over 2000 employees of a large corporation in Pennsylvania. Their rate of absenteeism was significantly lower during the full moon period. There are no other studies similar to this for comparison.

Duration of Studies

The duration of a study is important. If it is too short, the effect the researcher is looking for may be missed. Cohen-Mansfield, Marx, and Werner's (1989) study lasted for only a total of 3 months, and it covered only 3 minutes off each hour of a 24 hour day. The total amount of observation time was very limited. Weiskott's (1974) study covered only two fortnights. Neither study found a significant relationship with the lunar cycle. It would be difficult to determine if the findings of these studies are due to the short duration of the studies or if they were due to other factors.

Other factors could influence the study if the duration of the study is too long. Kelly, Laverty, and Saklofske's (1990) study covered traffic disasters over a 22 year period. Many factors that could influence the data in this study have changed dramatically in the last 22 years. Among these changes are the engineering of automobiles, the number of automobiles on the road, the conditions of the road surfaces, and high speeds attainable.

The rest of the studies examined had a duration of 1 to 8 years. Five studies found no relationship with the lunar cycle. Wagner and Almeida's (1987) study utilized arrest records for 5

years and city police calls for 2 years. Templer, Brooner, and Corgait's (1982) study covered 3 separate years. Taylor and Diespecker's (1972) study covered one full year. Mathew, Lindesay, Shanmuganathan, and Eapen's (1991) lasted 12 complete lunar cycles. Michelson, Wilson, and Michelson's (1979) study covered eight years.

All of the studies that found an effect had a time range of one year to four years. Hicks-Caskey and Potter's (1991, 1992) study lasted 19 months. Odera and Klein-Schwartz's (1983) study was 13 lunar months. Sands and Miller's (1991) study covered 2 years. Templer, Veleber, and Brooner's (1982) study used data from 946 days. Jones and Jones' (1977) covered 4 years. DeVoge and Mikawa's (1977) study covered a 2-year period.

Control Group

The researcher may wish to compare his sample to a second sample. This other group would be the control group. This is useful for comparison. Kelly, Rotton, and Culver (1985) tell us that "without having had a 'control group' on a planet without a moon (perhaps a random sample of Venusians), researchers cannot show that a full moon exerts a causal influence on behavior" (p.129). This is not true. The experimental group was the group of subjects during either the full or new moon. All of the studies used the same sample during interphase as a control group.

Weekend/Holiday Effect

The researcher can control for intervening or confounding variable. Controlling for variables such as these can completely change the findings.

Of the eight studies that found an effect, three of them controlled for intervening or confounding variable. Hicks-Caskey and Potter (1992) controlled for a weekend/holiday effect. Sands and Miller (1991) took into account controls for the effects of day of the week, month, and proximity to a holiday. Templer, Veleber, and Brooner (1982) controlled only for daylight and dark hours. Of the studies that found no effect, only one of them made any controls. Templer, Brooner, and Corgait (1982), used multiple-regression analysis to control for holidays, year, month and day of the week.

CONCLUSIONS

The research findings are divided; seven studies found a significant correlation with the moon phases and eight studies found no correlation with the moon phases. This analysis uncovered no patterns that would necessarily alter the findings. The disparity in parameters analyzed makes direct comparisons of these studies difficult if not impossible. Rather than engage in unjustified comparisons of these methodologies a simple contrasting of effect/no effect was noted. The original purpose of this paper was to analyze previous research on this topic and examine the study methods finding a relationship between behavior and the lunar cycle. The studies that found a relationship were: Hicks-Caskey and Potter; Odera and Klein-Schwartz; Sands and Miller; Templer, Veleber, and Brooner; Jones and Jones; and DeVoge and Mikawa. The studies which found relationships found them with the new, and /or full, moon. Although not clearly defined, this is the new and/or full moon day plus or minus 0-3 days. DeVoge and Mikawa however defined the moon phases by quarters. The durations of the studies ranged from one month, to twenty-two years. The studies finding relation ranged from one year to four years. The behaviors that were studied and found a relationship were: Misbehaviors, Poison center telephone calls, Crisis center

telephone calls, Completed suicides, Absenteeism, and, Injuries in traffic accidents. Also, these studies had in common the duration of the study lasting from 1 to 4 years.

FURTHER RESEARCH

The areas covered by these studies have yet to be thoroughly explored. Further research could clarify many of the questionable findings. Other areas that could be studied include menstrual cycles, the behavior of tidal creatures, and the behavior of large land mammals in correlation with the phase of the moon. Each of these could prove or disprove Lieber's biological tides theory. The human female's menstrual cycle is known to be associated with a change in water weight and moodiness. Determining the causal factors of this relationship could suggest a similar relationship as indicated in Lieber's Biological Tides Theory. A change in the location of body water is the explanation Lieber (1978) uses to explain the purported effects of the moon. The behavior of tidal creatures is dependent on the height of the tides. The tides in turn are controlled by the moon. Some tidal creatures will continue their cyclical behavior when removed from the ocean. Therefore, their behavior may be influenced by the moon rather than the tide. Lastly, large land mammals have a large amount of water contained within them. Therefore, their behavior may be influenced accordingly.

For any further research to be significant, some conventions need to be adopted and adhered to: A functionally precise definition of "moon-phase" needs to be clearly stated and used consistently. When used in studies, the actual dates of various phases should be given for later verification. (As it was not in most of the cases studied here.) There needs to be some accounting for more contributing factors of sample groups. Also, sample group size, and study duration, both need to be closely examined to determine validity and reliability. The question "Exactly how many moon

cycles need to be repeated, and how large of a sampling is required for any findings to be valid?" needs to be addressed. Since studies are usually conducted in order to validate a given theory, future researchers should be encouraged to state the theory being tested and how the effects studied are expected to be related to the alleged causes, at the onset of the study. Many of the existing studies, by failing to do this, have left major considerations entirely up to speculation. Of the cases studied, several researchers apparently discarded significant findings which simply were not expected. In particular, DeVoge and Mikawas's study which did reveal a significant relationship between the new moon and "suicide threat calls," when they were looking for a correlation involving the full moon. Previous research in this area has revealed many possibilities for further development of existing theories. The conclusions drawn from them serve as a foundation for future theories. And, the experience acquired will serve as a guide to make additional studies more meaningful.

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