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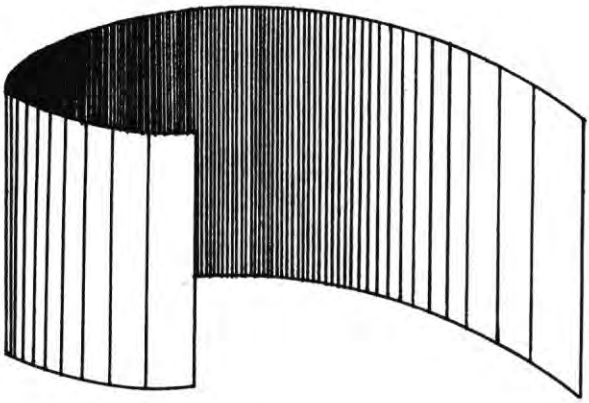

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by Michelle Brown

The Effects of Arousal and Motivation on The Speed of Cognitive Operations Involved in a Visual Search

Abstract

Three collages with target objects were shown to 20 female preschoolers in a Jewish nursery school. The children were divided into two groups. One group's target object was a picture of a fruit basket and the other group's target object was a picture of a doll. The directions were identical for each subject before each trial. They were each told to find the target object within the collages. The hypothesis which states that a person who is looking for an item that is of interest to him will scan a collage faster then if he was looking for an item that is not motivating, was supported. The results are discussed in terms of the practical applications.

Introduction

Ulric Neisser (1964) conducted an experiment where subjects were required to find a target letter within a field of non target letters. He predicted that finding a curved letter, like C, would be more difficult if the distractors were curved letters, like G,O,U, but easier to find if the distractors were straight block letters, like H,I,X . He found that when the target letter shared common

features with the distractors, it was twice as hard to distinguish it from the group. Neisser concluded that context effects the speed of a search.

In this experiment, a new variable which has not yet been examined is introduced. The goal is to determine if subjects' reaction times would increase if he is searching for something that interests him. According to Neisser, when one is trying to scan an area for a certain object he must be able to have enough information from each element of the context in order to determine that it lacks the properties that make up the target he is looking for. This experiment predicts that when one is searching for an object which he is motivated to find, he will be able to evaluate the given objects faster and therefore locate the target object at a greater speed. Neisser continues to elaborate on his experiment by testing the speed of someone trying to find one or more target objects at once. Since Neisser concluded that the speed of a search is not dependent on the number of different targets, this experiment will focus on the speed of scanning for only one target object in a field of miscellaneous objects.

Neisser and Beller (1965) ran an experiment in which subjects had to search through a list of words. They had to find either target words which were defined by their meaning (like their inclusion in a specific category such as `any animal') or targets which were specific single words (like the word `Monday'). Stimulus examination is the process which comes before the identification of a specific object. It is when certain features of the stimulus provide information which allows us to reject or

accept a certain target. They point out that the features do not necessarily have to be individual letters. In some cases words can be identified on the basis of other characteristics such as length or shape.

The targets defined by meaning alone require retrieval from stored information and therefore a memory examination is necessary for their identification. The targets, which are specific words can be distinguished by stimulus examination alone. Neisser and Beller's hypothesis, which was supported, states that scanning would be faster when searching for a specific target than scanning for a target defined solely by meaning. It is for this reason that the subjects in this experiment will be told to locate a specific item in a collage.

According to Wickens (1974), "there has been little experimental work with children on visual search tasks". Forsman (1967) had child and adult subjects search for complex geometric targets. He found that there was a major decrease with age in response time but no large difference was found in stimulus analysis time. This indicates that stimulus familiarity is important because in Forsman's study, the stimuli were presumably equally familiar to both the adult and child subjects. Due to these results, in this experiment the target objects which will be used in both conditions were chosen because of the assumption that they will be of equal familiarity to the children.

Neisser concluded that adults compare target items with each stimulus field item in parallel. Gibson and Yonas (1966) replicated Neisser's and conducted a study on adults and children using letters as stimuli. They varied the size of the target set and "target–field confusability". They noticed that children are

also able to process in parallel. This indicates that there is no significant change with age in the way of processing information. Wickens also concluded that the earliest age that reaction time can be reliably measured is approximately 3 years old. For these reasons this experiment will be conducted on 3–5 year old subjects who can produce valid and reliable scores on a visual scanning exercise.

It is also stated in Wickens that in experiments on subjects' attentiveness to a reaction time stimulus, there is an assumption that "reaction time to a stimulus will be faster if the subject is in a high state of preparedness or attentiveness (oriented toward the stimulus and highly aroused)". This should no longer be an assumption and it is what this experiment will try to support. The hypothesis is that it will take a subject less time to find a target object if the object is of interest to him. A picture of a doll will be shown to motivate the young subjects and a picture of a fruit basket will be used as the control.

Method

Subjects

The subjects were 20 nursery school students from Teaneck, New Jersey. The subjects ranged in age from 3–5 years old , and the mean age was 3.85. The students were obtained from the Bnai Yeshurun nursery school and from the Gan Rena nursery. Both are sponsored by Orthodox Jewish organizations. The students had to be female and have a signed parental consent form in order to qualify as a subject in this experiment. From the pool of subjects the girls were chosen by accidental random sampling. Whether or not the girls wore glasses was

not a requirement in their selection. They were asked if they were hungry or not. If a positive response was given, they were not included as a subject because then the picture of the fruit basket might be more motivating.

Apparatus

The instrument that was used for the control group was an 11 inch, 1 1/2 cm. wide, 8 inch 1 1/2cm. long piece of paper with a collage of pictures covering every inch and every corner. the pictures were of miscellaneous objects. The objects ranged in size and shape, the largest one approximately 4 inches in width and three inches in length, the smallest one approximately 3 cm. in width and length. The objects were scattered on the white paper and were taped down in no particular direction, some right side up, some sideways and some angled.The objects overlapped with one another so that the entire paper was filled. The collage which was initially created with objects in color was xeroxed so that all of the objects were uniform in black and white, and therefore color could not create a bias for the target object.

There were three collages for the control group. (see appendix A). In each collage all of the pictures in the background field remained constant in position and form. Only the target object was moved to 3 different places corresponding to the three different trials per subject. For the control group the target object was a basket filled with fruit. In the first trial the fruit basket was vertical and slanted at a 65' angle to the right. It was placed on the bottom of the right side of the page, 2 inches 1 cm. in from the right side of the page. In the second trial the

fruit basket was vertical on the left side of the page, 1 1/2 inches down from the top and 1 inch in from the left side of the paper. In the third trial the fruit basket was vertical and slanted at a 65' angle to the left. It was placed in the top right corner of the paper, 2 inches 2 mm. in from the right side and 3 cm. in from the top.

The same collages were used for the experimental group. (see appendix B). The same pictures remained in the same constant positions that they were in for the control group. The only variable that was changed was the target object. For the experimental group, the target object, instead of being a picture of a fruit basket, was a picture of a doll in a dress with a bow in her hair. Both target objects, the doll and the fruit basket, were equal in size at 1 inch 3 cm. long, 1 1/2 inches wide. The experimental target object was placed in the same three locations as the control target object. A picture of a doll was used as the experimental target object because it was assumed that a doll would be stimulating to girls ages 3–5 years old. A fruit basket was used as the control target object because it was presumed to evoke a neutral reaction from the subjects.

Design

The independent variable was the target object. For the control group the object was a picture of a fruit bowl. For the experimental group the object was a picture of a female doll. The dependent variable was the amount of reaction time it takes a subject to find the target object, measured in seconds. The design used was a two independent group design. A between subjects design was chosen in order to avoid any carryover

effects and so that the preschoolers would not get confused. Each subject was told to pick a piece of paper from a cup. The paper had either the letter "C"on it for control or the letter "E" on it for experimental. This was how the subjects were randomly assigned to the two groups.

Procedure

First the subjects were randomly assigned to either the control or experimental group. Each group had 10 subjects and each subject in both groups underwent three trials. Between 9:30 –11:00 am, each subject was taken to a brightly lit room, was seated in a chair with a desk in front of it and was told that she would be playing a game. The subject was also told what target she was to look for in the collage. If the subject was in the control group the experimenter asked, "Do you know what fruit looks like ?". If the subject was in the experimental group she was asked, "Do you like dolls ?". All of the subjects answered yes to either question.

The subjects were then told what to do. The experimenter said to the subject, "Say the word `here' and point to the object as soon as you find it". As soon as the experimenter placed the collage on the desk for the subject to view, a stopwatch was turned on. Once the experimenter heard the word `here', she turned off the stopwatch and checked to see if the subject was pointing to the correct target object. If the correct object was found, the experimenter recorded the subject's reaction time in seconds (increments of time). If the incorrect object was found, then the testing would have been terminated for that subject (but that did not occur in this experiment).

In between each trial there was a 10 second break to clear the subject's mind so she could start off fresh with the second trial. After the 10 second intermission, the experimenter proceeded to the second trial and asked the subject to find the same target object that was in the first collage. The same steps were done for the third trial. The same experimenter gave identical instructions and administered a uniform procedure before and in between each trial to every subject in both the control and experimental groups.

Results

The control group had a mean score of 8.67 with a standard deviation of 3.42 and a standard error of the mean at .26 . The experimental group had a mean score of 3.62 with a standard deviation of 1.34 and a standard error of the mean at .42 . The SED equalled .49 . A one–tailed t–test in the positive direction at the $p < .05$ level was used as the criterion for the statistical analysis. The degrees of freedom was 18, the critical t–score was 1.734 and the obtained t–score was 10.31 . The hypothesis that the reaction time for the experimental group would be faster was supported. It took the subjects significantly less time to find a picture of a doll then a picture of a fruit basket.

Discussion

These results show that the response time between the two groups differed significantly. The fact that one target was of interest had an influence on the speed of scanning a field for an object. This experiment demonstrated that when a girl is looking

for an item that interests her, she will be motivated to scan the area faster then if she is looking for an item which does not trigger arousal. The practical application of this finding is wide spread. Every action that we do is effected by motivation and arousal. At the preschool age, teachers and parents should stimulate their children in many different areas in order to increase their interest. This may help the children later on in elementary school and high school when it is required to consume a lot of new information in many different subjects in a short period of time. If the child is interested in the subject then he/she will be motivated to learn more about that subject and more importantly the learning will occur faster. It would be interesting to replicate this experiment using male subjects and see how their scores compare to the female subjects.

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Appendix B
Chestnut
Loden
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Chestnut
Herald Tribune
CALENDAR
1993


Appendix A
Chestnut
Loden
Herald Tribune
CALENDAR
1993

by Lisa Blitz

Family Influences on Self – Esteem

Children with high social self–esteem are liked better by their peers (Cauley and Tyler, 1989; Harter, 1982) and children with high academic self–esteem tend to do better in school (Harter, 1981; Marsh et al., 1984). Since varying levels of self–esteem can heavily affect one's progress in life, it is important for one to understand exactly what self–esteem is and precisely what can influence it during the critical stages of development in a child's life.

Self–esteem is the evaluative side of the self–concept. It deals with the judgments we make about ourselves. According to Rosenberg (1979), "a person with high self–esteem is fundamentally satisfied with the type of person he is, yet he may acknowledge his faults while hoping to overcome them." In essence, self–esteem is a realistic evaluation of one's personality, and capabilities, along with an attitude of self–acceptance, self–respect, and self worth.

The scope of this paper will focus on the various familial patterns and parenting styles and their influences on children's self–esteem. In a study done in 1982, George F. Kawash hypothesized that children raised in a warm and accepting environment would develop low levels of anxiety and high levels of extraversion. This, he thought, would lead to elevated interpersonal contact and more possibility for positive social

feedback. In the end Kawash believed this would result in an increased level of self–esteem.

Kawash studied 89 fifth grade students from middle class suburban neighborhoods. The children were given questionnaires and were asked to rate themselves on the basis of friendliness, ego strength, immunity to threat, guilt proneness and self sufficiency. The short form of the Coopersmith SEI (Self–Esteem Inventory) was employed as the measure of self–esteem. Correlations between Coopersmith's SEI and selected personality variables suggest a significant positive correlation between friendliness and self–esteem, especially in females.

Kawash believes there is an important relationship between anxiety, extraversion (friendliness), and self–esteem. He feels that the basis for the correlation between these three characteristics lies within the parental training. Siegelman (1966), published material that relates parental behavior to extraversion. He explains that since the child feels secure and happy with the loving and accepting parental behavior he receives, the child is motivated to interact with other people in hope of finding similar pleasurable experiences. Unpleasant experiences, resulting from negative parental behavior might have the opposite effect; children may then feel a need to escape from their parents and from any other people with whom they come into contact.

To prove this theory, Siegelman used a sample of fourth, fifth, and sixth grade males that were reported by their peers as being withdrawn. These "withdrawn" students reported displaying less loving behavior and greater punishment from their parents.

Mary J. Schneider and Harold Leitenberg (1989) also saw a difference in self–esteem between children who were aggressive/ extraverted and children who were withdrawn. They did a study consisting of 583 children from the fourth, fifth, and sixth grade classes. The children were mainly caucasian and came from lower to upper–middle–class homes spread across small cities and towns near Burlington, Vermont. Questionnaires were handed out to students and teachers. Students received the Piers and Harris Self–Concept Scale to measure their self–esteem and then they were given the Causal Attribution Questionnaire to measure social, academic and athletic events. Simultaneously, teachers filled out the Pittsburgh Adjustment Survey which comprehensively measured aggressive and withdrawn behaviors.

After compiling the answers from the questionnaires, the results were as expected. A direct comparison of self–esteem in mutually exclusive groups of aggressive and withdrawn children was clearly seen. This study indicated that children who were solely aggressive had higher self–esteem scores than children who were solely withdrawn. One of the main reasons for this is that self–esteem is associated with peer status and aggressive children are usually more popular with peers than withdrawn children.

These results correspond with Siegelman's (1966) study linking self–esteem to extraversion. It all follows the idea that if a child has positive familial experiences he will want to interact with others. As a result of having an extraverted/ aggressive personality, the child will be popular among peers and will ultimately possess a high self–esteem. Children, however, who

have negative familial experiences tend to be introverted and withdrawn. These children usually make very few friends and therefore tend to possess low self–esteem.

In Kawash's (1982) article, Sarason, Davidson, Lighthall, Waite, and Ruebush (1960) are cited for doing a study which attempted to correlate parental behaviors with anxiety in school children. Mothers of highly anxious children were insecure about their own abilities and were overly concerned with keeping up a "proper" image. Furthermore, these mothers punished aggressive behaviors strongly and constantly made negative comments concerning their children's behavior. Sarason et al. reported that mothers of highly anxious children tended to view their children's behavior more in terms of the standards and values of others than on the actual capabilities of the individual children.

Sarason et al. speculated that these maternal behaviors cause hostile feelings in their children. Since these children realize they should be loving their parents instead of feeling hostile towards them, they internalize many feelings of guilt. The combination of built up hostile and guilt feelings eventually lead to high anxiety and low self–esteem. From this study, one can see that the behavior of mothers of highly anxious children corresponds with the behavior of mothers of introverted children.

Coopersmith's (1967) data, also found in Kawash's (1982) article, seems to clarify the relationship further. When he did a study of pre–adolescent boys, he found that it was the <u>type</u> rather than the <u>frequency</u> of punishment that was related to the level of self–esteem in the child. Mothers of high self–esteem boys tended to be more careful and consistent in their

enforcement of rules than were mothers of low self–esteem boys. Mothers of high self–esteem boys were more likely to see their punishment as effective while the sons were more likely to see the punishments as deserved. On the other hand, mothers of low self–esteem boys were constantly punishing their sons, were rarely enforcing the rules and were usually not finding their punishments effective. In addition, the sons saw their mothers as unfair and did not think that they were deserving of punishment. The high self–esteem boys felt their mothers were taking an interest in their lives and were setting down guidelines and rules only because they cared for them. Conversely, the low self–esteem boys interpreted the fact that their mothers rarely enforced rules, (and when they did it was in such an autocratic fashion), as meaning that their mothers did not have any interest in their lives.

George F. Kawash. Elizabeth N. Kerr, and Janet L. Clewis (1985) continue to discuss self–esteem in *Children as a Function of Perceived Parental Behavior.* They maintain that maternal interest, control, warmth, and acceptance are significantly related to the self–esteem of children. In their study, they handed out questionnaires to 126 fifth and sixth grade children from a small southern Ontario city. Self–esteem was measured by the Coopersmith's SEI, and a shortened version of the CRPBI (Schaefer's Children's Reports of Parental Behavior Inventory) measured the children's perception's of parental behavior. Three scales were measured by the CRPBI: a) acceptance versus rejection, b)firm versus lax discipline, c) control versus granting autonomy.

After computing the results it was found that the mean

SEI scores for boys and girls were similar and the mean scores on each CRPBI factor for each parent were very close. Furthermore, all six correlations between SEI scores and CRPBI factors were significant for boys while four of the six were significant for girls. This study confirmed that there is a definite association between self–esteem and parental perceptions for both boys and girls. On a more general basis, this study confirmed that if children perceive parents as taking an active interest in their lives, they will feel more accepted and will ultimately have a higher self–esteem. The antithesis of this however, is that if parents do not seem concerned with their children's lives, the children will think that their parents do not care and this will result in low self–esteem.

We have now discussed two types of parenting styles; those parents which take an active interest in their children's lives and those parents which do not have particularly much to do with their children. Joan Kaufman and Dante Cicchetti (1989) discuss a third type of parent – child relationship; one in which the children are maltreated by their parents. Kaufman and Cicchetti hypothesized that maltreated children would fare poorly in terms of self–esteem. They studied 137 children 5 to 11 year old children. Seventy children had a history of maltreatment and 67 children served as demographically matched nonmaltreated comparisons. All of the children in the study came from low socioeconomic status groups, and 65% of them came from single parent homes. In addition, 87% of the families were receiving Aid to Families with Dependent Children (AFDC). The maltreated children in the study were referred by social workers from private and public service agencies. The children

from nonmaltreated homes were recruited through advertisements placed around the neighborhood.

There are three categories of maltreatment. Children whose supervision, nutrition and /or medical needs were not met were classified as neglected. Children who were constantly called unworthy, who were ignored and who were frequently exposed to marital conflict were considered emotionally abused. Lastly, children who were burned with cigarettes, bruised from beatings and scalded with hot water were considered physically abused. Most of the maltreated children in this study suffered from multiple forms of maltreatment.

The study took place in a summer day camp. The children were divided into three groups; half of each group was comprised of maltreated children and the other half was comprised of nonmaltreated children. Special education teachers and college undergraduates were trained and served as counselors. The counselors were not told which children were from which group.

The California Child Q–Sort was used to assess the adults' evaluations of each child's self–esteem. The Q–Sort is a deck of 100 cards, each with different personality/behaviors described on them. The cards are arranged in 9 piles, ranging from those that are most descriptive to those that are least descriptive of a given child. They create profiles which can be analyzed on a number of different dimensions.

On the Q–Sort test, the maltreated children were found to have significantly lower self–esteem scores than the comparison children. Interestingly, there were also differences within the subgroups of the maltreated children. Children who were subjected to all three forms (neglect, emotional, and physical

abuse) of maltreatment had the lowest self–esteem measures (Kaufman and Cicchetti, 1989).

This is consistent with all the previous studies mentioned. Maltreatment at home leads to a distrust of people in general and to an inability to form friendships. In turn, a lack of peers generally leads to a low self–esteem. Likewise, nonmaltreated children experienced normal relationships at home and abroad and therefore tend to have a higher self–esteem.

In conclusion, self–esteem can be heavily influenced by one's family and by one's home environment. All the studies seem to prove that children who have positive experiences in the home relate well to people in general. They usually have many friends and consequently possess a high self–esteem. Conversely, children who suffer from negative experiences in the home tend to be more withdrawn. They do not interact well with others and therefore have very few friends. This, in turn, leads to low self–esteem. Although there are many factors that impact on self–esteem, the role of the family seems to be one of the most major influences.

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by Aliza Dworken

The Story of the Moral Narrative

The Jewish people have been known throughout the centuries as "People of the Book." Most would ascribe this name to their close connection to the Torah. However, one might maintain that it is a reference to their affinity for books, or storytelling. This storytelling has taken many forms and has served many purposes throughout history. First and foremost, the Jews have always seen the story as a transmitter of values.

Psychologists and educators concede to this all–important role of the story. In fact, they recommend the story as an effective way of transmitting values and morals in the classroom. "In Ancient Times, all teachers were storytellers, passing along the history and traditions of their tribes through oral tales. Now storytelling is returning to the classroom."[1]

Why is the "return of the story" a popular trend today? How has the use of the story developed from Ancient Times until today? And, how does the Jewish use of the story throughout the ages, and for the future, reflect today's trends and psychological discoveries?

Most of us are familiar with the important role stories played in our youth. Fairy tales, for example, were always a favorite. We all cherish fond memories of the entertainment they provided.

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1 Peninah Schram, course rationale, *Informal Education: Storytelling.*

Bruno Bettelhiem, in his work *The Uses of Enchantment: The Meaning and Importance of Fairytales*, stresses the importance of the fairytale. "...the most important and also the most difficult task in raising a child is helping him to find meaning in life...second in importance is our cultural heritage, when transmitted to the child in the right manner. When children are young, it is literature that carries such information best."[2] Stories very often are seen as means of transmitting culture.

What makes the story a useful means of transmitting this cultural heritage? The story is the "universal learning medium."[3] A simple story can teach many concepts. At times the lessons are obvious. Other times, the story expresses its lessons as a metaphor. Metaphors tend to be particularly effective in explaining concepts which are foreign to the learner. "Metaphors are necessary as a communicative device because they allow the transfer of coherent chunks of characteristics – perceptual, cognitive, emotional and experiential – from a device which is known to a topic which is less so."[4]

The story is therefore used in the classroom for various reasons. "To promote problem–solving skills, to teach history...to add interest to science lessons...to encourage creativity and stimulate imagination, to enhance listening skills, to exercise

2 Peninah Schram, review essay, *Elijah's Violin and Other Jewish Fairy Tales,* by Howard Schwartz (New York: Harper and Row, 1983) 11.

3 Vivian G. Paley, *The Boy Who Be A Helicopter* (Cambridge: Harvard University Press, 1990).

4 Olga Nelson, "Storytelling: Language Experience For Meaning Making," *The Reading Teacher* February 1989: 388.

speech and language skills, to motivate students to read by exciting them with the world of tales, and to introduce students to world cultures."[5] The narrative takes a learning task or a piece of information and makes each come alive. No other technique can duplicate the results of a room full of children mesmerized while listening attentively to a story.

But, most importantly, a story can teach values. On the most simple level, those fairytales from our youth usually had "the moral to the story." *Beauty and the Beast* reminded us that beauty is only skin deep or not to judge a book by its cover.

On a more sophisticated level, the narrative as a "moralizer" is a "human phenomenon." "The narrative provides a very powerful means for understanding human experience."[6] The need to relay narratives is a natural human inclination. Whenever something occurs, human beings tend to tell a story that recounts events in a sequence. The narrative is "international, transhistorical, transcultural – it is simply there, like life itself."[7] The story does not simply retell events, but gives them meaning, and helps us understand human actions. Asasdair McIntyre claims that since man is "essentially a story–telling animal," he uses the story to describe man's actions. We also understand our own lives in terms of narratives. "It is because we all live out narratives in our lives and because we understand our lives

5 Schram, *Informal.*

6 Lyn M. Brown and Mard B. Tappan, "Stories Told and Lessons Learned: Toward A Narrative Approach to Moral Development and Moral Education," *Harvard Educational Review* 59.2 (1989):4.

7 Brown and Tappan, 185.

in terms of the narratives that we live out that the form of narrative is appropriate for understanding the actions of others."[8]

How does the narrative accomplish this feat? "The narrative meaning functions to give form to the understanding of a purpose to life and to join everyday actions and events into episodic units."[9] Without the narrative, all that happens to us is just a jumble of events without meaning. But, the meaning for which we strive to find in our lives is a specific one – a moral meaning. This theory is based on Hayden White's "narrativity" theory in historiography. The historical narrative is different from a listing of historical events because it has a moral perspective. He claims that every story relayed has a moral or "endows events, whether real or imaginary, with a significance they do not possess as a mere sequence, then it seems possible to conclude that every historical narrative has as its latent or manifest purpose the desire to moralize the events of which it treats." White clearly states that humans never narrate without moralizing.[10] This theory applies to the stories we tell day in and day out, as well. The story gives our lives moral meaning.

Judaism has utilized stories for centuries for these very same purposes. Stories are part of the blood stream of every Jew. Nathan Ausubel, in his introduction to his *Treasury of Jewish Folklore*, describes a portrait which shaped itself through his collection of Jewish stories. "This portrait was of one I knew

8 ibid.

9 ibid.

10 Brown and Tappan, 188.

intimately, of someone endowed with a well–defined character, familiar psychological traits, ethical values and emotional responses. And before long I knew with certainty whose portrait it was – it was the composite portrait of the Jewish people."[11] The story in Judaism is indeed a portrait of its essence.

Stories were utilized for entertainment purposes, similar to the child's view of the story aforementioned. In fact, in Gemara Shabbat 30b Rashi explains a technique used by many rabbis of the time before beginning derashot. The advice given to rabbis by Rashi is, "Make the laws pleasant to them through a story which tugs at the heart." The Jewish rebbe beginning class with a joke is a familiar scene.

In Judaism, however, the story contains much more that entertainment value. It is a transmitter of knowledge and morals. The Jewish story is almost always ethical, directing a person to what is right conduct, "ceaselessly instructing, often even when it is being entertaining or humorous."[12] One objective of these tales is didactic. The stories of Patriarchs, prophets and Jewish heroes are meant to present to the reader inspiring examples of righteousness.

"Jewish stories have been transmitted from generation to generation through both the oral and written traditions. A story is an effective way to teach religion, traditions, values and customs, a creative way to introduce characters and places and an imaginative way to instill hope."[13] The story is an integral

11 Nathan Ausubel, Introduction, *A Treasury of Jewish Folklore,* ed. Nathan Ausubel (New York: Crown Publishers, 1948) XVII.

12 Ausubel, XX.

13 Penina Schram, "Current Collections of Jewish Folktales,"

part of the mesorah tradition – passed on from father to son.

The Jewish sacred writings, such as the Bible, Talmud and Midrash are repositories of legends, myths and parables. As a devotional obligation, the Jew of every age studies this literature, thereby absorbing these stories as part of who he is. These stories humanize our heroes – Moshe, Jeremiah, Hillel – transforming them into "members of the same family."[14]

The Bible itself contains numerous stories written if they were labelled as "hutzracha l'dorot" – needed to teach lessons to future generations. The Book of Genesis specifically is a "story book" containing tales after which we must model our lives. Also called Sefer Hayisharim, Book of the Righteous, Genesis serves as guide for a moral life. The essential concept of "Maaseh avot siman l'banim" – the actions of the fathers are a sign (of how to act) for the sons – is one which is integrally related to the entire essence of Genisis.

As in secular writing, the metaphor in Judaism is also a vivid way to bring a message home. The book of Mishlei, written by King Solomon, is an example of one book of the Torah full of metaphors and parables. Shir Hashirim itself is one long parable of G–d's love for the Jewish people as expressed in the love of a man and woman.

The effectiveness of the parable is seen frequently in the Prophets. One such example is in Samuel II Chapter 12. Natan the prophet must rebuke King David for his sin in killing Uriah and taking his wife Batsheva. However, Natan chooses to tell

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Jewish Book Annual 49 (1991–92): 73.

14 Ausubel, XVIII.

King David a story, instead of simply telling him "you have sinned." The story is of two men, one rich and one poor. The poor man had one sheep which he kept close to his bosom. And, the rich man took that sheep to feed to a guest. Upon hearing the story, King David became enraged and demanded the death of the rich man. Natan replied, "Atah HaIsh" – you are that man! The story made a much stronger impact on King David than a "mussar shmooze" would have had. "Through some mysterious, magical process, a story will often pop into your head suddenly, help you to define your problem more clearly..."[15] The story made David's sin so obvious to him that it was clearly defined.

The Midrash is another instance of the use of stories in relaying messages. In fact, the Rambam states that if one reads the Midrash literally, without realizing the lesson it is trying to relay, he is reading the Midrash entirely wrong. The most significant tales of the Jews are found in the Agadah of the Talmud and in the Midrash. The rabbi's who compiled the Talmud and the Midrash understood this need of the people to relate to their teachings. "They were down–to–earth teachers of the people, robust with the life–urge and endowed with good, practical sense."[16] They wanted to make teaching intelligible to the people and therefore drew upon familiar tales and "they in turn took fire from the uninhibited folk imagination and themselves adapted innumerable folk–stories and sayings which

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15 Howard W. Polsky and Yaella Wozner, *Everyday Miracles* (New Jersey: Jason Aronson Inc., 1989) 4.

16 Ausubel, XIX.

they wove ingeniously into the fabric of their learned homilies and discussions."[17]

The Midrash uses several forms of narrative from tales of righteous men to historical events– in order to stress a point. Interpretation through storytelling is more effective than telling a message in abstract language. Jacob Neusner, in his book *Invitation to Midrash*, outlines the four types of stories found in the Midrash as "1. The parable 2. the setting for, of formal precipitant of a saying 3. the (ordinarily legal, but sometimes moral) precedent, and 4. the story– dealing with a biblical figure or relating to a hero in the sages' world."[18] Each means effectively relays a lesson.

Aside from the stories found throughout Jewish literature, there are mitzvot which command the telling over of stories. "V'higaddata l'bincha"– the command to tell the story of the Exodus is one such mitzvah. In fact, the entire holiday is one centered around the mitzvah of haggadah–retelling the story from enslavement until redemption. The purpose, of course, is not purely historical, but to pass on values as well. And, of course the duty to study as a religious act included the study of stories found in the Tanach, Mishna, Talmud, and Midrash.

The famous "Maggid" who would travel from town to town relaying stories, and, of course, wonderful Hasidic Tales, are modern variations of the ancient biblical story. They provide "sound practical, psychological guidelines for people with

17 Ausubel, XIX.

18 Jacob Neusner, *Invitation to Midrash* (San Fransisco, Harper and Row, 1989), 190–191.

problems that stand in their way of reaching desired goals. And, they are effective educational methods for disseminating values," like all Jewish stories.

Lessons learned from the various stories of Judaism are to become part of who we are, and a guideline for Jewish living to "then anchor itself in your mind, to be used again when it is helpful."[19] Judaism has long realized the power of the narrative in teaching values and morals. This trend of using stories for didactic ends has continued in the Jewish classroom of today.

The Child Tells His Own Story

Brown and Tappan maintain that although a teacher telling a story can relay morals, individuals develop better morally by authoring their own moral stories. In general, when children tell their own stories in the classroom, ideas normally generated by storytelling are based on their own experiences. The story will then be all the more meaningful because it is relevant to the "author". Children all have stories within them, and all they are waiting for is a "certain set of circumstances for these stories to unfold and to come forth."[20] Vivian G. Paley maintains that children in classrooms all over are "thinking up plot without instruction. Amazingly, children are born knowing how to put every thought and feeling into story form."[21] The storytelling is important because "In storytelling a child says, `This is how I interpret and translate right now something that is on my

19 Polsky and Wozner, 4.

20 Nelson, 388.

21 Paley, 4.

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mind.'"[22] And, then the child, after telling his story will know more about himself than he did before. Talking about an experience that occurred to him provides the child with a new meaning to his experiences. In addition, whatever is learned from those experiences which the child tells himself will remain longer. "Telling a story to someone else engraves it more deeply in your memory so that it becomes part of you and your way of life."[23]

In terms of moral development, Tappan and Brown see authorship as the key to development. An individual is faced with a specific dilemma that requires a moral decision and needs to decide, what is the right thing to do? A child is asked, "All people have had the experience of being in a situation where they had to make a decision, but weren't sure what they should do. Would you describe a situation when you faced a moral conflict and you had to make a decision, but weren't sure what you should do?"[24] The child then describes a situation, from a cognitive perspective, (what she thought), and affective perspective, (how she felt), and a conative perspective, (what she did). When the individual tells the moral story, she is forced to claim authority, and take responsibility for her moral thoughts, feelings and actions. The child does not simply learn about morals, but feels that she alone can establish her moral personality, and must act upon it.

In addition, narrating a story necessitates reflecting on that

22 Paley, 10.

23 Polsky and Wozner, 5.

24 Brown and Tappan, 195.

experience. "To narrate a story is already to reflect upon the event narrated."[25] Very often one goes through life without thinking about events he experiences. Narration points out that one must evaluate all that he says and does. The child then learns from the experience.

The presence of an audience also enhances the telling of a moral story. The audience serves as a "sympathetic and engaged listener." It also encourages authoring and claiming authority by virtue of the fact that the storyteller must now defend the legitimacy of his moral actions.[26] Children are excited to share stories with others. And, the audience benefits as well from the experience.

The story is an effective way of relaying moral values, but when a child tells a story which is "a living, evolving entity, influenced by the drama around her, as well as the one inside," its impact is immeasurable.[27]

This technique can be used in the Jewish Studies classroom, as well. Teaching midot and morals is an important role of the Jewish Studies teacher, and teachers are consistently searching for new ways to inculcate values in a society devoid of values. Children authoring their own stories is one new option.

25 Brown and Tappan, 192.

26 Brown and Tappan, 195.

27 Paley, 24.

It is interesting to note that this technique of moral narrative authorship is utilized by G–d Himself. One such example is in Genesis 3:9. G–d realizes that Adam and Chava have eaten from the forbidden fruit. G–d asks Adam a series of questions. First, "Where are you?" G–d knew where Adam was, why did He need to ask? Then G–d said, "Who told you that you are naked? Did you eat from the tree from which I told you it was forbidden to eat?" Did G–d not know the answer to that question? G–d similarly asks Chava a question to which He knows the answer. Why does He do so?

Perhaps G–d was encouraging Adam and Chava to author their own moral stories. G–d wanted them to take responsibility for their actions, to realize their sin and evaluate what they had done. By forcing them to learn from their actions by authoring narratives.

A similar situation occurs in Genesis 4:9 after Cain killed Abel. G–d says to Cain, "Where is Abel your brother?" G–d surely knew where Abel was, however He was encouraging Cain to tell the story of his sin. G–d in essence was teaching us through the Bible narrative the pedagogic technique of the self–authored moral narrative.

Such is the story of the narrative. Since the beginning of time it has been a form of entertainment, a didactic tool and most importantly, a conveyer of moral values. These purposes have been the heart and soul of the Jewish story as well. However, the story can teach all the more when it is told by the learner, and not simply learned. The morals a child derives from a story truly impact and are absorbed when the story is his own.

That narrative will ensure that "students can not only be encouraged to claim authority, and assume responsibility for their own moral perspectives, but they can also be encouraged to explore– in all of its irreducible richness and complexity– what it means to live a moral life."[28]

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Sharon Frisch

Phantom Limbs

Following the amputation of almost any body part, people have reported the sensation of a phantom limb. A phantom limb is the illusion that the actual limb still exists. About 95% of amputees experience phantom limb sensation (Jones, 1988) while 67% will experience phantom limb pain (Dernham, 1986). The actual number of people experiencing such sensation and pain are probably even greater than the statistics suggest. Many amputees who have not been prepared for the sensation of a phantom limb will ignore it and assume it is their imagination (Dernham, 1986).

Phantom limbs can occur in a patient immediately following surgery or may not begin until weeks later. The pain which accompanies the phantom limb ranges from mild to severe. It seems as though the pain can be triggered by such irritants as cold, damp weather and high amounts of stress. In many cases, when areas on the contralateral limb, known as trigger zones, are stimulated, the person will experience phantom limb pain (Dernham, 1986).

Researchers believe a phantom limb may result from both physiological factors such as poor stump healing and neuromas, and psychological factors such as anxiety over new body image, disruptions in lifestyle due to the surgery, and personality traits such as rigidity and excessive self–reliance (Dernham, 1986).

Ronald Melzack, although aware of the fact that no theory on the cause of phantom limbs has yet been proven, has come up with an extensive explanation for a possible cause for phantom limb sensation and pain. Especially in the beginning, the reality of a phantom and its pain is extraordinary. An amputee can feel the same sensory qualities in a phantom as in an actual limb and perceive its precise location. In fact, it has been documented that a patient may actually try to step out of bed onto a phantom leg or reach for a cup with a phantom hand (Melzack, 1992).

In general, a phantom behaves exactly as a normal limb. For instance, a phantom arm will hang straight down while one is walking, a phantom leg will bend while sitting and stretch while laying down. However, sometimes the amputee will feel as if the phantom is stuck in an unusual position. Since there is no way to fix the phantom's position, the amputee must accommodate his own behavior to the phantom's position. One man was sure that his phantom arm extended straight out from his shoulder and therefore had to turn sideways whenever he would pass through a doorway (Melzack, 1992).

The reality of a phantom is enhanced in several ways. A person may feel sensations in the phantom that he /she had felt in the actual limb before amputation. For example, the amputee may feel a bunion in a phantom foot or feel as if a ring is on a phantom finger. According to Melzack, these are not merely recollections of previous pain but actual intense sensations. When a subject experiences a phantom limb, he may also indicate that there are gaps in and between the phantom, however, they are able to estimate where different parts of the limb may exist

in space. This also supports the idea that the phantom may not be due to a visual impression of the body (Jones, 1988).

The fact that a phantom feels all sorts of sensations enhances its reality. A phantom can feel changes in pressure, temperature and pain. A phantom can also feel wet, itch, or tickle (Melzack,1992). Pain seems to be the most disturbing sensation of a phantom limb. As many as 70% of amputees suffer from phantom limb pain (Melzack, 1992).

Finally, the fact that the phantom is considered as part of one's own body enhances its reality. Even when amputees feel as though the phantom is not connected to the stump, it is still considered a part of the body and moves in conjunction with other body parts.

Beside amputation, a condition known as brachial plexus avulsion can result in a phantom. Brachial plexus avulsion is a condition in which the shoulder is severed from the body in such a way that all the nerves from the arm are ripped from the spinal cord. The victim feels as though the phantom occupies the actual arm, although the arm may physically still be there. When the actual arm is moved, if the patient's eyes are closed or turned away, the patient will not acknowledge the movement. In addition, although the actual arm does not respond to stimulation, the phantom is quite painful and surgical removal of the arm has no affect on the phantom limb pain (Melzack, 1992).

Paraplegics also suffer from phantom limb pain. Although a paraplegic may lay motionless, he may complain of continuous phantom limb movements. These movements result in a feeling of exhaustion in the patient. Finally, anyone undergoing spinal

cord anaesthesia may complain of a phantom (Melzack, 1992).

According to Melzack, the oldest explanation for phantom limbs is the fact that the nerves remaining in the stump continue to conduct impulses. The impulses travel from the stump to the spinalcord through the thalamus and up to the somatosensory cortex in the brain. In order to treat the pain based on this explanation, physicians have cut nerves in the stump, within the spinal cord, areas of the thalamus and in the somatosensory cortex. This, however, never completely abolishes the pain and does nothing to get rid of the phantom limb itself.

Some research suggest the source of phantom limbs come from spontaneous firing of neurons in the spinal cord that no longer receive their normal sensory input. This spontaneous output is excessive and usually is an abnormal, busting pattern which when reached by the cortex is perceived as a phantom limb. The problem with this explanation is that paraplegics who have suffered complete upper spinal cord destruction can feel pain coming from lower body parts thus bypassing the destruction (Melzack, 1992).

Still, other research suggests that phantoms are caused by signal changes in the somatosensory cortex itself. For example, if two arms become paralyzed or are amputated, the areas in the cortex, which were arranged in a certain manner and received input from the arms, reorganize themselves and respond to sensory input in a different way (Melzack, 1992). If this explanation were enough, then the removal of the affected areas of the cortex would solve the problem. There must be a better explanation.

Ronald Melzack has come up with his own hypothesis for

the cause of phantom limbs and their pain. According to Melzack, these sensations result from within the brain; however, more of the cerebrum is involved than actually thought. The brain contains a neuromatrix, a network of neurons that respond to sensory input. In addition, this neuromatrix continuously fires impulses, indicating that the body is intact and belongs to oneself (Melzak, 1992).

The neuromatrix must contain at least three neural circuits to enable phantoms to have all the characteristics they seem to possess. First, they must contain the normal sensory pathways leading to the sensorimotor cortex. Paraplegics and amputees refer to the sensations they feel from their phantoms as painful, pleasurable and exhausting. Therefore, there must also be a circuit leading through the reticular formation and limbic system which controls emotion and motivation (Melzack, 1992). Finally, the neuromatrix must involve areas of the brain which indicate a sense of oneself. The parietal lobe is the area which seems the most important for this information. It has been shown that patients who suffer from parietal lobe damage often believe that a limb that actually does belong to them belongs to someone else (Melzack, 1992).

Sensory stimulation from the periphery is integrated through these circuits and is transformed into a conscious perception; however, the site of this transformation is still unclear (Melzack,1992). Melzack believes that this neuromatrix is genetic as opposed to forming as a result of experience, although experience may strengthen or weaken existing synapses. For example, one who has suffered from bunion pain may frequently feel similar pain in a phantom as a result of experience; however,

because phantoms are felt among congenital amputees, Melzack concludes the neuromatrix must have some genetic component.

A phantom limb, according to the neuromatrix hypothesis, is perceived via external stimulation of the neuromatrix, spontaneous firing of the neuromatrix, the spinal cord or from neuromas in the stump. Wherever these signals come from, they result in rapid signals through the matrix and perception of a limb.

The most common pain complaint is that of a burning limb. According to Melzack, this can result from the bursting pattern of activity coming from the neuromas following the loss of external sensory stimulation. Such a pattern of bursting activity has been observed in the thalamus by researcher Frederick Lenz (Melzack, 1992).

Pain can also result from the fact that while the neuromatrix is making an effort to cause the limb to move, it is not succeeding. Therefore, since the matrix assumes that the limb must move, it sends stronger, more frequent messages resulting in a burning or cramping sensation.

Many researchers and laymen believe that congenital amputees do not experience phantom limbs. This idea is a result of the thought that phantoms result from the lack of previous stimulation or experience. Thus, many congenital amputees are not aware of a phantom because they have never developed a sensory representation of the missing limb in the brain (Scatena, 1990). New research, however, has shown that many congenital amputees do experience phantom limbs.

In 1961 Weinstein and Sersen published the first modern English report on congenital amputees. They asked subjects

aged 5–23 where they felt their limb ended – making a game out of it for the younger ones. Out of thirty subjects, five were believed to have had a phantom limb. These subjects were believed because the characteristics they gave their phantoms such as the salience of the distal part and the gap between the stump and the phantoms were properties similar to phantoms in acquired amputees (Scatena, 1990).

Paul Scatena suggests that the reason complaints of phantom limbs by congenital amputees are so rare is that these people fear they will be mocked. Even acquired amputees are reluctant to talk about their phantoms.

A report by Riese and Bruck in 1950 suggests that children will not experience a phantom if amputation took place before six years of age, while others suggest before three years. Weinstein and Sersen argue that these children are forced by their parents to believe they are not experiencing a phantom for fear of embarrassment. For instance, a study was done on a sixteen year old girl who had her leg amputated at five years. When this girl was asked if she ever had a phantom, her mother, who was present in the room, interrupted and said "she never had anything like that." In return, the girl shyly agreed (Scatena, 1990). Similarly, there have been reports in which parents actually discount their children's suggestion of a phantom (Scatena, 1990).

Weinstein and Sersen's research suggests congenital amputees do suffer from phantoms although proportionately less in magnitude than acquired amputees. It seems, therefore, the body schema is partly innate, although, largely relying on experience (Scatena, 1990).

Haus Poeck did research which contradicts Weinstein and Sersen's findings. Poeck did a study on an eleven year old girl with congenital amputation of both forearms and hands. This girl claimed with much detail that she had felt two phantom hands since six years of age. Not only could she move these hands but she learned to do math problems, just as almost any other child, by counting on her fingers. Certain properties this girl used to describe her phantom hands lead us to believe her account. She describes only hands and no phantom forearms. In addition, she reported that her hands would stretch out as she approached a wall but would disappear when the stumps made contact with the wall. These characteristics are similar to reports given by acquired amputees. While Poeck's subject reported her phantom disappearing as she approached the wall, other reports describe a phantom actually entering a wall. According to a researcher named Jalavisto, these differences may be age related. Younger amputees aged 17–24 report their phantoms disappear, while older amputees tend to feel their phantoms enter the wall (Scatena, 1990).

Finally, Weinstein did research on prosthesis and how they affect phantoms. Many researchers suggest that a prothesis can cause phantoms to fade. Some say it only enhances the phantom. Weinstein found that among congenital amputees those who are fitted with a prosthesis early in life, i.e. before the age of seven, report a phantom more than those who obtain a prosthesis later in life. The subject who Proeck studied did not wear a prosthesis (Scatena, 1990).

It seems from research done on aplasics, as opposed to acquired amputees, that phantom limb sensation is partly innate

and is definitely enhanced by experience. In 1966, Simmel reported that 20% of children who had an amputation before two years of age experienced a phantom limb while 100% of children who had an amputation at eight years experienced a phantom limb. Poeck's study suggests that although it may not be as common as among aplasics, congenital phantoms do exist and can be quite vivid to the one experiencing it (Scatena, 1990). This, in turn, supports Melzack's theory of an innate neuromatrix.

Phantom limbs are important to the study of kinesthesia in that initially they suggest limb position and movement can result from a centrally generated motor command and does not require external stimulation. A phantom can be perceived to move when 1)the stump of the limb is moved or 2)the phantom may move in response to a motor command. Amputees report that they are able to move certain parts of a phantom, such as the digits, more easily than others, such as the joints. Although movements even among the digits may be restricted, it seems, as though joint movements depend on how much it is represented in the cortex. After 12–18 months, the ability to move even the digits cease, although the phantom limb may still exist (Jones, 1988). According to research done by Henderson and Smyth, the movement of a phantom limb is accompanied by the contraction of the appropriate muscles in the stump. If these muscles were to be destroyed, movement of the phantom would not occur. However, any case of phantom movement is the result of a consciously motivated command and does not occur spontaneously. This supports the idea that phantom limb movement may be due to a voluntarily generated motor command

(Jones, 1988).

In contrast, there has been research that suggests that movement of a phantom cannot occur as the result of a voluntary motor command. It was found that partially paralyzed subjects, underestimate the movements of their index finger and movements made just before complete paralysis were not perceived at all. If movements were the result of a voluntary motor command, the subject would be aware of any change in the position of the finger and movement would occur (Jones, 1988). Many explain the impeded movement as a result of reduction in feedback from muscle receptors in the hand and a change in the rate of a response of afferent and efferent fibers (Jones, 1988).

Phantom limbs occur in most amputees and it does not depend on the extent of the amputation nor on which limb was amputated. The fact that people perceive phantoms in the digits, hands and feet more than in the forearms and legs, is consistent with the fact that there is more cortical representation of the digits, etc. than the forearms, etc. (Jones, 1988). Eventually, weaker parts of the phantom disappear. Then a process known as telescoping occurs. While the patient no longer perceives his forearms he may continue to perceive his digits as extending directly from the stump. Telescoping occurs faster on lower–limb amputees the upper–limb amputees. Again, the lower limbs are weaker and have less cortical representation. When a person wears a prosthesis, although telescoping has occurred, the patient may perceive the phantom as having gone back to its original length (Jones, 1988).

Different treatments for phantom limb pain may be

successful for some and not for others. In general, it is important to stimulate the stump by message, exercise and warm baths in order to send a normal pattern of impulses to the brain. Certain drugs such as Propanol, a Betaandrenergic blocker, may be administered to prevent abnormal messages from going to the brain. Chlorpromazine may help in decreasing anxiety. In addition, psychotherapy and hypnosis may help to reinterpret pain signals. Finally, a new, yet promising treatment entails the administration of 1% Mepivacaine by injection for eight days into the trigger zones of the contralateral limb. This method has brought relief of four amputees for six months to up to three years (Dernham, 1986).

Support and education about the amputation both before and after surgery is important for the amputee and his/her family. The one who is most likely to suffer from phantom limb pain is one who had experienced past surgeries, illnesses, has a history of poor wound healing, chronic pain before surgery, lack of psychological support, depression and a high degree of insecurity (Dernham, 1986). Unfortunately, emotional support and education about an amputation does not get rid of phantom limb sensation and pain. However, it does enable the person to be prepared for the ordeal and therefore psychologically deal with the discomfort to a greater extent.

by Heidi Telio

The Neurology Of Obsessive–Compulsive Disorder

Obsessive–compulsive disorder (OCD), is a chronic psychiatric disorder in which the patient experiences obsessions (intrusive and reiterating thoughts), or compulsions (repetitive stereotypical behaviors), in a severe and consistent fashion. For many years, OCD was thought to be a psychological "mood" problem, however, recent evidence has lead researchers to build a biologically rooted neurological model.

The primary reason for the development of the biological model of OCD was hypothesized through inference from the drugs used to treat the disorder. Drugs used in the past as antidepressants, have been found to alleviate obsessional activity, hinting at a neurological dysfunction as a cause of OCD. Four drugs have been found to be effective in treating OCD. Surprisingly, they only differ slightly in chemical structure from the two standard tricyclic antidepressants, desipramine (DMI), and imipramine. The four drugs are: clomipramine (CMI), zimelidine, fluoxetine, and fluoxamine. Tests have shown that these drugs do not relieve OCD symptoms as a function of relieving depression, as other antidepressants are not helpful in relieving the symptoms. In addition, the anti–OCD effects seem to be present independent of the patient's depression, regardless of his/her mood (Rapoport,1989).

Of the four drugs, CMI has been most extensively studied, and proven most effective. A study was conducted comparing the effects of CMI, versus those of DMI. Subjects received a placebo drug for two weeks and were then either put into condition A, which received CMI for five weeks and then DMI, or condition B, which received DMI for five weeks and then CMI. The results overwhelmingly demonstrated CMI's effectiveness. Subjects in condition A improved on CMI, and then relapsed on DMI, while those in condition B only improved after receiving CMI (Rapoport, 1989).

It is now clear that CMI is effective, yet the question remains – why? What neurological pathways does it activate? Evidence seems to indicate a relationship between these four drugs and the neurotransmitter serotonin.

Serotonin receptors are distributed throughout the brain, particularly in the frontal lobes and the basal ganglia. Although the function of serotonin is not perfectly understood, it is known to be important in appetite control, aggressive behavior, and suicide. Studies suggest that CMI and other drugs are effective because they block the reuptake of serotonin once it has been released into the synapse, preventing the neuron from being fired again. This is consistent with the hypothesis that increased, rather than decreased serotonergic responsiveness is associated with psychopathologic characteristics of OCD (Rapoport, 1989).

OCD has been repeatedly linked to other neurological disorders such as Sydenham's chorea, epilepsy, postencephalitic Parkinson's, and Tourette's syndrome. The link with Tourette's syndrome has been suggested by findings that 20 percent of children with OCD have chronic motor tics. Another striking

association between OCD and Tourette's is that 22 percent of first degree relatives of Tourette's, have OCD (Rapoport, 1989).

Biologically, the relationship between all these disorders is evident – they all affect the basal ganglia, a station between sensory inputs and motor outputs. The basal ganglia is a group of structures including the caudate nucleus, the putamen, and the globus pallidus that lie under the cerebral cortex. They connect to the frontal lobe in various ways. OCD patients have been identified as having deficits in their frontal lobes or in the basal ganglia. One study was done using CAT scans to compare OCD's brains to normal brains. It was discovered that the OCD patients had smaller caudate nucleus volumes than the normal patients. In addition, another study was conducted using PET scans to compare the brains. OCD patients were found to have higher levels of glucose metabolism in their frontal lobes and in the cingulate pathway, which is a connecting route to the basal ganglia. These results confirmed the correlation of levels of glucose metabolism to the severity of OCD (Rapoport, 1989).

Other studies have been conducted, analyzing animal behavior. Konrad Lorenz hypothesized that much of an animals behavior is "hardwired" into the brain's circuitry – namely, animals proceed to act out fixed action patterns. For example, nest building, courtship, grooming, and feeding the young. These behaviors appear without any modeling or learning taking place, implying that they are innate patterns. Lorenz hypothesized that the same might apply to human behaviors. Perhaps the ritualized obsessive–compulsive behaviors, which are almost identical in adults and children are a form of fixed action patterns

"hardwired" into the brain. This is supported by striking similarities of symptoms across ages and cultures, no matter how diverse (Rapoprt, 1989). The basal ganglia may indeed be a repository of programs for species specific behaviors, and part of its function is a gating mechanism for sensory input. Models have suggested the frontal cortex–basal ganglia–thalamic circuit as the neural system for self protective behavior patterns, such as grooming and checking. Other factors, seem to indicate a genetic predisposition as well, namely that OCD is more prevalent in among relatives of people with OCD, especially parents. It is also more common among people with type A blood –although no explanation has been proposed.

In addition to data suggesting a relationship between OCD and the serotonergic system, there is also clinical data suggesting a possible disorder of the dopaminergic system. Tourette's syndrome, which is believed to be a result of a dopaminergic system dysfunction, is associated with the occurrence of OCD in 68 percent of patients (Baxter et al, 1988). Drugs such as amphetamines and cocaine worsen the symptoms of OCD. These drugs have a strong effect on the dopaminergic system, which acts against the serotonin system, whereas CMI and others, increase serotonin's effectiveness.

Several animal studies have suggested that CMI possesses dopaminergic receptor blocking activity, causing inhibition of dopamine function. It has been suggested that it is perhaps a combination of both dopaminergic blocking activity and serotonergic activity that makes CMI the most effective antiobsessional agent (Austin, 1991). In some cases it has been observed that symptoms of OCD improve with the

administration of dopamine antagonists, and worsen with administration of dopamine agonists.

Another common symptom present in patients with OCD is fewer rapid eye movements during their REM sleep. Their sleep cycle is often disrupted by constant awakenings, as well as a short stage four sleep (Insel et al., 1982).

Various surgical procedures have been identified as being helpful in alleviating OCD symptoms. Surgical ablations of the orbitofrontal cortex, or the medial thalamic nuclei, have been very effective in amelioration of symptoms, but these procedures are associated with a high risk of neurologic and psychologic morbidity (Modell et al., 1989).

The basal ganglia/limbic striatum appear to serve an integrative role for the limbic system, which allows for the production of a coherent and goal– oriented stream of behavioral and emotional output, and suppression or inhibition of unwanted or inappropriate responses (Modell et al., 1989).

For example, lesions that disturb the caudate nuclei, often result in repetitive and compulsory behaviors, behavior disinhibition, indiscretion, emotional labeling, and possibly psychosis (Richfield, 1987). Conversely, interventions or pathology that lead to a relative increase in neural output from the caudate nuclei may cause arrest, overinhibition, or preservation of behavior, and blunted emotional responses (Sigel, 1987).

A significant role for the orbitofrontal cortex in OCD is supported by data from PET investigations. It appears to mediate the ability to alter behaviors and cognitions with varying tasks; ablation of this region has been shown to result in

perseverative behaviors and difficulty executing newly learned instructions, inappropriate behavioral responses to environmental cues, inappropriate or indifferent emotional display, and hyperactivity (Sigel, 1987). Normal activity from the orbitofrontal cortex thus appears necessary for appropriate cognitive and emotional reactivity to the environment.

The effectiveness of a thalamotomy for treatment of OCD symptoms implicates a role for the thalamus in this disorder (Modell, et al., 1989). Lesions to various areas of the thalamus produce different effects; damage to the dorsomedial thalamic nucleus, results in deficits in learning and short term memory acquisition and damage to sensory and associative nuclei may lead to an increased threshold for pain, touch, and temperature. Emotional instability may also be observed. In addition, the thalamus is influential on cerebral cortex activity in terms of regulating states of consciousness, alertness, and attention.

The verbal nature of obsessions, and the forced intellectualization of compulsions, suggests that left hemispheric structures may be particularly involved, although the strong affective components to the illness may implicate a right hemisphere dysfunction as well.

Orbitothalamic activity is proposed to give rise to the compulsions, whereas the basal ganglia/limbic striatum may be central to the inhibitory components. Modell proposes an understanding of OCD based on neurological findings. The orbitothalamic hyperactivity is functional in choosing appropriate cognitive, emotional, and motor responses to environmental stimuli. The thalamus has the critical role of integrating the incoming sensory information with higher levels

of cortical activity, allowing for processing of stimuli. A positive feedback loop between the frontal lobe and the thalamus might not integrate the stimuli appropriately. This may be symptomatically apparent in the obsessive–compulsive's struggle between what he/she sees and what he/she is cognizant of. For example, "My hands look clean, and should be clean after so many washings..." versus "My hands are in fact clean; I am satisfied that they are clean and therefore I should stop washing" (Modell et al., p.33).

Although many theories have been suggested, we still are not certain of the exact biological pathways of OCD, or the specific drugs and neurotransmitters involved. The evidence for a biological model is compelling, but unfortunately, it is still necessary to speak of the biology in vague terms (Rapoport, 1989). However, with the discovery of new drugs and more intense research, the exact neural mechanisms are gradually being pinpointed. Follow up studies on the effects of CMI on obsessional behavior have been encouraging, and seem to make a difference in the long run.

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by Ilana Werblowsky

Abnormal Psychology and the Law: The Insanity Defense

The insanity defense touches on ultimate social values and beliefs. As a result, volumes of scholarly work have been written on this subject. It has also engendered much thought and strong emotions in society at large. This occurs especially at times of high profile insanity trials such as that of John Hinckley. It is the most visible instance in which society confronts the question of when its citizens are to be excused from legal crimes they committed.

The insanity defense is the exception to the basic legal theory of criminal responsibility. Criminal guilt and responsibility generally require both the commission of a prohibited act and some accompanying "mens rea," which means "guilty mind or criminal intent". Both the act and intent are needed to find someone blameworthy. For example, killing in self defense is not a crime because there was no criminal intent, only self protection, and therefore no blameworthy element is involved.

The fundamental legal and moral question is, what kinds of abnormal mental states are sufficient to negate the blameworthy mental element of criminal guilt? At the onset, one should realize that finding the person insane is a legal ruling. A mental health practitioner can aid the judge and/or jury in this determination. By using his scientific and clinical

knowledge of psychological disorders, by using DSM III–R criteria with information at the time of the crime, he can aid in determining the mental state at the time of the offense. This information can then be determined by the judge or jury if it fulfills the legal criteria for insanity. For example, someone might be clinically psychotic, yet not fulfill the legal definition of insanity.

Despite its notoriety, the insanity defense is actually of little practical consequence. A plea of insanity is made in less than 1% of cases. It is successful in less than 20% of those cases. So that at most, it is successful in less than 0.2% of felony arrests. However, it provokes public attention because the defendant has committed the action and yet seeks to escape legal punishment. One may ask, "Why should someone be excused if they are insane?" Criminal law does recognize that some people lack the ability to discern the consequences of their actions because they are mentally disturbed. Although they may be technically guilty of a crime, their mental state at the time of the offense exempts them from legal responsibility, since the insanity defense was established to ensure that criminal law has moral authority. The criteria for legal responsibility has provoked much discussion and controversy among legal scholars, mental health practitioners and society in general. The legal tests of insanity have varied over the centuries. Tests have been at times narrow and limiting and over time expanded, and recently have begun to narrow again, even leading to abolition in some states such as Montana and Utah. The changing of the legal criteria for insanity has largely been affected by societal concerns.

The idea that criminal intent must accompany a physical act for it to constitute punishable wrongdoing has ancient origins.

The biblical Hebrews made a distinction between intentional and unintentional crimes. Neither children nor the mentally incompetent were held criminally responsible for their actions. In English common law, the earliest criteria tests were the "like a wild beast" tests. The analogy to the wild beast test as a test of criminal responsibility has three important characteristics. First, beasts as distinguished from human beings were considered incapable of reason; second, the wild beast was thought to lack any control over its behavior; and third, the wild beast was seen as totally emotionally deranged. The analogy provides a vivid picture of a very narrow category of mental abnormality sufficient to negate blameworthiness. Later on, legal tests emphasized at least one of the three characteristics of the wild beast tests as they expanded the scope of the insanity defense.

In The United States, a number of different standards are used as legal tests of insanity. One of the earliest is the M'Naghten Rule. This was adopted from the English common law. In 1843 Daniel M'Naghten, a woodcutter from Glasgow, Scotland, claimed he was commanded by God to kill the English prime minister, Sir Robert Peel. He killed a lesser minister by mistake and was placed on trial and found not guilty by reason of insanity. As a result of this trial, the M'Naghten Rule, which has popularly been referred to as the "right–wrong test" emerged.

> "Every man is to be presumed sane, . . . to establish a defense on the ground of insanity it must be clearly proved that, at the time of committing the act, the party accused is laboring under such a defeat of reason, from

> disease of the mind, as not to know the nature and quality of the act he was doing, or if he did know it, that he did not know he was doing what was wrong."

The first part of the test refers to a person being unaware of the nature or quality (for example, cutting a person up but believing he or she is an orange) of the act due to mental impairment.

Critics argue that although M'Naghten expanded the scope of the wild beast test, in time it was attacked as too limiting. It emphasized only the cognitive defect and ignored any affective or emotional derangement, or lack of volitional control.

The Irresistible Impulse test established in 1887 in a case of Parsons v. State, broadened the criteria for using the insanity defense.

> "Did he know right from wrong, as applied to the particular act in question? . . . If he did have such knowledge, he may nevertheless not be legally responsible if the two following conditions concur: (1) If, by reason of the duress of such mental disease, he had so far lost the power to choose between the right and wrong, and to avoid doing the act in question, as that his free agency was at the time destroyed; (2) And if, at the same time, the alleged crime was so connected with such mental disease, in the relation of cause and effect, as to have been the product of it solely."

In essence, the doctrine states that a defendant is not criminally responsible if he or she lacked will power to control his or her behavior, even though they may have "known" that what they were doing was wrong.

It expanded the insanity defense by adding a new category

of abnormal mental states to the category covered by M'Naghten. The irresistible impulse test is used as an addition to the M'Maghten test in many jurisdictions.

The most liberal of all laws concerning the insanity defense evolved from the case of Durham v. United States (1954). The U.S. Court of Appeals for the District of Columbia broadened the M'Naghten Rule. It was a radical departure from existing legal tradition and has since been rejected by the courts (except for the State of New Hampshire).

> "An accused is not criminally responsible if his unlawful act was the product of mental disease or mental defect. (We use "disease" in the sense of a condition which is considered capable of either improving or deteriorating. We use "defect" in the sense of a condition which is not considered capable of either improving or deteriorating, and which may be either congenital, or the result of a physical or mental disease.)"

The Durham test rejected the constraints of M'Naghten's cognitive category and the irresistible impulse category. It is best described as a "medical model" of criminal responsibility. Mental disease or defect as defined by mental health professionals is sufficient to negate blameworthiness under Durham. This gave the greatest possible weight to expert evaluation and testimony. Many feared that it usurped the jury's responsibility. It was found that some psychiatric diagnoses could be applied to the vast majority of criminals. This quickly became the focus of critical controversy and a symbol of the criminal justice system becoming soft on crime.

In 1962, the American Law Institute (ALI) with its model penal code produced guidelines to help jurors determine the

insanity defense on a case–by–case basis. It abolished the use of Durham's test and the wording of unlawful act having to be only "a product" of mental disease or mental defect.

> "A person is not responsible for criminal conduct, if at the time of such conduct, as a result of mental disease or defect he lacks substantial capacity either to appreciate the criminality of his conduct or to conform his conduct to the requirement of the law."

By using the phrase "lacks substantial capacity" it narrowed the criteria of the Durham Rule. However, by adding on the phrases of "appreciate the criminality of his conduct" and "conform his conduct to the requirements of the law", the ALI standard was broader than the M'Naghten and the irresistible impulse test. The use of the word "appreciate" rather than "know" included both a cognitive and affective understanding. This was more in keeping with the psychological knowledge of the time.

The case of the United States v. Hinckley (1982) greatly challenged the use of the insanity defense. John W. Hinckley, Jr.'s attempt to assassinate President Ronald Reagan, and Hinckley's subsequent acquittal under the ALI standard, led to public outrage which demanded change. Congress considered three major alternatives. The first was to abolish the insanity defense altogether. The second was to create an additional alternative verdict: guilty but mentally ill. This permitted a jury to find a defendant mentally ill but still criminally responsible. This option has been adopted by some state legislatures and reduces the likelihood of successful insanity defenses. It permits jurors who think a defendant is mentally

ill to opt for guilty but mentally ill instead of not guilty by reason of insanity. Defendants found guilty but mentally ill get treatment, but when "cured" they serve out an appropriate sentence imposed by the court.

Congress eventually acted on a third option as a result to public outrage to the Hinckley case, and in 1984 adopted a new narrower version of the insanity defense. The Insanity Defense Reform Act of 1984 states:

> "It is affirmative defense to a prosecution under any federal statute that, at the time of the commission of the acts constituting the offense, the defendant, as a result of severe mental disease or defect was unable to appreciate the nature and quality or the wrongfulness of his acts."

Congress thus removed both the volitional alternative of the ALI tests and the language of "substantial capacity" narrowing the scope of the defense. The word "severe" was added to make clear that not every mental disease was sufficient to invoke the defense of insanity. This is essentially a return to a M'Naghten standard with the term "appreciate" being substituted for the word "know".

The criteria for the insanity defense has undergone many changes over the years. These changes seem to reflect our society, its standards for individual responsibility, and attitudes towards morality and crime.

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