The Harvey Project

A Digital Mind Raised in a Digital World

Semester Report – Fall 2002

by Steven M. Berardi

January 2003

Table of Contents

Harvey: A Digital Mind Raised in a Digital World

by Steven M. Berardi

I. Introduction - The (Ultra)Intelligent Machine

"It is more probable than not that, within the twentieth century, an ultraintelligent machine will be built and that it will be the last invention that man need make."
-- Irving Good, 1965

Although we have already turned off the lights of the twentieth century, new lights in the realm of artificial intelligence have recently illuminated bringing forth new concepts and direction to the field. The field of artificial intelligence (AI) has recently regained the attention of the world, after decades of dormancy. It has even jumped from the computer science world into the world of entertainment. It seems no science fiction film today is complete without at least a vague reference to AI and how someday technology will enslave the human race. Perhaps all these years of slow progress were wasted by traveling down the wrong road. Two projects today have taken new looks at the realm of AI, and one in particular (The Harvey Project) takes an especially unique approach to accomplishing the ultimate goal of AI: to create the thinking machine, to essentially take the A out of AI. Building such a machine will unintentionally lead us to the creation of this "ultraintelligent machine" Irving Good speaks of.

Possessing complete control over an object (in this case, a digital mind) will allow for full optimization and understanding. We see this every day in our world. A computer technician has a far more powerful and optimized computer than does a brain surgeon, even if their machines contain the same components. An auto-mechanic keeps his or her car in far better condition than does an average hairdresser. The reason is not because of responsibility, but because of knowledge. The computer technician knows far more about the inner-workings of a computer than does the brain surgeon. He knows how to get the most out of his system. On the other hand, an auto-mechanic knows far more about keeping his or her car in shape than does a hairdresser. Optimization and understanding comes from their tools of knowledge. The same idea can apply to the digital mind. Masters of a digital mind will have complete control over their "mind machine," allowing them to extinguish the faults of mankind, replacing them with optimized instructions that no human being can follow. Therefore, construction of the intelligent machine will inevitably lead to the creation of the "ultraintelligent" machine. This ultraintelligent machine will serve as our scientist, our brain surgeon, our pilot, and our engineer of the future.

II. The Turing Test

Before building the intelligent machine, we must first define what constitutes "intelligence." However, this task bears much more difficulty than it may seem. We must ask ourselves, "Is something that 'acts' intelligent considered intelligent?" or "Does a machine have to 'understand' in order to show intelligence?" Answering these questions would entail much debate, thus taking away the focus on the real goal. Realizing this, Alan Turing designed a test of intelligence he calls "the imitation game" (Turing 1). In 1965, he wrote a paper, "Computing Machinery and intelligence," in which he outlined the details of this game.

The Imitation Game

The game begins with three people: a man (lets call him Arnold), a woman (Betty), and an interrogator (Dr. Calvin) (Turing 1). The interrogator may be a man or woman (Turing 1). Betty and Arnold sit in a room apart from Dr. Calvin and they communicate with some sort of electronic communicating device (Turing 1). Dr. Calvin knows Arnold and Betty only as "X" and

"Y" (Turing 1). In order for him to win the game, he must determine who is "X" and who is "Y" (Turing 1). Arnold has the job of fooling the interrogator (answer in such a way to "imitate" Betty), while Betty attempts to help the interrogator with the correct identification (Turing 1). In the end, it all relies on the intelligence of Arnold, how well he can imitate the mind of another human being.

Next comes part two of the game, when we introduce a machine. Since the game concentrates on the intelligence of one participant, what happens when we replace that participant (in this case, Arnold) with a machine (Turing 1)? If the interrogator has the same difficulty in identifying who is X and who is Y as he did before (with Arnold and Betty), can we conclude the machine bears intelligence (Turing 1)? Alan Turing believes so, and any machine that shows intelligence in this way is said to have passed the Turing Test.

One may ask how we can use this test without first having a complete definition of intelligence. However, the test does not require a description of intelligence. The test assumes human beings possess intelligence, and uses this idea to validate the intelligence of a machine. Perhaps the idea could be clarified through the use of an analogy. Suppose a scientist must determine if a certain object can fly. How can he go about doing this? What determines if an object can fly, and what exactly is flying? Does a feather fly? What about a paper airplane? After much thought, defining the art of flying seems literally impossible. Arriving at this conclusion, the scientist decides to compare the object with another object that has mastered the art of flying. He realizes the majority of the population associates flying with birds, so he appoints a bird to act as the comparator. Next, he must determine a means of testing if the object of question can indeed fly. He uses the idea behind the "imitation game" designed by Alan Turing: if the object of question can imitate the bird on a basis of measuring flying only, then the object of question can fly. In other words, if he cannot consistently guess which object is the bird, then it can be concluded that both objects possess the power of flying. Finally, the scientist needs to find a blind method of measuring an object's flying ability, meaning he can only use the property of flying to discriminate between the two. He cannot see both objects fully at once when testing because in that case he can rely on structure or color of the object to identify the bird. In the end, he uses a radar to watch both objects simultaneously and if he cannot identify the bird on a consistent basis, he concludes the object of question can fly. Perhaps with this analogy, flaws of the imitation game have become amplified, but those flaws and other criticisms will be discussed later in this report.

Playing the Game

In order for the test to bear relevance, the interrogator must reach for the tasks involving extreme intelligence, yet still common to the typical human being. We may consider most of these tasks simple, but in reality, they require the most knowledge and associations that our society has taught us. One such task of measuring extreme intelligence is the "rating game" (Millican 18).

The rating game employs bogus words (i.e. "googly glop", "blabio", "wasaldo") that the machine must rate based on the word's plausibility to a set of subjects (Millican 18). For example, the interrogator gives the machine a word such as "flugblogs" and informs it to rate the word from one to ten (one being least plausible, ten being most) as the following:

- name of a new cereal
- name of a new line of shoes
- name of large, air-filled bags worn on the feet and used to walk on water

An intelligent machine would rate "flugblogs" as a name of a new cereal close to one because its not a good name for a cereal. Who would want to eat a cereal called "flugblogs?" A more appropriate name would be something like "Sweety Googles" or "Nikeetos." Next, is the plausibility of naming "flugblogs" as the name of a new line of shoes. Obviously, this is a horrible name for shoes, so the machine should again rate close to zero. However, what about the next item: the name of large, air-filled bags worn on the feet and used to walk on water? For some reason, most people will respond with a rating around six or seven. We now must ask ourselves where these ratings come from, how do we rate a word we have never seen before? The method is quite simple to think about, but what bears the difficulty is how we replicate that method on a machine.

When we hear the word "flugblogs" we immediately associate it with other words (Millican 18). Perhaps typical associations are "thug", "rug", "dug", "ughh", and then for the second part: "clog", "log", "dog", "fog" (Millican 18). Looking at the word associations, it becomes apparent that the words are all either negative or bear little excitement, which explains why the word cannot be a good name for cereal, or a new line of shoes, or for any product (Millican 18). Millican explains this ability "requires taking unconscious account of a vast number of culturally acquired, competing associations triggered initially by phonetic resemblances" (18). This explanation aids in the process of giving machines this ability, but much work still needs to be done with problems like these, and possible solutions will be explained later.

The rating game also consists of many other variations. These variations include a poetic beauty rating game, jokes (i.e. how funny do you rate these jokes?), advertising rating game (i.e. given a product X, rate a slogan Y for that product), and even a rating game employing real words (Millican 21):

- rate "banana splits" as medicine
- rate "purses" as weapons
- rate "pens" as weapons
- rate "jackets" as blankets

For the preceding example, the machine is required to determine how reasonable it is to use "banana splits" as medicine or "purses" as weapons (Millican 21). Perhaps this variation involves the least intelligence because it does not require that extra phonetical association. It is also worth mentioning that the interrogator brings with him a list of averages derived from asking thousands of humans these same rating game questions (Millican 20). He may have an average of seven from "rate purses as weapons" and if he notices that one of the subjects (human and machine) is consistently away from the average, he will conclude that subject is the machine (Millican 20). As illustrated, the rating game represents one of the most common games played within the imitation game and a game that measures vital intelligence.

Other such questions often used to identify the machine:

- Are you human? How do you know?
- How was your childhood?
- What kind of mood are you in?
- How much is 293204520 times 934387420?
- If your husband said to you, "I'm leaving you" what would you reply with?

The last question in the preceding list deserves special interest. If taken literally, the wife would respond with something like "where are you going?" However, because of the vast amount of knowledge we possess about our society, we know the husband is suggesting divorce or some kind of indefinite separation. Therefore, the wife is mostly likely to respond with "who is she?" or "how could you do this to me?" The interrogator employs such a question because of the simple fact that it can be taken two ways. However, if the computer takes this question literally, it becomes doomed of giving away its identity, thus losing the game.

This section about "Playing the Game" aimed to illustrate the fact that the interrogators come to the test prepared. The interrogator does not simply try to have a "normal" conversation with the machine of question. He puts the machine through a rigorous test of extreme, yet simple intelligence. As Roger Schank proclaims, "Any human, even the dullest of us, is unbelievably intelligent" (3). If any "dull" human could pass the Turing Test, then a machine bearing intelligence should perform just as well.

Winning the Game

No machine has yet won the imitation game, and some critics say no machine ever will. However, since the introduction of the game in 1965, many research projects have strived to create the intelligent machine and some have made significant progress, but none have come close to passing the ultimate test of artificial intelligence. The next section of this report outlines the attempts so far and their respective progress. It will also serve as a general knowledge base of the components of intelligence.

III. The Story So Far

The idea of an intelligent machine has sustained the interest of computer scientists since the creation of computing machinery. Many scientists have dedicated their lives to creating such a machine, only to meet failure at the end. However, much can be learned from their failures and although they believe they failed, they have actually shed new light on the realm of AI. This section not only examines past ideas, but also investigates the core of intelligence with subjects on child development, language acquisition, and humor. Researching these areas are essential to building the intelligent machine because they are the components of intelligence.

Components of Intelligence

Breaking down intelligence into components will aid not only in the discussion of, but also in the understanding of intelligence. This mandatory understanding will become the blueprint for building a machine of intelligence. The components are presented below (Tveter 2):

- Intuition
- Creativity
- Thought
- Understanding
- Emotions
- Sense of humor

This report will explore all of these components. However, some have been condensed for sake of convenience and others are mentioned only briefly.

One may ask, "why study all these components? Why not just look at it from a natural language processing point of view?" Since the Turing Test relies on communication with language, why force the machine to experience and understand the other forms of communication? The answer is simple: in order to create a truly intelligent machine, the machine must think, it must understand, it must have feelings. It cannot simulate these components as Natural Language Processing (NLP) does. John F. Sowa agrees and further illustrates the weakness of NLP, "Language and logic are independent skills" (38). However, this does not prompt us to dismiss the ideas of NLP. It simply means we must combine the forces of NLP with the forces of the intelligence components to engineer the ultimate weapon of intelligence.

We begin our investigation by studying the common tool of communication: natural language. However, many people lack this tool, such as blind and deaf people. Research has showed that such people eventually gain the same magnitude of intelligence, yet develop at a slower rate simply because they lack a vital sense (sight or hearing) and more greatly because they lack the primary form of communication: language (Sowa 37). This illustrates that language does not in itself advance intelligence. Instead, language simplifies and accelerates the learning process (Sowa 37). To understand this, ask yourself what goes on when you think? What are you doing in your head? You are talking to yourself in the form of natural language! Now, imagine if that language was taken away from you. How would you think? Would you develop a new "personal" language? How do deaf people think? After thinking about this last question, the power of language becomes obvious. The intelligent machine will employ this power much like we do: only in communication and thought. Therefore, in order to simplify the theories of intelligence, we will first gain an understanding of natural language.

Study of Language

The study of language has attracted the interest of not only linguists, but also the interest of psychologists. Linguists primarily focus on the structure and sometimes the acquisition of language, while the psychologists concern themselves with the meaning and emotion behind the mask of language.

While studying language, psychologists and linguists have divided the subject into six distinct areas (Sowa 216). Some are more commonly studied than others, but all of them play a role in the end product of language. These areas are listed below (Sowa 216):

- Prosody: rhythm and intonation patterns
- Phonology: sounds of words/letters
- Morphology: meaningful elements that build words
- Syntax: rules for putting words together in sentences
- Semantics: meaning
- Pragmatics: use of language and its effect on listener

Of these sub areas, prosody has been the most frequently ignored when it comes to NLP or AI (Sowa 216). It has mainly assisted in the research of poetry (Sowa 216). However, linguists and computer scientists have rigorously dissected the other areas in search of a pattern. The rest of this report explores these various areas of language.

Language Acquisition

Human beings acquire language by instinct. They have a willingness to learn language (Sowa 212). This willingness separates us from animals, and furthermore, animals lack the magnitude of our intelligence partly because they lack a code: natural language. Our analysis of language acquisition begins from the moment of a child's birth and ends when they reach the age of twelve.

The language acquisition process begins with babbling. The act of babbling involves nonsense words or phrases combined with random smiles and giggles. Examples of babbling include "babba", "babbama", or "mamaba." A complete description of babbling identifies it as spontaneous, an expression of satisfaction, and a form of play (Young 180). The baby is simply striving to communicate and without knowing any words, they simply blurt out whatever they can until they get a reaction from a parent or guardian (Young 180). When they get a reaction, they usually receive a reward in the form of a cookie or simply a smile from the parent. They enjoy this reward and it prompts them to speak this word more often and eventually they must learn new words to receive a new form of reward (Sowa 212).

First words of a child usually refer to familiar items such as "dada", "mama", milk, or ball (Young 180). "Mama" draws special attention because it often plays the role as the child's very first word. John Sowa addresses this issue by explaining "since the syllable 'ma' is common in babbling, the probability that a human baby will say 'mama' is high" (212). Further down the line, children learn to construct sentences from their relatively small arsenal of words. Early sentences often include a "pivot" word or phrase combined with a fixed relation to other "open" words (i.e. "all gone shoe" or "all gone care") (Young 180). In these early sentences, the child also begins to illustrate relationships (Young 180):

- Possession: "mama shoe"
- Agent -> action: "mama read"
- Action -> object: "put book"
- Position: "hat chair"
- Absence: "all gone rattle"

Although the parents can often understand what the child means, the child still makes many obvious errors. In a way, this early language resembles the quality of "cave man talk." J.Z Young points out that most early mistakes in language spawn from grammar, pronunciation, and devising the wrong rules (i.e. "r" before a vowel is pronounced as a "w", as in "wong" or "wule") (180). Later on, the child throws out these invalid rules just as he or she throws out invalid bodily movements devised from using the various parts of his or her body (Young 180).

It may seem from a child's first sentences that the child lacks the intelligence to create a proper sentence. Contrary to this belief, children actually possess complex conceptual structures, but lack the tools necessary for translation into a proper sentence (Sowa 214). They form advanced conceptual relations that requires deep intelligence, but they simply lack the long list of rules contained in the English language (or any language for that matter). John Sowa sums this idea up by pronouncing, "limitations in sentence structure do not imply limitations in conceptual structure" (214). It has been discovered that children around the age of two often have trouble relating more than two or three concepts in one sentence, as demonstrated by the following sentences taken from an actual two-year-old girl (Sowa 214):

- "raisin there"
- "buy more grocery store"
- "raisins"
- "grocery store"
- "raisin a grocery store"

Obviously, the child strived to pronounce she wanted more raisins from the grocery store, but she had difficulty relating all those concepts in one sentence. This also shows that children are more sensitive to semantic errors than syntactic ones (Sowa 215). They rely more on semantics than syntax to communicate their message. They "use semantics as a guide to learning syntax" (Sowa 215).

By age three, children harness a rich power in language, as they begin to rely more on concept types (Sowa 214-215). However, this can often lead to errors or over generalizations. To illustrate this, consider what word you would respond with after hearing: "obey", "up", and "pickup." Below is a table of the most common responses of an adult and of a child (around age three) (Sowa 215):

Word	Child	Adult
"obey"	"your mother"	"disobey"
"up"	"stairs"	"down"

"pickup" "your toys" "throw down"

After reviewing them, you will notice children often respond with sentences, while adults often reply with opposites. This shows children often store complete sentences in their mind until they master the creation of them. Adults, on the other hand, who have already mastered construction of a sentence, reply with opposites because they have formed complex conceptual structures that are completely independent from the procedure for creating sentences.

Finally, by the age of twelve, children have developed a mastery of language. They are close to the skill possessed by adults (Sowa 215). The acquisition of language can be summed up through three steps (Sowa 215):

1.) Children associate words with basic concepts of the world
2.) Learn syntax and improve linking of concepts to form better sentences
3.) Master the formal structures of the type hierarchy and refine their syntax

This section has provided a summary of the language acquisition process. Many holes still exist, but these holes will soon be filled with more research and testing.

Now that we have a good knowledge of language and the process by which it is acquired, we can begin our investigation of intelligence and then combine these forces to devise a blueprint of the intelligent machine.

Intuition - The Solving of Problems

"The hardest thing to understand is why we can understand anything at all."
- Einstein, quoted in Minksy, 1986:319 (Wagman 103)

Defining understanding is nearly as hard as defining intelligence. However, maybe we can get around the definition as we did with intelligence. If we assume problem solving requires understanding of the problem, then in order to accomplish understanding on a machine, it must have the power to solve problems.

A common way of solving a problem by a human is outlined below (Langley 7-8):

1.) Create symbolic representation (initial, intermediate, final situations)
2.) Gather concepts involved in solution process
3.) Conduct "mental search" for solution
4.) Search is selective (heuristic search)

First, the human analyzes the various situations of the problem: the initial stage, intermediate, and the final or solution stage (Langley 7-8). Next, occurs the gathering of concepts related to the problem or solution (Langley 7-8). This gathering is quick, and it drives the person to focus on the problem. Finally, a search begins for the solution, but the search is highly selective (Langley 7-8). Not all outcomes receive attention because the majority of them bear no relevance or consume too much time. This type of search refers to a heuristic search (Wagman 14).

We also commonly solve problems through an indirect proof. If we can prove one of two possibilities is false, then we have proved the other is true. Inside our brains, the indirect proof, also referred to as the "resolution method," works like this (Wagman 46):

<From a set of propositions, prove X>
1.) Negate X
2.) Add negation of X to set of propositions to form an "expanded set"

3.) Transform expanded set of propositions into a set of clauses (groupings of predicate calculus expressions)
4.) Apply resolution to clauses
5.) Look for a contradiction

The "expanded set" refers to a set of rules or laws that must be true if the negation of X is true. A resolution is derived from this set of clauses, and then a search for contradiction begins. If a contradiction exists, then X must be true.

While solving problems, we sometimes require a visual reference. The ability we have to move around objects in our head suggests we have some kind of visual buffer (Sowa 32). The proof of this comes from an experiment involving the removal of the visual cortex (organ used in sight) in a monkey (Sowa 32). After the removal, the monkey still had the ability to find objects with the help of visual clues (Sowa 32). We often find ourselves using this visual buffer when someone asks a question like, "How many windows are in your house?" (Sowa 52). Answering such a question usually requires a "mental tour" of your house (Sowa 52). This essential visual buffer aids us in the solving of visual problems.

The ability we have to solve problems plays a major role in our intelligence because it requires great understanding and great knowledge. Although we do not have a firm grasp on the definition of understanding, we have successfully avoided its definition by focusing on what we do have a definition for: problem solving.

Metaphor - The Language of Creativity

Metaphor represents the core of poetic beauty, sometimes jokes, and even insults. However, we also use the art of metaphor in casual conversation. For example, we often refer to time as money or argument as war (Sowa 271). Still, these common metaphors account for such a small speck among the collection of infinite possibilities. Although we can break metaphors into these classes, we will gain a better understanding of them if we focus on all possibilities simultaneously.

Like many words in this report, metaphor has a wide spectrum of definitions. John Sowa believes "Metaphor is a normal means of adapting existing words to new situations" (270). On the other hand, Aristotle defines it as giving "a thing a name that belongs to something else" (Sowa 270). Along the same lines, Goodman describes metaphor as "migration of concepts to new territory" (Sowa 270). Now that we have defined the art of metaphor, our next step involves the process in which we recognize them. Carbonell (1982) researched this process and formulated the following steps (Sowa 271):

1.) If literal meaning not found, possible metaphor exists
2.) Check library of "common" metaphors
3.) Attempt to interpret the metaphor
4.) If connection is made, remember it (likely will occur again in same conversation)

As with many abilities, we can learn a great deal by understanding their development or acquisition. Chukovsky (1963) studied children around the age of four and found a complete absence of metaphor, while they maintained an extreme literalness in their speech (Sowa 271). He used the following conversation as an example (Sowa 271):

Adult: "Betty, why didn't you provide a knife and fork for Mr. White?"
Child: "Because I thought he didn't need them—daddy said he ate like a horse."

It may seem as if the child is acting like a "smart alek," but in reality, she simply does not understand the concept of a metaphor. Furthermore, children's language mistakes often spawn from simple misunderstandings, not from "calculated mistakes" of metaphors (Sowa 271).

The power of creativity acts as a generator for creating and understanding metaphor. A person must possess creativity before they recognize a metaphor because metaphor involves complex associations between ideas. John Sowa discovered that high creativity also leads to a greater sense of humor (351). On the other hand, he discovered a person of high intelligence employs good organization skills, low tolerance of chaos, and high predictability (Sowa 351). In the end, however, we can all understand metaphor because we experience it every day of our lives. Some may harness a great talent for carving metaphor, but we all share a basic understanding of the art.

Emotion - The Indescribable

Great difficulty arises in the task of defining a word such as "emotion." We often attempt to describe how we feel, but we never successfully communicate to our listeners the exact feelings existing in our minds. This difficulty results from the absence of language for emotion (Young 132). No words can properly describe a state of mind. For example, each of us has difficulty defining a word such as "happy" or "sad," but we each have ease in describing what leads us to these states of mind. Perhaps we must once again use the strategy of avoiding the definition of the word by describing what creates it or what possesses it.

Some may argue that a language for emotion does indeed exist. However, consider the language of description employed by a physicist. He finds words such as "heavy" and "light" useless (Young 132). Instead, he must rely on precise measurements such as meters, grams, or liters (Young 132). Without these precise measurements, he cannot make formal conclusions (Young 132). The same concept applies to psychologists: "happy" and "sad" are not adequate (Young 132). Psychologists demand a precise system much like the system utilized by a physicist or biologist (Young 132). Unfortunately, no such system exists. The absence of this system has led to the creation of a fog barring us from discovering the roots of emotion.

On the other hand, a limited amount of information dealing with emotion already exists and it may indeed lead us to a mathematical system we strive to reveal. First, we must classify the various emotions experienced by humans. Arieti and Bemporad (1978) conducted extensive research on emotion and classified different emotions on three levels (Sowa 62):

1.) **First Order (simple, directly experienced by inner-body):**

    tension, hunger, fear, rage, satisfaction

2.) **Second Order (cognitive process, employs images associated with first order):**

    anxiety, anger, wishing, security

3.) **Third Order (complex conceptual processes depending on past experience and future predictions):**

    love, hate, joy, sadness

First order emotions describe immediate responses to stimuli, and require no thought in any way (Sowa 62). On the other hand, second order emotions consist of imagined first order emotions

(Sowa 62). For example, anxiety and anger are actually imagined fear and rage (Sowa 62). Anxiety exists because we imagine that something in the near future may lead to fear or rage. Finally, third order emotions consist of not only imagined first order emotions, but also of past experience (Sowa 62). Past experience has defined what we conceive as love, hate, and sadness. Our past has created a scale of these third order emotions. Based on the level of sadness or love we experienced yesterday, we create a new scale representing these same emotions today. As we once thought the ultimate gift of happiness was receiving an ice cream cone, we now demand the same gift to bear much more (most likely sentimental) value, such as falling in love. This classification has greatly simplified the description of emotion, and this report will use this classification while investigating the other aspects of emotion.

Evolution plays a vital role in our emotions. As stated in the earlier paragraph, our views of happiness and sadness constantly undergo continuous mutations. Each year, we see the same ideas in different ways and with different perception (James 157). We even change our emotions monthly, as William James points out, "we wonder how we ever could have opined as we did last month about a certain matter" (James 157). We also find ourselves changing these emotions daily! William James concentrated must of his "emotion" research by further investigating these past experiences that build emotions such as happiness and sadness. He makes his point by giving many examples. For instance, he proclaims "the real color of the brick is the sensation it gives when the eye looks squarely at it...out of the sunshine" (James 170). The redness of the brick only represents what we have previously perceived as the sate of "redness." He also believes a person's interests play a major role in deciding his fate: "A thing may be present to a man a hundred times, but if he persistently fails to notice it, it cannot be said to enter into his experience" (James 170). This quote suggests we only notice objects of interest, and those that fail to gain our interest never enter our realm of intelligence, therefore never play a role in the construction of our emotions. James also makes clear that "...a thing met only once in a lifetime may leave an indelible experience in the memory" (171). In the end, only objects and events of interest shall shape our personalities, and our intelligence.

Some researchers feel emotion requires understanding why that feeling exists. John Sowa writes, "Until one is prepared to say that a computer system has emotions, needs, and intentions, one cannot say that it has understanding" (358). Obviously if a machine must feel emotions, it must first know what causes those emotions, thus "understanding why that feeling exists." We shall now investigate the emotions of a child and the cause of these emotions. Understanding the cause of a child's first emotion will help us understand why we need them and what causes subsequent emotions.

The child begins as a selfish being: crying for food, attention, and expecting the love and care of his mother (Young 149). He seems to care only for himself and believes crying and screaming serves as his best weapon for fulfilling his personal satisfactions (Young 149). Soon, the mother will begin to pay less attention to the child when he screams and cries, and the child realizes he must change his strategy (Young 149). He begins to formulate hypotheses about the world around him (Young 149). He begins to understand the people around him also require satisfaction. He may illustrate this by offering his mother his teddy bear (Young 149). In a sense, you can conclude at this point the child learns the moral "to give is better than to receive." However, what if in reality the child really thinks to himself, "giving means more receiving or at least better chance of it" (Young 154). We find it hard to believe a child thinks this way, but how do we know what really goes on in their minds? What if that seemingly "selfish" belief turns into the not so "selfish" moral "to give is better than to receive"? The fact is, each human being displays a phenomenal amount of selfishness, but not all this selfishness is bad. When the selfishness of a person benefits others, we can label it as "good" selfishness. On the other hand, a form of selfishness only benefiting the actor is often labeled as "bad" selfishness. As J.Z Young points out, "It is foolish to deny that a large element of selfishness remains in most adult loving" (155). However, this type of selfishness does not grow from a bad person. The selfishness involved in marriage or any kind of love benefits both sides. Both sides feel satisfaction; therefore it's a "mutual" form of selfishness. J.Z Young goes further to explain the specific needs of the brain and how they relate to selfishness, "the individual requires satisfaction, the whole brain works that way" (155). Before giving emotion and understanding to a machine, we must understand all humans bear a sort of selfishness, and the machine must bear the same sort.

Let us never make the mistake of attempting a translation of emotion into written language. As John Sowa explains, "Good writing does not express emotion. Instead, it describes scenes and events in a way that leads the reader to experience the emotion for himself" (41). We have difficulty understanding the meaning of "John is mad." However, if we say "John was so mad he threw his monitor out the window," we begin to understand the magnitude of his madness. When describing emotion, stories and scenes bear much more effectiveness than ordinary words. Body language can also help in the communication of emotions (Sowa 41). With this idea that written language cannot properly describe emotions, we must develop some sort of language that can. Possibly this language will revolve around stories and scenes.

Humor

Researchers in the field of artificial intelligence have often ignored the area of humor. Some actually leave it out completely, without even a brief mention of theories of laughter and humor. However, humor and intelligence have a direct relation to one another. Therefore, in order to create the intelligent machine, we must not allow the absence of humor. No intelligent being lacks a sense of humor.

Research and formulation of theories and philosophies describing laughter have spanned over several centuries. Through this research, the following questions have often puzzled philosophers and psychologists alike (Morreall 1):

- What is humor?
- What is laughter?
- What is the relation of humor to laughter?
- Is humor an emotion?
- Is humor rational or Irrational?

Three theories have examined and attempted to answer these questions: Superiority Theory, Relief Theory, and the Incongruity Theory (Morreall 1).

The Superiority Theory, derived by Plato, Aristotle, and Hobbes, suggests we laugh and find humor when we feel superior to someone or something else (Morreall 1). For example, we often laugh when someone falls or makes a fool of themselves (Morreall 41). Immediate flaws in this theory become apparent, but remember this theory was the first of its kind. Francis Hutcheson criticizes this idea by exclaiming no connection exists between "having feelings of superiority and laughing or being amused" (Morreall 26). Having feelings of superiority is neither a necessary condition nor a sufficient condition for laughter or amusement (Morreall 26). Although this theory contains many weaknesses, we shall not forsake this theory of Superiority, but simply keep it in mind.

The Relief Theory suggests we laugh and spawn humor in order to relieve stress or fatigue (Morreall 1). Although this theory further classifies laughter into another group, it still does not paint a complete picture of laughter when combined with the Superiority Theory. For example, if a ticklish person is tickled, they will laugh, but neither theory thus far presented accounts for this source of laughter.

The Incongruity Theory examines humor at its core, concluding that we laugh when an expectation is not met (Morreall 1). Kant, Schopenhauer, and Kierkegaurd founded this theory that describes how many jokes work (Morreall 1). As Cicero points out, "A speaker can get a laugh by setting up a certain expectation in the audience, and then jolting them with something they did not expect" (Morreall 16). For example, consider the following joke:

How can you get four suits for a dollar?
Buy a deck of cards.

Ask yourself what makes this joke amusing? When reading the question "How can you get four suits for a dollar?" you think of the kind of suits you wear and begin to search for a way you can buy four of these suits for just one dollar. When the joke teller replies with "buy a deck of cards," you laugh because you did not expect "suits" to make reference to a deck of cards. Immanuel Kant defends his theory with general evidence, "In listening to a joke, we develop a certain expectation as to how it will turn out. Then, at the punch line, our expectation vanishes" (Morreall 45). Although this theory of Incongruity represents humor very well, we still cannot accept it as a universal theory that explains all forms of humor.

As we have done with the other components of intelligence, we can examine laughter and humor employed by children. Studying humor in the stages of childhood will give us an idea of the inner workings of humor development. David Hartley observed that children do not laugh until several months after birth (Morreall 42). He explains the first instance of laughter as a "surprise, which brings on a momentary fear first and then a momentary joy in consequence of the removal of fear, agreeably pain" (Morreall 42). At first, the child does not understand humor because he cannot make the necessary connection to sense the humor. As the child grows mentally, learning new associations of the world, he begins to understand how the world works, thus beginning to understand the concept of humor (Morreall 43). The first occasion of child laughter occurs with a feeling of superiority (as discussed earlier). This occasion involves the often "fake" stupidity of a parent or guardian. The parent will bang his or her head against a wall or let the child hit the parent's head with a toy hammer of some sort. As the Superiority Theory explains, this makes the child feel superior to the parent, thus causing amusement. Perhaps the theory of Superiority rose first because it explains the first instance of humor employed in human life.

John Morreall studied the three theories presented and realized they did not account for all instances of humor and laughter, leading him to formulate his own theory in attempt to remedy the flaws of previous theories. Morreall believes "laughter results from a pleasant psychological shift (sudden change)" (131). The difficulty in classifying each form of humor into one unified theory arises from the enormous amount of stimuli that lead to laughter. Each form bears a distinctiveness unrelated to the other forms of humor. Morreall begins his explanation by amplifying the flaws of the three traditional theories. Since the flaws of the Superiority Theory have already been presented, we will skip to the Incongruity Theory. Morreall explains the theory of Incongruity fails to work in non-humorous cases, meaning it may classify some acts as humorous yet the act may be far from humorous (Morreall 133). He uses the following example (Morreall 133):

"If I open the bathroom door to find a large pumpkin, I would probably laugh."

BUT

"If I open the bathroom door and find a big cougar in my tub, I would probably scream"

Using the theory of Incongruity to test the humor of these statements would classify both as bearing a form of humor. However, the second statement illustrates a situation far from humorous. Next, we must examine the flaws of the Relief theory. After understanding this theory it becomes apparent that it does not explain what leads to laughter, but instead it explains a benefit of laughter (Morreall 134). It fails to make any conclusion about the rise of laughter. On the other hand, John Morreall concludes, "Laughter results from a pleasant psychological shift" (Morreall 135). He further explains the shift "must be sudden" and "to adapt we must be caught off guard by the change so that we cannot smoothly adjust to what we are experiencing" (Morreall 135). The shift must also arrive pleasantly (Morreall 135). For example, "enjoying glory, being amused by some incongruity, releasing nervous energy" all represent pleasant feelings and may cause us to laugh. On the other hand, if the shift travels the opposite "unpleasant" way, it will rarely evolve into laughter.

To explain Morreall's theory in a simpler way, Morreall turns to children and how they progress in understanding the world (138). When an infant begins the act of laughter around the age of three or four months, it does not arise from his understanding and response to humor (Morreall 138). At that age the child has no comprehension of humor, and he cannot properly "perceive objects" (Morreall 138). The first psychological shift experienced by a child does not utilize concepts or perception, but merely represents "a shift in sensory input" (Morreall 138). The easiest way to illustrate this is by tickling a child or propelling them up into the air (Morreall 138). For the most part, the child will laugh in each previous instance (Morreall 138). When the child gains the experience of a few years, he begins to comprehend the "conceptual shift" (Morreall 138). By this time, the child can distinguish objects and begins to understand them and how they construct the world (Morreall 138). They can also distinguish food from what is not food, and further develops patterns among properties and events (Morreall 138). In essence, the child is constructing "a conceptual system, or picture of the world, which is based on his experience and which is the basis for his expectations" (Morreall 139). John Morreall has constructed a versatile universal theory of laughter, but much research needs completion before adopting this theory. This research consists of understanding each form of humor. We must investigate everything from puns and wordplay to the language of sarcasm. After structuring the various forms, it will either prove Morreall's theory or lead to the creation of a new universal theory.

Memory

Memory represents our cave for knowledge. We store valuable information in these caves that components of intelligence require. Constant associations and searches occur in our brain at any given moment, and these operations allow us solve problems, sense humor, write a poem, and even play a game of baseball. We become useless without the vital function memory serves, and this section will examine exactly how our memory operates and how we can replicate that process on a machine.

First, we shall make the assumption that the brain utilizes two types of memory: Short Term Memory (STM) and Long Term Memory (LTM). These two types operate differently, but they both serve the same purpose: to store information.

Short Term Memory allows quick and easy access to small amounts of information. This information does not always relate to one idea, but the efficiency and life span increases greatly when each bit of information relates to a central idea (Sowa 51). The organization of STM consists of various registers (Sowa 53). These registers store addresses to structures in LTM (Sowa 53). In relation to computing machinery, these registers work much like the registers of a CPU inside a computer (Sowa 53). John Sowa sums up this idea, "Short-term memory consists of a limited number of working registers, each of which excites or activates same record in long-term storage" (Sowa 53). The number of STM registers is still unknown, but two scientists have made educated conclusions. Miller suggests we have seven registers capable of storing seven "chunks" of information (Sowa 53). Describing each chunk, Miller says "The basic property of a chunk is not its size, but its unity as a well-learned familiar pattern" (Sowa 53). According to this description, then, a complete sentence could serve as one chunk so long as it was "familiar" (Sowa 53). On the other hand, Broadbent believes only three or four registers exist (Sowa 53). He agrees that seven chunks can be stored, but only 3-4 can be retrieved with considerable accuracy (Sowa 53). He further explains that extra items above three can only remain accurately if they form an association with the first three (Sowa 53). Broadbent supports his claim by pointing out we often group items in threes or fours when recalling them from a large list (i.e. countries, cities, baseball players) (Sowa 53). Since STM consists of only registers, no data structure is required for its operation. Regardless as to how many registers STM contains, it still serves the same purpose: to provide fast and reliable information utilized when solving complex problems or executing a complex task.

Long Term Memory greatly exceeds STM in terms of complexity and mass. LTM employs numerous methods for searching, sorting, computing, and navigating. These methods act as the brain's form of communication. Because of its complexity, LTM requires a data structure. Many years of research have attempted to model this structure, and together they have constructed what they call a Semantic Network. Remembering our previous discussion of language, you will recall "semantic" refers to "meaning." This semantic network represents a map of conceptual structures, and links connect structures to illustrate associations (Patrick 1). Perhaps a picture can best present it (Patrick 1):

The top box, or "node," represents a very general idea: an animal. As you move down through the network, you travel through subclasses that increase with detail (Patrick 1). "Animal" subclasses into a "Cat" and a "Dog" because cats and dogs are animals, they share all general properties of an animal (Patrick 1). Next, the dog is given the property of "barking" and subclasses into a "poodle." Whenever a concept (i.e. cat, dog) subclasses into a more specific idea, the subclass inherits the properties of its superclass. In the case of the dog/poodle link, the poodle inherits all properties of a dog because the dog is its superclass. You can see that various nodes or ideas share properties with other nodes. In the network above, both cats and dogs share the property of "fur." Furthermore, three types of "links" (represented by lines in diagram above) exist: down-link, up-link, side-link. A down-link gives further details to a concept (i.e. "bark" is a down link from dog that signifies dogs bark). Up-links are the reversal of down-links: linking up in the network will retrieve more general properties (i.e. the "dog" up-links to "animal", but at the same time "animal" down-links to "dog"). In other words, every down-link of a concept is also an up-link of another concept.

The diagram above lacks one essential aspect: the significance of the links. A line represents each link in the diagram, but this link is not explained. For example, how does "meow" relate to "cat"? We all know cats make the sound "meow", but how will a machine know this? Well, each link is also treated as an object (Patrick 1). Each link will contain properties explaining its type (up, down, side) and significance (does it signify a sound made by its superclass, its color, what it eats, etc) (Patrick 1). These links will form the basis for navigation and understanding of an idea.

Next, we must determine a method for searching this network, for finding the meaning of a sentence. The most modern way of accomplishing this is through a method called Spreading Activation (Patrick 1). This method relies on an intersection of two ideas within the network and works like this (Patrick 1):

1.) Gather objects in sentence(s), keep a count
2.) Find positions of each object in the network
3.) From each position, simultaneously navigate through the network with help of other words in the sentence (adjectives, verbs, etc)
4.) Attempt to find intersection of all object(s)

For non-programmers, the process may still bring forth confusion, so lets look at simpler process involving the same idea. Lets say we have three people spread around the United States: one from Atlanta, Chicago, and the last one from Seattle (these people will represent the objects given in the sentence). Next, we instruct them to meet each other at Houston. From their various starting positions, they all travel through the United States (the network) to their destination: Houston. Once they arrive at Houston, they have accomplished their mission, thus "intersecting" at the correct meaning of the sentence. This method of intersection searching replicates the process of thinking we carry out in our own brains, and perhaps that means we cannot utilize a better process.

Although semantic networking provides a seemingly flawless method of implementing memory into a machine, many limitations not yet discussed still exist. For example, what happens if the search takes a wrong path, and this leads to an infinite loop (Patrick 1)? Also, many paths through the network can lead to the same conclusion, but only one path is correct, how will the network know the right path to take (Patrick 1)? We also must decide how much information to pay our attention to (Patrick 1). If we are given twenty sentences, should we use information from each sentence to determine the meaning? Fortunately, solutions to these problems exist. First of all, we will introduce a limit to the search allowing the search to only travel through a set number of links before it returns to its original position and tries again (Patrick 1). Next, we will implement a link strength to each link allowing the search to examine strong links over weak links (Patrick 1). Finally, some sort of decaying factor will allow the search to concentrate on the most important information presented, ignoring the obvious (Patrick 1). With these solutions, a semantic network represents the best candidate for replicating the human memory structure on a machine.

Now that we understand the structure and navigation of the network, we must decide what exactly goes into this network. What properties do we store, and what properties do we ignore? In order to answer this question, we must investigate what exactly humans remember about objects or concepts. The truth is, we remember the world in a very discrete manner (Sowa 345). We remember simple aspects of an object such as its size and color, and rely on our imagination and stored images to recreate the object in our head (Sowa 345). To illustrate this, close your eyes right now, and describe the room you are in. Your description will include such properties as color of the walls, how many doors, how many windows, the color of the carpet, the relative size of the room, and maybe even the temperature of the room. Look at the list again and you may realize it consists of discrete properties. Below is an example of a summary you may derive from your description:

Wall Color = white
Door Count = one
Window Count = two
Carpet Color = brown
Size of Room = small

Temperature = warm

All these properties are discrete: they represent exact conditions. In reality, however, the world is a continuum (Sowa 345). John Sowa explains the problem of discreteness, "The crucial problem is that the world is a continuum and concepts are discrete" (345). For example, you can measure the height of an object with a ruler, but you will never determine the exact height, because it has no exact height. Sometimes it's difficult for people to understand this idea of discreteness because we have lived our entire life concentrating on the idea we live in a discrete world, but in reality we dwell in a world of continuity.

Together, the concepts of semantic networking and discreteness construct a flawless blueprint for mapping human memory in computing machinery. We still face the problem of developing a file structure for these concepts, but this task seems minimal when compared to the task of finding a proper memory structure. In terms of memory, we have crossed over a very difficult bridge into a world of somewhat simple tasks.

Learning

Now that we understand the intelligence of a human being at any exact moment, we must next explore how we add to that intelligence, how a human being learns. John Sowa agrees, "making computers learn the way people do has been the dream of AI from its earliest beginnings" (329). Unfortunately, however, "nobody knows exactly how people learn" (Sowa 329). This section will present a few theories on how we learn and may lead us to the development of a seamless method of implementation we can use to incorporate the power of learning into computing machinery.

The most antiquated theory of learning goes by the name of "apperceptive mass" (Sowa 329). This theory, originally derived by Leibniz, further gained the interest of Johann Friederich Herbart (1816) and Watson (1963) (Sowa 329). Watson summarized the theory as follows (Sowa 329):

- Only one idea can be attended to at once, unless multiple ideas join to form one complex idea.
- This central idea forces all others into the background.
- A combination of related ideas form an 'apperceptive mass': a mass allowing only acceptable ideas.
- Learning occurs when building upon this mass of already familiar ideas.

As you can see, this theory bears a bit too much simplicity and its generalizations are not fit for translation to computing machinery. However, we can build upon its basic idea that we learn one idea at a time, and this one idea can lead to multiple new links in order to formulate a once simple idea into a seemingly complex concept.

Another well-known learning theory arose from the research of Piaget (Sowa 330). Basically, Piaget believed "learning progresses by stages, not by a constant rate of accretion" (Sowa 330). He concluded the existence of two modes of learning:

- **Assimilation:** new information is attached to existing conceptual structures
- **Accommodation:** old structures undergo modification because new information does not fit with old concepts

This theory does a good job of providing more detail, but it still comes short of providing a perfect model of learning.

The notion of abduction learning has also gained the attention of researchers striving the find the method of learning present in the minds of human beings. The method involves three separate processes (Sowa 332):

- **Deduction:** logical inference derived from rules of reasoning or common sense
- **Induction:** gathering and sorting new information based on existing structures
- **Abduction:** making a hypothesis that introduces a new data structure, followed by deduction for finding consequences and then by induction for testing its reality

This theory seemingly provides an explanation for each form of learning and for this reason it is the most modern theory of learning. John Sowa cited an example of a machine utilizing this theory (333). The machine attempted to diagnose a disease through abduction (Sowa 333). It went through the following steps to accomplish its goal (Sowa 333):

1.) User enters list of symptoms caused by a disease
2.) System queries user to get some background information
3.) By abduction, system formulates a hypothesis based on symptoms
4.) By deduction, system determines consequences and tests if they match the known symptoms
5.) If results match, system outputs diagnosis if results do not match, formulate new hypothesis

Evidently, this theory works very well in real-life situations and perhaps this further proves we learn by means of abduction. However, we must continue to explore theories of learning and strenuously scrutinize this theory of abduction learning before we formally accept its adoption into the realm of artificial intelligence.

Machines of Specialization

After all these years of research in the field of artificial intelligence, no machine has yet implemented and demonstrated all the components of intelligence. Many machines, however, have seemingly replicated one or two components and this section will examine those machines.

Perhaps the most popular machine of simulated intelligence is the "chatterbot" known as A.L.I.C.E. (Artificial Linguistic Internet Computer Entity) ("An" 1). This bot has gone through many implementations of its unique technology called AIML (Artificial Intelligence Markup Language) ("An" 1). AIML is a markup language, much like HTML (Hyper Text Markup Language), that stores complete responses to questions asked by a user ("An" 1). For example, an Alicebot may store the response "My name is Alice" as an answer to the following questions, "What is your name?", "What do people call you?", "My name is Bob, what's yours?" The project started decades ago, and hundreds of developers around the world continue with its development ("An" 1). Understanding how his research could help other projects of AI, the author, Dr. Richard S. Wallace, decided to make A.L.I.C.E open-source under the terms of the GNU General Public License ("An" 1). Although A.L.I.C.E. can carry on a conversation with a user, it merely simulates intelligence. It does not give the machine intelligence, but rather gives the machine rules to follow in a conversation.

On the other hand, some machines have successfully replicated an aspect of intelligence, and below is a short list of a few machines:

- **FORCE4 by Walker and Amsler (Tveter 8):**

        - Examines a newspaper article and attempts to determine its subject (Tveter 8)
        - Uses association (much like semantic networking) to find patterns in the article (Tveter 8)
        - Works well with articles about law, military, sports, radio, and television (Tveter 8)
- **BACON.3 by Langley (1981) (Wagman 148):**
    - Utilized methods of intuition to rediscover scientific laws, when given a relatively small amount of primitive laws and equations (Wagman 148)
- **PARRY by Colby (1975) (Wagman 4):**
    - Behaved with a state of paranoia (Wagman 4)

These three bots exemplify the components of memory/association, intuition, and emotion. Unfortunately, the methods each of them utilizes make it difficult to build upon. However, we can still learn from their mistakes, and perhaps their existence proves that building an intelligent machine will endure many more decades of intensive research.

One last active project draws special interest because of its striving goal to implement all components of intelligence into a machine, and at the same time taking a completely new approach. This project goes by the name of "HAL: The Virtual Child" ("Who" 1). The program, HAL, apparently acquires language much like an actual child does, "Through practice and training, trial and error" ("Who" 1). The development of HAL concentrated on the principles outlined by Alan Turing over forty years ago: build a "child machine", a machine which learns from experience and is taught much like a real child ("Who" 1). The project of three years old consists of two major components: the Brain and the Personality ("Who" 1). The researchers behind the project believe personality spawns from experience and knowledge, so users can create their own personality simply by speaking to a new instance of HAL ("Who" 1). Although this approach seems appealing, the machine is still young and it cannot yet carry on a legitimate conversation.

Most of the machines presented in this section implemented just a single component of intelligence, which explains why I gave them the label of "Machines of Specialization." They do not represent any form of intelligence (with the exception of HAL), so they do not deserve any label of intelligence. These machines of specialization have taught us mistakes to avoid and we can utilize a few methods they employed to create the truly intelligent machine.

IV. Criticism of the Intelligent Machine

No concept will ever exist without a form of criticism, and when it comes to building the intelligent machine, criticism haunts researchers from every corner. Even ordinary people will laugh in your face if you tell them of an intelligent machine you strive to create. However, we can ignore this form of unconstructive criticism by remembering previous scientific breakthroughs. For example, do you think people laughed at the concept of airplanes two hundred years ago, or what about the concept of sending someone to the moon, or cloning an animal? Perhaps the construction of an intelligent machine does not involve as much anticipation as the previous instances described, but we can still consider them to prove the point that we should only pay our attention to constructive criticism. For this reason, we will dedicate this section to famous critics of the intelligent machine, and further bring forth concepts that possibly prove an intelligent machine cannot exist.

Criticism by Robert M. French

One famous critic, Robert M. French, believes an intelligent machine can someday exist, but exclaims projects of the past and present have chosen an erroneous path (Millican 12). He points out that these machines portray an intelligent adult, but building a machine utilizing the intelligence and knowledge of a forty-year-old man is virtually impossible, unless that machine went through forty years of experience and learning (Millican 12). In essence, he believes "the Turing Test could be passed only by things that have experienced the world as we have experienced it" (Millican 13). Keeping this in mind, French concludes, "the Test provides a guarantee not of intelligence but of culturally-oriented human intelligence" (Millican 13). To illustrate these concepts, consider an American who travels to China (Tveter 2). Upon arriving in China, the American reports that all Chinese look astonishingly alike (Tveter 2). However, the Chinese do not share this belief of the American because they have developed recognition of their race (Tveter 2). They have lived their entire lives amongst Chinese, and the minute features they recognize may not grab the attention of someone from another country, like America (Tveter 2). This situation also works when the American and Chinese switch places (Tveter 2). If a citizen of China migrates to America, they will report all Americans look alike because they have not developed recognition for Americans (Tveter 2). This ability of recognition spawns from environment and experience, and as illustrated, it does not possess its power outside its original environment (Tveter 2). Considering this example, and the criticism of French, we can conclude that an intelligent machine requires an environment in which the developers "raise" it and teach it about its environment. This environment must model the world in which we live.

Personal Criticism by Steven M. Berardi

First of all, I agree completely with Robert M. French. He makes a very key point, and I believe no machine could be deemed intelligent, unless it "grew up" and matured within some sort of virtual world modeled much like our own. However, I think we can take the point of French even further. No one has seemed to realize that most attempts have concentrated on using written language only, with a complete absence of any other kind of language. Any linguist will tell you that written language contrasts greatly with spoken language, and even more with body language. We have difficulty comprehending this fact because we grew up in a society of complete literacy where everyone next to us reads, writes and speaks, but remember that only half the population of the world can read and write. We must consider this when building the intelligent machine because making the jump straight into written language may turn out as a dead end. On the other hand, we can look at it as simply giving the machine an instinct to learn written language, instead of giving it our instinct of learning spoken language. The machine can treat written language as we treat spoken language. This would cause the machine to inevitably learn how to read and write, but it would require teaching in order to learn spoken language.

We could also program the machine in such a way that they do learn some sort of spoken language, but only through means of phonemes present in spoken language. For example, it can generate the sounds of "baba", "dapa", "bablioba", etc. We will give the machine a set of initial sounds, and it will babble much like a real child does. However, instead of the users seeing output in the form of words, they would see phonemes, or pronunciations of words. Take the word "hello", for instance. The machine would communicate this word to the user with "/hh eh2 l ow1/" instead of generating the actual written version of "hello." To make the job easier for the users, we could also have the phoneme code go through some kind of filter (completely independent from the intelligent machine) to translate any noticeable words. I have yet to find a machine that has attempted this approach, so with more rigorous assessment it may turn out as a building block of the truly intelligent machine.

The machine will also lack the vital sense of sight. This would also lead to the absence of body language, another vital tool of communication we utilize daily. In a sense, the machine would be blind. When looked at in this way, sight does not seem to bear its same importance. As explained earlier, although blind children develop at a slower rate than sighted children, they still develop the same magnitude of intelligence, and sometimes even greater. Perhaps this proves an intelligent machine without the sense of sight can exist, but what if we give them the sense in another way? Suppose, for example, we simply give the machine a list of visual properties of an object and program it to utilize its imagination in order to generate a virtual image of the object. Do we do this ourselves? Of course we do. Every time you read a book or listen to a story, you constantly readjust your virtual image of the setting as new properties emerge. At the same time, your friends reading or listening to the same story form completely different images. At the moment, this seems to endure the most logic and simplicity, and since intelligence does not require sight, we need not implement it into the intelligent machine.

I have seen no criticism that proves an intelligent machine can never exist, and until I see such a proof, I will continue to believe the intelligent machine waits quietly for us to discover its blueprint and to embark on the journey of its construction.

V. The Harvey Project - Taking a new Road

The Harvey Project strives to accomplish the ultimate mission of artificial intelligence: to create the truly intelligent machine. The mission will endure great difficulty and criticism will inevitably come with. However, members of the Harvey Project have committed themselves to accomplishing its goal, and together we can reach success.

We embark on a road not yet taken, and although this road may endure great length, we do not perceive any other road leading to success. Our mission began as many other similar projects have, but we soon realized it would not lead us to our destination. We then began formulating our own ideas based on past attempts. This thought process led to the formation of our current direction. We intend to construct a virtual world, modeled much like our own, and literally raise our intelligent robot, Harvey, within this world. Knowledge gained from past attempts combined with criticism of our mission has led us to believe the intelligent machine requires a society in which to mature. Furthermore, we must model this society as a society we are familiar with. From the research previously presented, we have also concluded we must raise Harvey from the beginning. We cannot implant him with the maturity, knowledge, and intuition possessed by a twenty-three year-old college graduate. If we attempted such a task, we would skip too many steps. We must first understand what leads up to the development of the college graduate, before we can replicate it on a machine. Therefore, we must start from the beginning.

Harvey's intelligence must also resemble the structure of a human mind. In order to make Harvey think the way we do and possess the same magnitude of intelligence, we must first model his brain after our own. Harvey will begin with the same abilities we possess at birth, and nothing more. Attempting any other way would lead to failure.

This section will simply serve as an outline of the Harvey Project. Our plans of the past present, and future will be discussed, and individual reports of each team member (excluding president, vice president) will follow.

Early Ideas

In the beginning, we envisioned a machine of primitive intelligent, a machine of "simulated" intelligence. We did not concern ourselves with building a machine to understand, but rather have it "appear" to understand. During this period, we also believed we could rely solely on syntax to determine the meaning of a sentence. Diagramming a sentence and finding the verbs and nouns within it seemed necessary to our goal. However, we soon realized syntax is learned, not given to us. The endless list of rules concerning syntax does not come implanted in our brains at birth. Instead, these rules are learned over a period of time. When we adopted the notion of modeling Harvey's mind like our own, we realized we could not give Harvey abilities that we learn. Instead, we must teach those abilities to him.

Early in our research, we also believed in relying only on the study of the English language. However, we learned language is merely a tool of communication completely independent of thought and intelligence. Our direction now points to the fields of psychology and the study of language in general, linguistics.

Our early ideas should not be looked upon as a waste of time. We spent valuable time mapping our previous direction, and this early research that spawned these ideas have in one way or the other influenced our current path. We may even return to a few of these ideas, but for now, they will remain in the past.

The Virtual World

The virtual world where Harvey will live and grow separates our project from all the rest. This world will closely resemble our own, but with far less details. Instead of Harvey viewing the complete picture of an object, he will simply remember the most important aspects of the object and rely on his imagination to create the details. As discussed earlier, humans remember discrete properties of items (i.e. color, length, or weight). Furthermore, when we listen to a story, we use our imagination to bring life to those discrete properties. We form images in our head unlike the images other people form from the same story. For this reason, Harvey will rely heavily on his imagination to perceive objects, since we cannot give him the whole picture.

The world will consist of a collection of digital objects. Harvey himself will be treated as a digital object within the world. Each object will possess various properties such as its smell, size, color, etc. Notice the discreteness of these properties. If you were asked to describe a banana, how would you describe it? Most likely you would give a description consisting of words like yellow, long, skinny, wide U-shaped, pointy ends, and sometimes green. All of those words represent discrete properties, exact properties. Harvey will also remember objects this way and for this reason, he will only concern himself with such properties.

Each object within the world will also require unique code, but some may subclass others. For example, a general animal class may subclass into a more specific animal, such as a cat. Instead of recoding this cat object to include all the properties of the general animal class, it will automatically inherit these general properties. Writing the world in this manner will save us enormous amounts of time and utilizing the Object-Oriented design of Java will make the process even smoother.

Since the development of this world will entail much work, we will divide the process into phases. Phase one will consist of a basic room, with a few objects such as a ball, blanket, and a bottle. This early stage will also utilize a graphical user interface (GUI) to aid in the development of Harvey. With the GUI, we will easily have the power to move objects, and it will essentially act as our portal to Harvey's world. Our development team will raise Harvey in this initial atmosphere until he reaches the intelligence of a one-year-old child. At this time, we will move into phase two.

During phase two, we will construct a house for Harvey. The house will resemble the houses we live in ourselves. At this time, we will also introduce another Harvey, acting as his theoretical brother. Together, they can teach each other new ideas, and it will allow us to examine what happens when we pay more attention to the initial Harvey. Will the new Harvey become jealous of the older one? We hope so. Phase two will also incorporate many new objects such as toys and more food items. This phase will end approximately when Harvey reaches the intelligence of a two-year-old.

Phase three will introduce Harvey to the outside world. We will create outdoor scenes, as well as other buildings Harvey can visit. Scenes may consist of a pre-school, a park, a mall, or a restaurant. These new scenes will also require the development of new objects to suit them. Introducing Harvey to the outside world also means he will begin to meet friends. Currently, we believe we can "clone" Harvey and tweak the new instance slightly to create a new "person" acting as his friend.

Phase four and beyond will strive to create more scenes and essentially represent every scene a typical human comes in contact with during the course of their life. By this time, we will possess many object templates and even scene templates, allowing the rapid creation of new scenes.

Obviously, creating this virtual world will allow Harvey to experience the world very closely to the way we experienced it. Furthermore, it will ease the education process of Harvey. He will have all senses available to him and we can visually communicate with him through the GUI. Development of this virtual world will require more work on the initial development of Harvey, but the work will payoff with the creation of an easier education process.

VI. Individual Reports of Team Members

Nicola Brunetti on Humor and the "math gene"

YESTERDAY AND TODAY

Laughter - A movement (usually involuntary) of the muscles of the face, particularly of the lips, with a peculiar expression of the eyes, indicating merriment, satisfaction, or derision, and usually attended by a sonorous and interrupted expulsion of air from the lungs.

Humor - That quality of the imagination which gives to ideas an incongruous or fantastic turn, and tends to excite laughter or mirth by ludicrous images or representations; a playful fancy; facetiousness.

For ages man has tried to explain the many mysteries of laughter and humor. When trying to explain, many have failed to come up with a universal theory, but have succeeded in explaining why laughter and humor occurs on certain occasions. During the past month, I have researched Laughter and Humor. Specifically, what defines laughter and humor, and how to detect its phenomenal existence. During my research, I came across three traditional theories of laughter and humor. They consist of the Superiority Theory, the Incongruity Theory, and the Relief Theory. All three theories make good points about laughter and humor, but not one of them works as a universal theory. The reason why its so hard to come up with a universal theory is because most of the time that we laugh, the situations are so different that there's nothing in common other than our laughter. For example, we laugh at someone's foolishness, we laugh when we expect one thing but end up getting another, we laugh at someone tickling us, and we laugh at all kinds of jokes. This is why it's almost impossible to create a universal theory that is fit for all kinds of laughter. Upon the discovery of new theories questions begin to rise that need answering:

- Is humor an emotion?
- Is humor rational or irrational?

These two questions I believe are a very important aspect in regards to humor and laughter. Is humor an emotion? Both sides have very good reasons why humor is an emotion and why it isn't. I studied both sides and after careful consideration I believe humor is an emotion. To help us through this we need to take a closer look at a sharp gentleman named Robert Sharp. In his study of laughter and humor he came up with several reasons why humor would be considered an emotion. I will mention only the points that stand out most. One of the reasons he explained that humor is an emotion is because both humor and emotion involve an object:

- I love something or somebody or hate something or somebody.
- I am amused at something or somebody. To be amused at nothing at all is very odd.

Both have different degrees:

- Funny may range from mild amusement to rolling on the floor with roaring laughter.

As you can see here, Sharp does a wonderful job of explaining why humor closely resembles emotion. Another interesting question is: is humor rational or Irrational? You're probably asking yourself why would humor be irrational. Well we might not want to admit it but we do laugh sometimes irrationally. To explain this we need to take a look at the Superiority theory. The basic idea behind this theory is that most of our laughter is aimed at someone's foolishness or misfortune or in simpler words, "sudden glory." This means that we get a kick out of making fun of people and are constantly watching for people to fail or be much worse off than us. This is were humor is considered irrational. Now I'm not saying that all laughter is bad. We do laugh at rational things. Like for example we laugh at joy, we laugh at sadness and we laugh when we are tickled. Those examples are all positive instances of laughter.

Another topic that I've looked at this past month was on patterns in language and mathematics. This topic I believe will be a very beneficial to us because they are one of the major keys we need to succeed in this project. Some questions that I've come across and will strive to answer are listed below:

- Do mathematicians think in language?
- Do Mathematicians have different brains?
- Can you use language to help you be better in math?
- Is there a Mathematical pattern in the English language?

These are just a few of many questions to come out of this topic. I've also learned something important on how our brains function. It has been observed that we are born with a number sense, meaning that as old as two days we can tell the difference between a group of one, a group of two and a group of many. It can be argued that this is key to our survival. Another interesting thing I've learned is although we are all born with a number sense, if for some reason we lose it, we can never relearn it again. Number sense cannot be taught to us. We would be able to count but those numbers wouldn't mean anything to us, without our built in number sense. I haven't gotten real far in this topic to explain a whole lot more but by the end of semester I plan on having those questions at the top answered as well as more to come.

TOMORROW

This coming semester I plan to finish off my research of Laughter and Humor and start focusing on Language and Mathematics. Also, I plan on looking into memory and how our brain stores and retrieves information. These topics again are going to be major keys for this project to succeed. This like the humor and laughter topic, will be difficult to research but at the end will be very useful for our development of Harvey. In conclusion, the next semester will be spent heavily on how our brain interprets language and mathematics and if there is any pattern between them. I look forward to continuing my research on Harvey and I hope I've given you a feel for where I am and where I'm going.

Niket Gandhi on Child Psychology

Harvey, an artificial intelligence bot that is made to communicate like a human. Why? In today's society, instant messaging is a big part of our life. For many of us, instant messaging is what we depend on in order to communicate. Whether you talk about sports, movies, shopping and etc. the people who use instant messaging portray their feelings and identities over this simple program. As a researcher, I have to find ways that will make Harvey an artificial human that can share its feelings and thoughts over the Internet to other people. In return people share their feelings and thoughts, which could benefit or hurt Harvey.

Three months into the project, researchers like me find information that will help make Harvey. One of the earlier assignments was to find books and sites that focus on what we want to research. I began researching websites that would have various word lists. All of these word lists came in txt format, which makes it easier for our programmers. A lot of these words lists included dictionaries, verbs, adjectives, nouns, slang and etc. These word lists makes it easier for us to track down words. At first, we needed these word lists for creating and identifying sentences. We have done some test with the information we learned. Our basic test was to break down the structures of a sentence. By this I mean to find patterns and ideas about how sentences are structured. For example, is a verb always next to the subject or is the noun always next to the subject? This kind of research helps us understand how Harvey will speak and identify such things I mentioned above. Later, we took notes on what we think is important for creating Harvey. Next, we started gathering basic ideas and concepts about the functioning of the bot. Through our research, we observed that tree diagrams are the best way to create the bot. Soon, we decided to go a little further and called it semantic networks, which is the method our programmers will use to create Harvey.

Today, my research is focused around child language development and child psychology. In order to create Harvey, we have to assume that he is also a child. And as Harvey learns more, he starts to become a young adult. For example, we observed that if someone talks to Harvey in slang for a long time, Harvey would also use slang as his language to communicate since that is how he learned to speak from others who taught him slang. Also, a child needs a parent in order to be a good citizen. For Harvey, we are his parents and we are responsible for all of his actions that will take place. We have only begun to start research on child psychology and language development. As more research is done, we will incorporate it into Harvey. At this time my goal is to teach Harvey the way humans are taught.

In the near future we have set many goals for Harvey. I plan to research on child memory development since Harvey is going to memorize what we teach him. The researchers of this project plan to get Harvey off its feet. This is going to be the biggest challenge for us. As a researcher, I consider Harvey an artificial human, not just any program that people use. Harvey is going to be able to think like a human but not physically. It would be a great honor for us to get Harvey working fast as possible. Three months into this project, I've learned that we are embarking a journey that has been never correctly finished. But with our group's dedication and efforts, our dream of Harvey becoming a reality is possible.

Credits:

President: Steven M. Berardi
Vice President: Jay Joshi

The Research Team:
Jay Joshi
Steven M. Berardi
Nicola Brunetti
Niket Gandhi

The Programming Team:
Steven M. Berardi

Special Thanks to:
Association of Computing Machinery
University of Illinois at Chicago

Bibliography

“An Introduction to A.L.I.C.E., the Alicebot engine, and AIML.” The A.L.I.C.E. AI Foundation. 2001-2002. <http://alice.sunlitsurf.com/alice/about.html> 19 January 2003.

James, William. William James: Writings 1878-1899. University Press. 1984.

Langley, Simon, Bradshaw, Zytkow. "Scientific Discovery: Computational Explorations of the Creative Process." (1987:7-8).

Millican, P.J.R. and A. Clark. Machines and Thought: The Legacy of Alan Turing. Oxford University Press. 1996.

Morreall, John. The Philosophy of Laughter and Humor. State University: New York. 1987.

Patrick, Alton. “Memory – Semantic Networks.” <http://www.cc.gatech.edu/classes/AY2003/cs8803b_fall/>

Schank, Roger C. Tell Me a Story. Macmillan: New York, NY. 1990.

Sowa, John F. Conceptual Structures. Addison-Wesley. 1984.

Turing, Alan M. "Computing Machinery and Intelligence." 1965. <http://www.loebner.net/Prizef/TuringArticle.html>

Tveter, Donald R. The Pattern Recognition Basis of Artificial Intelligence. IEEE Computer Society. 1998.

Wagman, Morton. Cognitive Science and Concepts of Mind. Praeger: New York, NY. 1991.

“Who is HAL?” Ai Research. 2001. <http://a-i.com/show_tree.asp?id=97&level=2&root=115> 19 January 2003.

Young, J.Z. Programs of the Brain. Oxford University Press. 1978.

Appendix A

Fall Semester 2002 - notes

```
notes.18.november.2002.1600.joshi.gandhi.txt

Harvey Bot Project Notes
18 November 2002 @ 16:00
Notes Taken by: Jay Joshi and Niket Gandhi
   compiled by: Nikhil Sheth

--------- // start //

1) Sentence
2) Tree Diagram
3) Example

Sentence->subsets

Categorizing 1st division
      subject-Predicate
      Exact mechanism for differentiation

[subject->independent] [predicate->dependent]

Problems
1) how is subject independent?
2) how is predicate dependent?
3) how to link?

Key Words

      Nouns
      Propers(non-pronouns)
      Pronouns
        Subject- I, we, he, she
        Possesive- my, your, his, her[problem area]
        Objective- me, us, him, her[problem area]

Key Words
1) Non-pronouns
2) Pronouns

      [subject][verbs*][direct objects]
*Linking Verbs
      whole list of words
        1) action
        20 state of being

George[s] attacks[v] Bob[D.O.]

[Nouns] + [Pronouns]

Def->nothing
Linking->serves to changes def.

This IS dumb.

Sumplifying assumptions
  Verb always adjacent to subject (based on subject study)

      2 Cases
```

1 Subject verb predicate
2 Predicate verb subject

Side Notes

"he"
"she"
"her"
"him"
"his"
"them"
" " = Nouns

Assumption
1) Not asking questions but relaying statements
2) No complex subject-predicate analysis

George[subject] are[verb] shot[verb] at by[preposition] George

1. Use of Key Words (prepositions)
   a) Active voice sub.->verb
   b) Passive voice verb->sub.

We now will study interactions of prepositions + subjects + verbs.

--------- // end //

notes.23.november.2002.0008.berardi.txt

23 November 2002 @ 0008
------------------------- // notes //
notes taken from:

"Machine Learning of Natural Language"
David M.W. Powers
Christopher C.R. Turk

Publisher: Springer-Verlag

------------------------- // start //

-(pg 236) "A system... should, in principle, never find more than one meaning for a given sentence at one time... That is, humans simpy do not see all the ambiguities present in a given sentence at one time. Rather they see one meaning,
and then they see another if the circumstances are right."

Schank, Roger C., "Identification of Conceptualization Underlying Natural Language"
in Roger C. Schank and K.M. Colby, eds, Computer Models of Thought and Language
(Freeman 1973), p.166

-(pg 236) puns: detected if two interpretations of the sentence are found

-(pg 237) jokes/puns interpretation: after first reading, the listener is confused,
possibly two meanings? they rehearse sentence again, and armed with the knowledge
about the possible "second" meaning, they determine if it fits.

-(pg 237) "the horse raced past the barn fell"
many people would add extra word: "...barn <and> fell"
some make "barn" an ajective, and 'fell' refers to hill/field
CORRECT interpretation requires an answer to question "who fell?"
To answer this question, reparsing is not performed (reread close words)
when "fell" is thought of as a noun, the user asks "which fell?"
-> these people thought of the "fell" near the "barn" vs
the "fell" near a pond or house
the CORRECT parse does NOT always follow the first incorrect parse

MORE INFO: http://nuzban.wiw.org/wiki/index.php?gardenpathing

-(pg 237) "he shot the man with the gun"
use of definite article implies prior knowledge of the 'gun' and 'man'
also: who was holding the gun? all information is implied.
how to handle cases like this?
SOMETIMES: ambiguity used to create suspense

-(pg 238) "possible, in theory, to classify the adjectives and nouns in terms of which can govern which-but in practice there will always be exceptions. If not, language is sufficiently dynamic that we can invent some."

"colorless green ideas" ---- how handle this sentence?

-(pg 240) "Intuition confirms that speech can be produced as it is organized."

-(pg 241) "At the level of learning from a model, the process is much simpler... The child will simply discover the appropriate ways of binding together concepts in the order he requires."

-(pg 241) "...ordering of adjectives in English has been studied extensively by Vendler (1968)... adjectives in a higher class must precede adjectives in a lower class if they both occur in a noun phrase... It seems that the more noun-like the adjective is, the closer it can occur to the noun. for instance, adjectives that refer to substance like 'foam' follow adjectives that refer to absolute properties like 'white', which follow adjectives like 'big', which refer to relative properties, which follow adjectives like 'comfortable', which refer to features of the noun's use."
(i.e. cant have phrase like: "white big cat" instead: "big white cat")

Anderson, John R., "Computer Simulation of a Language Acquisition System: A First Report", in R.L. Solso, ed., Information Processing and Cognition: The Loyala Symposium (Lawrence Erlbaum Associates, Hillsdale, 1975), p.336.

-(pg 241) "the most active adjective is usually the focus of a noun phrase and hence comes first, modifying the entire residual specified noun phrase."

-(pg 241) try interchanging 'small' and 'little' in following:
"the little red fire-engine"
"the reddest little fire-engine"
"the small little boy"
"the little green block"
"the green little block"
('little' is more an opposite of 'much' than of 'big')

-(pg 242) 1. "John is easy to please."
- John has an actor role
2. "John is eager to please."
- John has an outside role, the "undergoer"

------------------------- // end //

notes.24.november.2002.1800.berardi.txt

24 November 2002 @ 1800
------------------------- // notes //
notes taken from:

"The Pattern Recognition Basis of Artificial Intelligence"

by Donald R. Tveter

Publisher: Matt Loeb

Copyright (c) 1998 by IEEE Computer Society

ISBN: 0-8186-7796-1

------------------------- // start //

-> famous mistranslation:
"The spirit is willing but the flesh is weak."
(from English->Russian->English):
"The vodka is strong but the meat is rotten."

[observation]: children's first words: nouns? does this conclude something?

-> "Indeed, it might turn out that to get a computer to understand language it
will be necassary to give the computer a body and raise it much as human children are raised."

```
->  the     baseball     broke     the     window
   1     2            3         4       5         6

   word(the,1,2)  ("the" is between position 1 and 2, above)
```

[idea]: get first (most common) usage of a word, try it in sentence, does it 'fit'
(with set of rules)? if not, then try next usage of word, etc.
examples: "Working is fun." "I like the working computer."

[idea]: keep list of phrases/sayings (e.g. "Time flies when you're having fun")

-> SEMANTIC NETWORKS:

```
         food
       /      \
      /        \
     /          \
   verbs       nouns
  /     \        |
eat    obj v     |
| |            foods
v struct       /   \
             cake  apple
```

[idea]: verb never follows a determiner?
[idea]: all verbs = verb, noun, adjective

```
-> 1.) "The boy ate the pasta with the fork."
        [ NP  ] [    VP     ] [           ]

      -notes- "with the fork" applies to "ate"

   2.) "The boy ate the pasta with the sauce."
        [ NP  ] [  [     NP ]              ]

      -notes- "with the sauce" applies to "pasta"
```

SEMANTIC NETWORK:

```
          ate
         /   \
        /     \
       /       \
  adjectives    \
                 \
                nouns---------utensils
               /     \       /        \
             pasta  food    fork     knife
               ^----------------------^
               (CANNOT eat pasta w/ knife)
```

-> Sentence Parsing ideas:

- -combination of Syntactic AND Semantic
- -SYNTAX = identify word types
- -SEMANTIC = identify meaning, correct word types if unapparent meaning, ask for clarification, detect humor

-> "The bat fastly swung through the air."
- incorrect, but still understandable
- common mistake of grammar

-> Conceptual Dependency (CD) theory, derived by Roger Schank:
-focuses on semantics, rather than syntax

1.) "John is in love with Mary."
2.) "John loves Mary."

-notes- when someone hears (1), they will store ideas/content, not syntax of sentence. Therefor, they will recite those ideas when telling other people, as in (2).

(further information): "The Cognitive Computer" - discusses Schank's theories
"Inside Computer Understanding" - detailed discussion of Schank's theories

------------------------- // end //

notes.24.november.2002.1815.berardi.txt

24 November 2002 @ 1815
------------------------- // notes //
notes taken from:

"Natural Language Processing Technologies in Artificial Intelligence"

by Klaus K. Obermeier, Ph.D.

Halsted Press, New York

------------------------- // start //

-(pg 141) "...in order for a program to comprehend a story, it has to be able to abstract
from what is explicitly stated in the sentence and integrate the information into what is
present in its current knowledge base."

-(pg 151) three central questions for Text Generation (TG):
1.) is there a bidirectional grammar for both understanding and generation of language?
2.) how is the knowledge represented?
3.) what are the processes that transform such a representation into a sentence or whole text?

(suggested reading):
"In-Depth Understanding." Dyer, M.G. MIT Press, 1983.
"Syntax and Semantics 3." Grice, H.P. Academic Press, 1975.

------------------------- // end //

```
notes.29.november.2002.1730.berardi.txt

 29 November 2002 @ 17:30
----------------------// notes //
notes taken from:

 "Machines and Thought: The Legacy of Alan Turing"
    (volume one)

    Edited by P.J.R. Millican and A. Clark

 Copyright (c) 1996 by Oxford University Press

ISBN: 0-19-823593-3

----------------------// start //

(pg 11) Turing Test claims:
      1.) If a machine could pass the Turing Test, it would
          necassarily be intelligent
      2.) In the not-too-distan future it would in fact be
          possible actually to build such a machine

(pg 12) remaining notes from an essay by Robert M. French

      "Whatever acts sufficiently intelligent is intelligent."

      "the Turing Test could be passed only by things that
       have experienced the world as we have experienced it."

      "the Test provides a gurantee not of intelligence but of
       culturally-oriented human intelligence."

(pg 15) Turing Test assumption: all participants experienced
                                same culture

(pg 18) RATING GAMES
      ( on a scale 1 (completely implausible) to 10 (completely
        plausible) rate the following ) :
      - "flugblogs" as
            1.) new Kellog's cereal
            2.) new computer company
            3.) name of big, air-filled bags worn on the
                feet and used to walk on water
      - "flugly" as
            1.) a child's teddy bear
            2.) surname of bank accountant in a
                W.C. Fields movie
            3.) surname of a glamorous female movie star

      [idea: conduct survey of this sort, generate averages
             to conclude associations]

      * explanation:
        "flugblogs" --> initial syllable "flug" phonetically
                    activates words like "flub", "thug",
                    "ugly" or "ugh!" ... "blogs" activates
                    "blob", "bog"... the sum of these words
```

```
                  and meanings create our reaction.
      "flugly"    --> activates "snugly", "cuddly"; brings
                  feeling of cosiness, friendship, warmth
                  good name for teddy bear, but not
                  appropriate for (2) and (3)

(pg 20) to accomplish the rating/association game by computers:
       * "...requires taking unconscious account of a vast
          number of culturally acquired competing associations
          triggered initially by phonetic resemblence." *

(pg 21) questions for rating game:
      - rate "banana splits" as medicine
      - rate "grand pianos" as wheelbarrows
      - rate "purses" as weapons
      - rate "pens" as weapons
      - rate "jackets" as blankets

  *[idea: harvey asks "what do I know about {medicine, weapons,
        blankets}?" to rate words. for example, blankets are
        long and wide and keep you warm, and when a jacket is
        spread out, it is also long and wide and can keep warm]

(pg 21) "...virtually impossible to explicitly program into the
       machine all the various types and degrees of
       associations necassary to answer these questions like
       a human."
      [conclusion: develop a network/system to dynamicaly
                   associate items]

(pg 21) poetic beauty rating game?

(pg 21) joke rating game?
      how funny do you rate a joke?

(pg 22) advertising rating game?
      ( given a product X, rate a slogan Y for that product )

(pg 23) "The physical level is not disassociable from the
       cognitive level."

(pg 23) to make a machine "intelligent" it must be able to make
      conclusions and associations

(pg 25) "The meat of the first three hours of this lecture will
       be medieval torture in general. And if none of you has
       fallen asleep by then, we'll have the Spanish
       Inquisition for dessert."
       ** "Spanish Inquisition" is given a 'food' identity
           through creativity

(pg 25) "Most of our thought processes are intimately tied to
       the associative overlap of categories."

----------------------// end //
```

notes.30.november.2002.1500.berardi.txt

30 November 2002 @ 15:00
----------------------// notes //
notes taken from:

"The Pattern Recognition Basis of Artificial Intelligence"

by Donald R. Tveter

Publisher: Matt Loeb

ISBN: 0-8186-7796-1

----------------------// start //

(pg 2) "Knowledge gained by experience is essenial."

(pg 2) Adults find it easy tellig one person from another.
However, when a large number of adults (i.e. Americans)
visit a foreign country, like China, they report that
all Chinese look alike. Chinese don't because they
developed recognition of their race. Chinese often
report that Americans all look alike. this ability
is developed based on evironment and experience.
It does not work well outside this environment.

(pg 2) "... as people learn a new task they get faster and
faster at it..."

(pg 2) required for intelligence:
1.) intuition
2.) creativity
3.) thought
4.) understanding
5.) feelings
6.) [addition by Steven Berardi] sense of humor
(it can be argued that a "sense of humor" arises
through the power of intelligence)

(pg 3) Turing Test questions:
- Are you human?
- Tell me about your childhood.
- Is it warm in the room?
- How much is 1084638483 times 1893483049?
(must answer last question as slow and as unreliable
as a human would)

(pg 3) "Thinking is something that is independent of knowledge."

(pg 5-6) < Ideas of William James >
we often use association for logic:
if someone is given two lines to memorize:
1.) I, the heir of all the ages in the
foremost files of time
2.) For I doubt not through the ages one

increasing purpose runs

* when the person recites these lines, why does he continue with "...in the foremost after "the ages" instead of "...one increasing" ?
  CONCLUSION = while "the ages" refers to both lines, what matters are the words BEFORE "the ages"

* another example: a teacher assigns seats each year in alphabetical order to memorize student names. when the teacher sees a student outside of class he or she will have trouble recognizing the student. the teacher may remember where the student sits to remember the name.

(pg 7) IMPLEMENTATION = use "weights" to associate or link ideas. for example, how close are "western" and "John Wayne" related? or "western" and "cowboys"?

* to determine how two clues/objects associate with one another, simply add their weights. for example:

WESTERN:		TRAIN:	
John Wayne	40	Amtrak	30
cowboys	30	electric	25
Indians	25	Santa Fe	25
Santa Fe	25		

--> in this example, if you were given words "western" and "train", the most apparent answer would be "Santa Fe" because it gets a weight of 50 by adding its 25 from "western" and 25 from "train"

Further Reading: "Principles of Psychology" - two volumes
"Psychology"
by William James

(pg 8) Walker and Amsler's FORCE4
- looks at newspaper articles and figures out story
- uses association
- what story is about = greatest value of association
- program works with law, military, sports, radio, television

----------------------// end //

```
notes.01.december.2002.1400.berardi.txt

 1 December 2002 @ 14:00
----------------------// notes //

 conclusions made from previous notes

----------------------// start //

 "Mike ate a cookie."
   n    v      n

  to find subject: look through possible nouns, see if it
               fits with possible verbs.
               (i.e. Mike (person) can "eat" but a cookie
                cannot)

 question: subject ever occur AFTER the predicate?
         if not, only look at nouns between possible verbs

 "Working is fun."

  --> "work" is used as a noun, but does that matter?
      suppose we look at the sentence as applying a description
      to the verb "work" ?

 KNOWLEDGE BASE - ideas - semantic networking

      - Nodes = ONE occurrence in knowledge base
      - Links = infinite occurrences in knowledge base

  * hypothesis: more NEW nodes are created than NEW links
  * links represent basis for learning. is this true?

Input/Output pocedures:

 Input:                      Output:
  1.) unslangarize            1.) semantical generation
  2.) spell check             2.) syntactical clean-up
  3.) semantical analysis     3.) slangarize

  * procedures are basically reversed from input to output

----------------------// end //
```

notes.14.december.2002.2145.berardi.txt

14 December 2002 @ 2145
------------------------- // notes //
notes taken from:

a set of lecture notes located at:
http://www.cc.gatech.edu/classes/AY2003/cs8803b_fall/

------------------------- // start //

*** on the topic of neural networking ***

-> "Provided with a sampling of specific cases, an inductive process can produce a rule that fits the specific cases, and can be applied to cases that have not yet been encountered."

-> neural networks allow learning and rule production that depends on user feedback. the feedback generates the value of weights.

-> relies on the presence of teachers or relevant data

-> further research: multilayer neural networks

*** on the topic of semantic networking ***

-> semantic networks as a form of knowledge representation (memory)

-> ex 1:
"Jack got a rope. He wanted to commit suicide."
(From Charniak and McDemott, Artificial Intelligence, chapter 10.)

* why did jack get the rope? because he wanted to hang himself. knowing this must consider the various uses of a rope.

-> parts of semantic representation:
1.) lexical/vocab = nodes, links
2.) structural = node->link->node
3.) semantic = node is object, link is relation
4.) procedural = input/output, navigating network

-> works much like a neural network, algorithm for navigation in ex 1:
1.) "get rope" node activated by first sentence
2.) "commit suicide" node activated by second sentence
3.) activation spreads in both directions
4.) when activation intersects, explanation is formed

[idea: look up all content words (adj,verbs,nouns) and navigate through their links to form a collision (meaning)]

-> downsides:
- search could take wrong path, loop indefinitely
- multiple paths lead to same collision
(i.e. using a rope to scale a building so you could jump off)
- adding more sentences: focus on last sentences since they will contain more specific information

-> solutions:

- introduce a limit of level searching
  (i.e. do not go back more than four links, or forward 5 links)
- introduce a link strength
  (i.e. how strongly do cats relate to animals?)
- add some kind of decaying factor to separate first sentence knowledge from last sentence knowledge

-> SemNets create relations between states and objects:
(from ex1, we could conclude Jack was unhappy, due to his urge to commit suicide.)

-> "Question from class: Does the programmer have to handcraft the semantic networks?
Answer: In most of the times the semantic networks are handcrafted."

[note: harvey must learn to develop his own semantic networks and create his own links based on "thinking"]

[decision to make: does each node represent a frame, or are frames avoided by use of more links? frames provide an easier way of searching, but harder way of learning.]

-> SemNets help find the "hidden meanings" of sentences:
"Bill shot Bob." --> from this sentence one can conclude:
1.) bill has a gun, and pulled the trigger to shoot bob
2.) bill probably does not like bob
3.) bill killed bob
4.) bob is probably not too happy about bill's action

[idea: navigate through semantic network as harvey is reading sentence. this is how humans read sentences, so perhaps harvey should take the same route?]

-> "When making inferences, it is not only important to know what inferences you can make, but it is also important to know what inferences not to make."

-> "Semantic networks do this through activation. By activating nodes related to a mentioned node, semantic networks indicate what inferences can be made. By decaying activations, and limiting the spreading activation, semantic networks control what not to infer (if spreading was not bounded, then eventually all nodes would be activated from every mention, and no meanings would be possible from semantic networks)."

-> "humor is telling a story that doesn't meet expectations?"

------------------------- // end //

notes.16.december.2002.1420.berardi.txt

16 December 2002 @ 1420
------------------------- // notes //
notes taken from:

"Tell Me a Story"

publisher: Macmillan. New York, NY

ISBN: 0-684-19049-4

------------------------- // start //

(pg 1) "People learn from what happens to them, and they guide their future actions accordingly."

(pg 1) "...intelligence is really about understanding what has happened well enough to be able to predict when it might happen again."

(pg 1) - reminding gives us power to evaluate past events and make generalizations or predictions

(pg 2) "Finding a relevant past experience that will help make sense of a new experience is at the core of intelligent behavior."

(pg 2) "We need to know how people do the ordinary things, not the extraordinary."

(pg 3) "Any human, even the dullest of us, is unbelievably intelligent."

(pg 5) - many answers to questions were already available in memory (no thought was needed)

(pg 6) "...a great deal of what people say at any time, do not require-nor do they receive-much thought."

(pg 6) "An understander of the world is an explainer of the world."

(pg 7) "Life experience means quite often knowing how to act and how others will act in given stereotypical situations."

(pg 7) - Scripts:
  - set of events/ideas that help predict the future of a situation
  - can help us understand others by pulling up the correct script and filling roles
  - categorize ideas/events
  - example: ordering food at restaurant

(pg 8) "...people may do no more in thinking than to apply a script."

(pg 8) - everyone has different scripts they use daily (pg 8) "...much of our early education revolves around learning the scripts that others expect us to follow."

(pg 8)
- more scripts = less confusion
- more scripts = more comfortable in situations

(pg 9) - scripts evolve with new information and serve as a memory structure

(pg 9) - two different people have two different sripts, although they may share certain information

(pg 9) "...we find it easier to apply scripts than to reason out every new situation from scratch."
-> very rare to generate new scripts strictly from "thought"

(pg 9) - understanding a situation without a script can be done by applying an old script to the new situation

(pg 10) "...the most important data we have comes from within."

(pg 10) - we constantly re-evaluate situations when new information arises

------------------------- // end //

```
notes.20.december.2002.1700.berardi.txt

 20 December 2002 @ 17:00
----------------------// notes //
taken from:

 "Cognitive Science and Concepts of Mind"

   Copyright (c) 1991 by Morton Wagman

   publisher: Praeger, New York, NY

   ISBN: 0-275-94044-6

----------------------// start //

(pg 4) - Colby (1975) created bot named PARRY that behaved
         with state of paranoia

       [question: what exactly IS understanding?]

(pg 8) - more info on scripts:
          "Scripts, Plans, Goals and Understanding"
             by Schank and Abelson, 1977

(pg 8) - "At what point does a person graduate from merely
          manipulating rules to really understanding?"
              - quoted from Waldrop, 1987:138
              * do we ever REALLY "understand"?
              * do we ever abandon rules?

[slogan: we will take the A out of AI]

(pg 8-9) "The problem for artificial intelligence is not
          whether it can represent the syntax, rules, and
          formal structures generally of human culture but
          whether it can represent varying semantic contexts,
          shifting imprecise rules, incomplete or historically
          bound knowledge, proffered reasons that disguise
          real reasons."

(pg 9) "the book of nature is written in the language of
        mathematics"  - Galileo (1564-1642)

(pg 10) further research:
          - Leibniz's "universal character" (Alston, 1968)
          - Weaver's "inter-lingua" (1955)

(pg 14) "...accomplishes thinking by copying and reorginizing
         symbols in memory, receiving and outputting symbols,
         and comparing symbol structures for identity or
         difference."

         PROBLEM-SOLVING:
           1.) create symbolic representation
               (initial, intermediate, final situations)
           2.) gather concepts involved in solution process
           3.) conduct "mental search" for solution
```

4.) search is selective (heuristic search)

* from: "Scientific Discovery: Computational Explorations of the Creative Process" by Langley, Simon, Bradshaw, Zytkow (1987:7-8)

(pg 46) Resolution Method (indirect proof):

<from a set of propositions, prove X>

1.) negate X
2.) add negation of X to set of propositions to form and "expanded set"
3.) transform expanded set of propositions into a set of clauses (groupings of predicate calculus expressions)
4.) apply resolution to clauses
5.) look for contradiction

[idea: Semantic Networking:

1.) start with first word of sentence
2.) move through network with each word
    * some word types will share links about what words can modify it (i.e. "not" or "under")
3.) put final path through SemNet into STM?]

(pg 94) "Research has demonstrated that systematic training in the identification of the structure of texts can result in improved comprehension and recall of text."
 - Bartlett, 1978

(pg 103) "The hardest thing to understand is why we can understand anything at all."
 - Einstein, quoted in Minksy, 1986:319

(pg 106) classic memory researcher - Bartlett and his "serial recall" theory

(pg 110) "The human memory process elaborates the original stimulus material in a meaningful way, as indicated by coherence effects and schemata effects."

[note: research Bartlett's ideas on memory distortion, evolution, etc]

(pg 110) father of Semantic networks: Quillian (1966)

(pg 110) spreading activation - intersection search of SemNets

(pg 111) further research of SemNets:

- Collins and Quillian, 1969, 1972
- Conrad, 1972
- Collins and Loftus, 1975. theory of weights applied to links (or distance)

[idea: incorporate variable of energy into SemNets as a means of determining how far to go through the network. for example, a car does not have an infinite supply of gas]

(pg 114) Propositional network
- may help with memory organization
- more info: Anderson, 1974. ACT

(pg 116) vital parts of memory:
- encoding
- storage
- retrieval

(pg 124) "Human reconstructive memory for events is an integration of specific recall and of reasoning as to what probably occurred based on general and personal knowledge of similar situations."

(pg 144) AM - program that made mathematical discoveries
- developed by Lenat, 1976

[question: creativity/discovery = pattern recognition?]

(pg 148) BACON.3 by Langley (1981): discovers scientific laws

(pg 165) "The nature of human intellect is discoverable, the mathematics of human intellect is describable, and the computational representation of human intellect is constructible."

"A general unified theory of human and artificial intelligence can evolve."

----------------------// end //

notes.21.december.2002.1300.berardi.txt

 21 December 2002 @ 13:00
----------------------// notes //
taken from:

  "William James: Writings 1878-1899"
       by William James

  University Press, ISBN: 0-940450-72-0

----------------------// start //

(pg 13) "...our various ways of feeling and thinking have grown
         to be what they are because of their utility in shaping
         our reactions on the outer world."

(pg 14) each mental state causes body to act in certain way

(pg 15) our feelings and moods come more from physical state
        than thought and logic

[idea: proving humans are "machines" proves machines can think?]

(pg 106) "The brainless pigeon will starve thought left on a
          corn-heap."

(pg 109) our minds have evolved
         (i.e. if we thought suffocatioin was "fun" we would
          all be dead)

(pg 110) more info on feelings:
           "Physiological AEsthetics" by Grant Allen

(pg 127) reaction times listed in increasing order:
           - sound, touch, light, taste, smell

(pg 127) more intense stimulus = shorter time

(pg 129) we identify words almost as quickly as letters
         (we read by looking at word as a whole, not identifying
          each separate letter)

(pg 129) time taken to make an association of an unknown idea:
            5/6 of a second

(pg 130) time taken to identify words in a sentence is much less
         than identifying them in a random list

         [question: does this support the idea of moving
                    through the SemNet as each word of
                    sentence is read?]

(pg 132) "If we are striving to remember a lost name or fact,
          we think of as many 'cues' as possible, so that by

their joint action [association] they may recall what no one of them can recall alone."

(pg 132) "The sight of a dead prey will often not stimulate a beast to pursuit, but if the sight of movement be added to that of form, pursuit occurs."

[conclusion: some objects/ideas must come together to create an appropriate reaction]

```
(Strange Man)---AND---(Dog)---AND---(Darkness)
        \              / \
         \            /   \
          \          /     \
           \        /       \
            ((fear))    (agression)
```

*these states of fear/agression only exist when all top nodes are true

(pg 133) as brain-activity increases:
- blood supply to brain increases
- temperature of brain increases

(pg 137) "An acquired habit, from the physiological point of view, is nothing but a new pathway of discharge formed in the brain, by which certain incoming currents ever after tend to escape."

(pg 140) "habit simplifies our movements, makes them accurate, and diminishes fatigue"

(pg 140)
- man is born with intent to develop habits
- animals are born with most of their life habits
- "But in him [man] the number of them [habits] is so enormous that most of them must be the fruit of painful study."

(pg 141) "It is impossible for an individual to realise how much he owes to its automatic agency until disease has impaired its functions."

(pg 145) "Habit is thus the enormous fly-wheel of society, its most precious conservative agent."

"It alone is what keeps us all within the bounds of ordinance and saves the children of fortune from the envious uprisings of the poor."

(pg 145) age < 20: formation of personal habits (vocalization, pronunciation, gestures, motion)
age 20-30: intellectual/professional habits

(pg 146) "make our nervous system our ally instead of our enemy"

(pg 146) "We must make automatic and habitual, as early as possible, as many useful actions as we can."

(pg 150) "Keep the faculty of effort alive in you by a litle gratuitous exercise every day."

(pg 150) "The hell to be endured hereafter, of which theology tells, is no worse than the hell we make for ourselves in this world by habitually fashioning our characters in the wrong way."

"Could the young but realize how soon they will become mere walking bundles of habits, they would give more heed to their conduct while in the plastic state."

"We are spinning our own fates, good or evil, and never to be undone."

"Every smallest stroke of virtue or of vice leaves its never so little scar."

----------------------// end //

notes.25.december.2002.0000.brunetti.txt

25 December 2002 @ 0000
------------------------- // notes //
notes taken from:

"The Philosophy of Laughter and Humor"
John Morreall

Publisher: State University of New York

ISBN 0-88706-326-8

------------------------- // start //

Traditional Theories of Laughter and Humor (Part I)

-(Introduction)

These notes and many to come from this book will answer 5 basic questions about Humor/Amusement; "What is humor?", "What is laughter?", "What is the relation of humor to laughter?", "Is humor an emotion?", and "Is humor rational or Irrational?". To answer these questions we turn three traditional theories- the "Superiority Theory", the "Relief Theory", and the "Incongruity Theory".

-(Superiority Theory)

"represented by the selection from Plato, Aristotle, and Hobbes, we laugh from feelings of superiority over other people, or over our own former poisition." Now although this theory makes sense another person named Hutcheson pointed out to Hobbes and said, "We do not always respond with laughter when we see the failure of others or our own sucess; and conversely, much of our amusement does not seem to involve feelings of superiority."

-(Relief Theory)

"best represented from the selections from Spencer and Frued, has been very influential in contemporary psychology, states simply that every time we laugh we are working off extra excess energy." Both the Relief and Superiority Theories seem to latch on incidental benefits to the amused person rather then on what it is about amusing that makes them amusing.

-(Incongruity Theory)

"represented by Kent, Schopenhauer, Kierkegaurd, amusement is "the Incongruous.", what amuses us is some objects of perception or thought that clashes with what we would have expected in a particular set of circumstances"

-(Plato pg 10)

In Platos view what we laugh at is particulary self ignorance, in people who are powerless. Our amusement is a kind of malice toward such people, and this should make wary of amusement, but should the fact that amusement is an emotion in which we tend to lose rational control of ourself when we abandon ourselves to violent laughter, our condition provokes a violent reaction.

Conversation between Socrates and Protarchus about Superiority Theory (pg 12-13)

"Those who are weak and unable to retaliate when they are laughed at may rightly be called ridiculous. Those who are strong and can defend themselves may be more truly called formidable and hateful, because it is hurtful to everyone both in real life and on the stage, but powerless ignorance may be considered ridiculous, which it is."

"When we laugh at what is ridiculous in our friends, our pleasure, in mixing with malice, mixes with pain, for we have agreed that malice is a pain of the soul, and that laughter is a pleasant and on these accasions we both feel malice and we laugh."

-(Aristotle pg 14)

Agreed with Plato that laughter is essentially derisive and that in being amused by someone we are finding that person inferior in some way. "

-Quotes from Cicero (pg 16-18)

-"A speaker can get a laugh by setting up a certain expectation in the audience, and then jolting them with something they did not expect."

-"Humor- he who says funny things, and he who says things funny"

-"Two kinds of jokes, one of which is based on thinfs, the other on words"

-"The most common kind of joke is that in which we expect one thing and another is said; here our own disappointment expetation makes us laugh. But something ambiguous is thrown in, and the joke is heightened."

-(Thommas Hobbes pg 19)

Agrees with the Superiority Theory in his view humors are in "constant struggle with on another for power and what power can bring. In this struggle the failure of our competitors is equivalent to our sucess." And so we are all constatntly watching for signs that we are better oof than others, or, what counts as the samething, that others are worse off than we are. "Laughter is nothing but an expression of our sudden glory when we realize that in some way we are superior to someone else."

Quotes From "English Works" (pg 19-20)

-"Sudden glory, is the passion which makes us laugh and is eighter caused by sudden act of their own, that pleased them, or by the apprehension of some deformed thing in another, by comparison whereof they suddenly applaud themselves."

-"Men laugh often especially such as actions performed never so little beyond their own expectations; as also at their own jests: and in this case it is manifest, that the passion of laughter proceeds from a sudden conception of some ability in himself and laughs."

-"Men also laugh at the infirmities of others, by comparison wherwith their own ablities are set off and illustrated."

------------------------- // End //

notes.26.december.2002.0200.brunetti.txt

26 December 2002 @ 0200
------------------------- // notes //
notes taken from:

"The Philosophy of Laughter and Humor"
John Morreall

Publisher: State University of New York

ISBN 0-88706-326-8

------------------------- // start //

Traditional Theories of Laughter and Humor (Part II)

-(Rene Decartes pg 21)

According to Decartes there are only six basic emotions- wonder, love, hatred, desire, joy, and sadness- and laughter is found to accompany three of them, wonder, (mild) hatred, and joy. Laughter itself, is the reapeated rapid expulsion of air from the lungs caused by a sudden flow of blood into the lungs from the heart, with the attendant movements of the diaphragm and muscles of the chest and face. "He considers laughter only as it occurs in scorn and ridicule. Indeed he incorporates joy and wonder into scorn as the cause of scornful laughter."

Some Observations made by Decartes (pg 22-25)

-"Laughter consists in the fact that the blood, which proceeds from the right orifice in the heart by the arterial vein, inflating the lungs suddenly and repeatedly, caused the air which they contain to be constrained to pass out from them with an impetus by the windpipe, where it forms an inarticulate and explosive utterance; and the lungs in expanding equally with the air as it rushes out, set in motion all the muscles of the diaphragm from the chest to the neck, by which means they cause motion in the facial muscles, which have a certain connection with them. And it is just this action of the face with this inarticulate and explosive voice we call laughter." In other words it means, HAHAHAHAHAHAHAHAH.

-"And I can only observe two causes which make the lung thus inflate suddenly. The first is the surprise of admiration or wonder, which, being united to joy, may open the orifices of the heart so quickly that a great abundance of blood suddenly entering on its right side by th vena cava, rarefies there, and, passing from thence by the arterial vein, inflates the lung."

-"And we notice that people with very obvious defects such as those who are lame, blind of an eye, hunched-backed, or who have received some public insult, are specially given to mockery; for, desiring to see all others held in as low estimation as themselves, they are truly rejoiced at the evils which befall them deserving of these."

-(Francis Hutcheson pg 26)

States that there is no connection between "having feelings of superiority and laughing or being amused". Meaning that having feelings of superiority is neither a necessary condition nor a sufficient condition for laughter or amusement.

Quotes by Hutcheson (pg 27-40)

-"laughter often arises without any imagined superiority of ourselves, may appear from one great fund of pleasantry, the parody, and burlesque allusion, which move laughter in those who may have the highest veneration for the writing alluded to, and also admire the with of the person who makes the allusion."

-"Cause of laughter is the bringing together of images which have contrary additional ideas, as well as some resemblance in the principal idea."

-(David Hartley pg 41)

" Hartley's obeservations on laughter an humor do not bring in any new theories, but his conclusions bring together elements of the three traditional theories. A Hobbesian Theorist (Superiority) would like his observations that we often laugh at the mistakes of children and other misfortunes. Those who hold an incogruity theory would like when he discusses surprise, inconsistencies, and improprieties as causes of laughter. And those who hold the relief Theory note when he says that laughter sometimes is a result from the sudden dissipation of fear or other negative emotions.

Also Hartley made a great observation in children and how theylearn to laugh."

Quotes by Hartley (pg 42-44)

-"Now it may be observed that young children do not laugh aloud for some months. The first occasion of doing this seems to be surprise, which brings on a momentary fear first and then a momentary joy in consequence of the removal of fear, agreeably pain." Meaning they would cry!!

-"They learn to laugh, as they learn to talk and walk, and they are most vunerable when others laugh."

-"As children learn the use of language, they learn to laugh at senteces or stories, by which sudden alarming emotions and expectations are raised in them, and again dissapointed instatly."

-(Immanuel Kant pg 45)

"Indeed, even though amusement is caused by the play of ideas, it is a kind of sensory gratification based on feelings of well-being, especially feelings of health. In listening to a joke, we develop a certain expectation as to how it will turn out. Then, at the puch line, our expectation vanishes. This sudden mental movementis not enjoyed by our reason, for our desire to understand is frustrated. But accompanying our mental gymnastics at the pung line is the animation of our intestines and internal organs, and this bodily motion produces a feeling of health. The incongruity we experience in humor "gives a wholesome shock to the body"

------------------------- // End //

notes.27.december.2002.1400.brunetti.txt

27 December 2002 @ 1400
------------------------- // notes //
notes taken from:

"The Philosophy of Laughter and Humor"
John Morreall

Publisher: State University of New York

ISBN 0-88706-326-8

------------------------- // start //

Traditional Theories of Laughter and Humor (Part III)

-(Arthur Schopenhauer pg 51)

"What we percieve through our senses, are individual things with many characteristics. But when we organize our sense of perception under abstract concepts, we focus on only a few characteristics of any individual things by the same word." In other words Schopenhauer is saying here that when we look at something adn then asked to describe it we only focus on certain aspects of it, things that stand out the most "discrete things". But when we are able to see it infront of ourselves we see the whole picture.

Some Observations made by Decartes (pg 52-64)

-"Humor arises when we are struck by some clash between a concept and a percption that are supposed to be of the same thing."

-"Two or more real objects are thought through one concept, and the identity of the concept is transferred to the objects."

-(William Hazlitt pg 65)

States "Man is the only animal that laughs and weeps; for he is the only animal that is struck with the diffrence with what things are, and what thighs out to be." In other words we laugh and cry becouse we how how things are suppose to be and when things seem out of place; thus either arousing laughter or at times crying.

Some Observations made by Hazlitt (pg 67-82)

"If everything that went wrong, if every vanity or weakness in another gave us a sensible pang, it would be hard indeed; but as long as the disagree-ableness of the consequences of a sudden disaster is kept our of sight by the immediate of the circumstances, and the absurdity or unaccountableness of a fool-ish action is the most striking thing in it, the ludicrous prevails over the pathetic, and we receive pleasure instead of pain from the farce of life which is played before us..." What this is saying is that if a man walks on a street and stumbles into a rock, that to us is funny, even though the man could have gotten injured. Sometimes we can take everyday things that in reality would be pain to us, and transform them into humor for us to enjoy.

"if we hold a mask before our face, and approach a child with this dis-guise on, it will at first, from the oddity and incongruity of the appearence, be inclined to laugh. If we go nearer to it, steadily, and without saying a word, it will begin to be alarmed, and be half inclined to cry. If we suddenly take off the mask, it will recover from its fears, and burst out laughing, but if instead of presenting the old well known countenance, we have concealed a satyr's mask then the child would scream for help."

Hazlitt observed that lets say a child was expecting to meet someone they were very fond of. And for some reason that person never shows up, the child would start express forms of sadness and emptyness. Now lets say the person shows up unexpeted for a long period of time, then the child when first seeing the person would start express forms of joy and excitment, its face will light up with joy, its eyes sparkle, ect.., Now lets say in a game of hide and seek the child knows for sure where the person is hiding but when it arrives there the person is nowhere to be found. The child keeps looking and looking and then when least expected bumbs into the person the shock from it would start to express laughter. This showing that the same object at times when looked at can bring diffrent fellings and expressions to someone.

Hazlitt says there are degrees to laughter. One degree is the short lived laughter, meaning it only last for a little time and then when its over ther is nothing that can bring us back to that same state of mind and have the same expectation. The second degree is more lasting and is usually caused by "ludicrous arising out of the improbable or distressing." The third degree is the "ridiculous arising out of absurdity as well as improbability."

"In general we laugh at those misfortunes in which we are all spectators, not sharers. Their humiliation is our thriumph."

"You cannot force people to laugh, you cannot give a reason for people to laugh, they must laugh themselves, or not at all. As we laugh from a spontaneous impulse, we laugh the more at any restrain upon the impulse."

Misunderstandings, where one person means one thing and onther means something else are another great source of comic humor.

------------------------- // End //

```
notes.27.december.2002.1525.berardi.txt

 27 December 2002 @ 15:25
--------------------------// notes //

 this file contains an outline of an idea derived from thought
 while considering the key ideas of the previous notes.

--------------------------// start //

 Raising Harvey in a Virtual World
 --------------------------------------------
   -> a "digital" world modeled much like our own

   -> digital world:
       - Harvey is an object (a person object)
       - Harvey is digital (created with binary code)
       - a digital world is simply a collection
         of digital objects
       - for example, a digital banana will be modeled with a
         class called "banana" and will have various properties:
             - color    - size
             - smell    - weight
         it will also have functions/methods, like:
             - changeSize(newsize)
             - changePosition(newpos)
             - changeColor(newcolor)
                 * will change from green to yellow after
                   several days
       - for help understanding the concept of a digital world,
         watch the movie "The Thirteenth Floor"

   -> harvey will have all five senses:
        - sight      - touch
        - hear       - smell
        - taste

   -> each object in this world will be represented by a
      unique coded object (each object will have to be given
      properties and programmed specifically to represent
      its real world counterpart).

   -> objects will have sense sockets:
        - object's output socket for smell connects to
          harvey's input socket for smell
        - this is how harvey will examine and recognize the
          various properties of the objects
        - in case of 'sight' sense: harvey will work like we do,
          remembering the most important aspects of the object's
          sight (color, shape, etc)

   -> harvey can move around in this world, and can pickup,
      throw, smash, etc any object in the world

   -> phase one:
       - world consists of a small room (real-life babies spend
         most of their time at home)
       - few objects (i.e. a ball, blanket, bottle, etc)
```

- development team acts as parents
- a GUI will allow the dev team to communicate with harvey and move around objects or just talk. this GUI will be our portal to Harvey's binary world.

-> phase two:

- extend the world to entire house (a typical house of bedrooms, bathrooms, kitchen, etc)
- introduce another baby (another harvey)
- introduce many more objects (as the first harvey will have learned to "play" with them)

-> phase three:

- create a couple outside scenes (i.e. a park, school, etc)
- objects to go with these new scenes
- this will force the creation of even more harveys (possibly derived from the original?)
  [question: could we learn from a clone of ourselves?]

-> phase four (and beyond):

- create more scenes in an effort to model every scene a typical person comes in contact with during their life
- by this time we will have many object templates and even scene templates, allowing the creation of new scenes to go faster

-> Purpose: to allow Harvey to experience the world just as we did (this approach seems to be the closest we can get while remaining in the world of binary computers)

I also believe this will ease the education process of Harvey. He will have all senses available to him and we can visually communicate with him through the GUI.

-> final hypothesis: more stress on development of harvey, but much less on the post-dev education of harvey.

--------------------------// end //

```
notes.27.december.2002.1640.berardi.txt

 27 December 2002 @ 16:40
----------------------// notes //
taken from:

  "William James: Writings 1878-1899"
       by William James

  Copyright (c) 1984 by The President and Fellows of
                         Harvard College

  University Press, ISBN: 0-940450-72-0

----------------------// start //

(pg 153) four characters of consciousness:
          1.) each state of mind tends to be a part of
              personal consciousness
          2.) states always change inside personal consciousness
          3.) personal consciousness is continuous
          4.) chooses objects among a collection
              accepts objects of "interest"

(pg 153) we only deal with "states" we have experience with

(pg 154) "no state once gone can recur and be identical with
          what it was before"

(pg 155) "there is no proof that an incoming current ever gives
          us just the same bodily sensation twice"

(pg 155) many people are masked from their changing states by
         the constant objects these states employ

(pg 157) "we wonder how we ever could have opined as we did last
          month about a certain matter"

(pg 157) each year we see the same things in new ways with new
         ideas and light

(pg 159) consciousness "flows" like a 'river' or 'stream.' it is
         not a bunch of links like a 'chain' or 'train'

[idea: forgetting, fading memory = breaking of links (but keeping
       the nodes)]

(pg 164) an adult can read aloud passages he does not understand,
         but still read them with correct flow and emphasis. why?
          * because he has grown to recognize patterns of words
            together and just words themselves
          * this explains why people learning to read stuter
            and read slowly (aloud)

(pg 169) senses = organs of selection

(pg 170) "The real sound of the cannon is the sensation it makes
          when the ear is close by."
```

"The real color of the brick is the sensation it gives when the eye looks squarely at it...out of the sunshine"

(pg 170) "The mind chooses to suit itself, and decides what particular sensation shall be held more real and valid than all the rest."

(pg 170) "A thing may be present to a man a hundred times, but if he persistently fails to notice it, it cannot be said to enter into his experience."

(pg 171) "...a thing met only once in a lifetime may leave an indelible experience in the memory."

(pg 171) we pay our attention to those objects that interest us, this forms our "experience"

(pg 172) what a man chooses as interesting decides his personality, his "career"

(pg 172) "The problem with the man is less what act he shall now resolve to do than what being he shall now choose to become."

(pg 172) all of us share some common evolutionary interests

----------------------// end //

```
notes.28.december.2002.1200.berardi.txt

 28 December 2002 @ 12:00
----------------------// notes //
taken from:

 "Conceptual Structures"
    by John F. Sowa

  Copyright (c) 1984 by Addison-Wesley Publishing Company, Inc.

  ISBN = 0-201-14472-7

----------------------// start //

 STM = short term memory
 LTM = long term memory

(pg 85) semantic nodes = possibility of "extending" nodes to
                         create specific instances
        (i.e. extend "water" to mean some water in some glass.
              give it some kind of serial number)
        -> these extensions will retain properties of superclass,
           but include more properties such as color, amount,
           weight, etc
        -> be used for STM?

[idea: Bill as name/noun
         Name
            \
             \
             Bill   (subclass, extension of name) ]

(pg 89) numbers also have names (i.e. four, pi, e, etc)

(pg 95) "syntactic rules can map noncanonical graphs into
         grammatical"

(pg 30) children learn words by building letters
        [not always true: first words?]

(pg 31) Lashley(1942) hypothesized images are stored as
        "wave-like interference patterns"
            - De Valois (1980) found strong supporting evidence

(pg 32) Kosslyn (1980) - hypothesizes a visual buffer in mind used
                         for transforming/storing images on the fly

(pg 32) Shepard and Cooper (1982) - mental images presented in some
                                    kind of "mini model"

(pg 32) "When a monkey's visual cortex is surgically removed, it
         can still find objects by visual clues."

(pg 33) Horn (1960)
         - cat sitting quietly jumps at sound of sharp click
         - cat pursuing a mouse ignores the same sharp click
```

[idea: instead of storing complete image, store "remembered" parts]

(pg 36) "behavior becomes less consciousness as it becomes more automatic"

(pg 37) we tend to forget ideas we cannot translate into words

(pg 37) "Symbols are necessary; thoughts without symbols fly away in the wind."
- Paul Keller

(pg 37) from studying the deaf, it is concluded that complex thought does not require language

(pg 37) Piaget (1970) found logic development in children depends more on experience than language

(pg 37) speed of development (slow to fast):
- blind
- deaf
- normal

(pg 38) "Language and logic are independent skills."

(pg 38) David Waltz (1981) - the brain sometimes requires visual and spatial mechanisms for understanding
(i.e. "The shitzu bit the man's ear." // not possible
"The dog bit the man's ear." //possible)

(pg 39) people remember discrete properties:
- house is red and tall
- car has four doors
- paper is white with horizontal blue lines

(pg 40) language uses discrete words, but our world is in reality continuous

(pg 40) "The reason language has fuzzy terms is not that human thought is fuzzy, but that the world is fuzzy."

(pg 41) slang terms or objects remain, while slang emotions fade
(i.e. kid, mob, far out, groovy)

(pg 41) "words do not express emotions in the same way they express concepts"

(pg 41) "Good writing does not express emotion. Instead, it describes scenes and events in a way that leads the reader to experience the emotion for himself."

* emotion is best communicated with body language

(pg 48) without knowing it, we use formulas when speaking language:

```
 ___   ___
 | |   | |    |    |     // musical notes
 o o   | o    o    |
       o           o
```

Joey is a sissy

* this formula represented by notes is used by children to mock other children
* broken down, it looks like:

Joe --- ee	is --- a	Siss	ee
(normal pitch)	LOW norm	norm pitch	low pitch
	pitch pitch		
half counts	half counts	full count	full count

"The mocking form is so effective that even with meaningless syllables it can send a child home crying."

(pg 51) for STM: "items not at the center of attention tend to fade away"

(pg 52) one complex activity at a time

(pg 52) people remember words in a phonetic, auditory way [?]

(pg 52) "How many windows are in your house?"
- requires a mental tour of your house
- Shepard (1966)

(pg 53) "Short-term memory consists of a limited number of working registers, each of which excites or activates same record in long-term storage."

(pg 53) Miller suggests STM consists of seven registers.
it can store seven "chunks" of information.

"The basic property of a chunk is not its size, but its unity as a well-learned familiar pattern."

- a complete sentence could be one chunk as long as it is "familiar"
- registers store addresses, not data

(pg 53) Broadbent (1975) says three registers:
- seven can be stored, but only 3-4 can be retrieved with considerable accuracy
- extra items above three can only remain accurately if they have an association with the first three
- when people recall items from a list (i.e. countries, states, baseball players), they usually group them in two or three

(pg 54) STM is not just simply "faster" than LTM

----------------------// end //

notes.28.december.2002.1500.brunetti.txt

28 December 2002 @ 1500
------------------------- // notes //
notes taken from:

"The Philosophy of Laughter and Humor"
John Morreall

Publisher: State University of New York

ISBN 0-88706-326-8

------------------------- // start //

Traditional Theories of Laughter and Humor (Part IV)

-(Hebert Spencer pg 99)

"The usual answer to laughter results from a perception of incongruity. Some have alleged that laughter is due to the pleasure of a relative self eveluation, which we feel on seeing the humiliation of others. But this theory whatever porportion of the thruth it may contain, is open to fatal objection that there are various humiliations to others which produce in us anything but laughter, and in second place, it does not apply to the many instances in which no one's dignity is implicated, as when we laugh at a good pun. Moreover it is merely a generalazation of certain conditions to laugh and not explain of the odd movements which occur under these conditions." Spencer hear starts to draw a line. Up till now the Superiority theory has just shown us general situations of why we laugh it has not explain why we laugh and further more the facial effections of laughter.

Some Observations made by Spencer (pg 100-110)

- Every child has once tried to their feet still while it is tickled and for the most part has failed. Also we at one point in our life have tried avoiding winking when a hand has been suddenly passed before the eyes. These examples of muscular movement which occur indepedently of the will, illustrate what is called "relflex action". The same thing as coughing and sneezing.

-"Nervous Exitation always tends to beget muscluar motion; and when it rises to a certain intense always does beget it."

- When you severly burn you finger it is very hard to stop from screaming or the reaction from your face. If a man recieves a good notice with no facial expression nor body motion, it is obvious that he is not pleased or that he has an amazing sence of self control. Joy almost always produces contraction of the muscles and alters expression and attitude.

- Emotions and sensations tend to generate bodily movements, as emotion and sensation get more intense violence tends to have the same effect.

- Deepest grief is the "quiet grief". Becouse the nervous excitment not discharged in muscular action, discharges itself in other nervous excitments. In other words all the excitment instead of coming out as yelling or screaming gets stored and and keeps getting stored until it finally comes out and when it comes out; it comes out and the person tends to act in a violent or irrational behavior.

-(Sigmund Freud pg 111)

"There are two ways in which the process at work in humor may take place. Eighter one person may himself adapt a humourous attitude, while a second person watches and derives enjoyment from the attitude of the first; or there may be two people, one of whom does not himself take any active share in producing the humorous effect, but is reguarded by others in a humorous effect." What Frued is trying to say here is; When Eddie Murphy in Beverly Hills Cop gets thrown out of a window and then he gets arrested by the beverly Hills Police Dept. He makes a joke out of it by saying "I see you dont arrest those SB for throwing me out of a window but you arrest me for getting thrown out", here he makes a joke to himself to satisfy his dissapointment at the BHPD and the spectators get a laugh out of it too. Now take a man walking down a street and suddenly you see him tumble across the street becouse he trips on a rock, here the spectators are getting a laugh out of it but the man didn't plan on being the the effect of the comedy, he accidently tripped.

Some Observations made by Freud (pg 113-116)

"Humor is not resigned; it is rebellious. It signifies the triumph not only of the ego, but also of the pleasure principle, which is strong enough to assert itself here in the face of the adverce real circumstaces."

-(Henri Bergson pg 117)

"We tend to handle our experience in a rigid, repetitious way, much like a machine might. Treating what are actually things and events as repetitions of familiar concepts."

Some Observations made by Freud (pg 118-126)

-"Several have defined man as "an animal that laughs." They might as well have defined him as an animal which is laughed at; for if any other animal, or some lifeless object produces the same effect, it is always becouse of some resemblence to man, of the stamp he gives it or the use he puts to it."

-In a society composed of pure intellegences there would be probably be no more tears, though perhaps there would still be laughter; whereas highly emotional souls, in tune and unison with life, in whom every event would understand laughter." I think what it is saying here is that if we all had the same exact train of mind and looked at the world as an "disinterested spectator" to many a drama would turn into a comedy.

-Our laughter is always laughter of a group. Meaning that if see a group of people going on and talking about something funny and laughing loudly, if you too were in that group, you would be enjoying it too. But becouse you are not; you really have no desire too.

-Have you ever wondered why a joke so funny in one language cannot (for the most part) be translated into another language and have the same if any re-action? Becouse sometimes jokes tend to refer to customs and ideas of a particular so-cial group.

------------------------- // End //

```
notes.29.december.2002.1300.berardi.txt

 29 December 2002 @ 13:00
----------------------// notes //
taken from:

 "Conceptual Structures"
    by John F. Sowa

  Copyright (c) 1984 by Addison-Wesley Publishing Company, Inc.

  ISBN = 0-201-14472-7

----------------------// start //

(pg 55) difference between recognition and recall?

(pg 55) threshold theory:
          - weak memory link is required for recognition
          - strong memory link, exceeding a min threshold,
            is required for recall

(pg 55) two-process theory:
         - recognition = process of testing familiarity of an image
         - recall = process of retrieval or reconstruction

(pg 56) structure is imperative for recall, but not recognition

(pg 56) more associations = better recall

(pg 57) recall is more reconstruction than retrieval

(pg 58) Selz's theory of schematic anticipation:
          implementation theory of recall

(pg 62) "Emotions are the driving forces that set goals and
         determine which structures to process."

(pg 62) Arieti and Bemporad (1978), emotions:

          - First Order (simple, directly experienced by
            inner-body):

             tension, hunger, fear, rage, satisfaction

          - Second Order (cognitive process, employs images
            associated with first order):

             anxiety, anger, wishing, security

          - Third Order (complex conceptual processes depending
            on past experience and future predictions):

             love, hate, joy, sadness

          * fear/rage are immediate responses
          * anxiety/anger are imagined fear/rage
```

[idea: Harvey views present as the past]

----------------------// end //

notes.30.december.2002.1600.brunetti.txt

30 December 2002 @ 1600
------------------------ // notes //
notes taken from:

"The Philosophy of Laughter and Humor"
John Morreall

Publisher: State University of New York

ISBN 0-88706-326-8

------------------------ // start //

Contemporary and Traditional Theories of Laughter and Humor (Part V)

-(John Morreall pg 131-139)

He examines the three traditional theories of laughter and shows that they all do have very interesting points about why we laugh, but not one theory covers all types of laughter. So Morreall decided to make a theory from ideas from all three theories that explains all types of laughter. He says "laughter re-sults from a pleasant phychological shift (sudden change)".

The reason why its so hard to come up with a universal theory is be-couse most of the time that we laugh the situation are so diffrent that theres nothing in common other than our laughter. To better understand his theory we need to take a quick look at the three traditional theories and what they contain.

Ok lets take a look at the Superiority Theory. The basic idea of this theory is that all cases of laughter is due to feelings of superiority and "sudden glory". This as we know cannot be the reason why we laugh for if I tickle a baby, the laughter coming from the baby im pretty sure is not due to any superiority. At that age the child doesnt even have any sense of "self-eveluation". So although the theory is true in some cases it does'nt cover all cases, redering this theory inificiant.

The next theory I want to look at is the Icongruity Theory. The basic idea of this theory is that we live in a world with patterns. We have come to expect certain patterns among things. When something doesn't fit these patterns and go against our expectations, we laugh. Although this theory does a better job at explaining laughter then the previous one, it too has a flaw. The flaw in this theory is Humor. This theory works perfect in humorous cases but it doesn't work so well in non-humourous cases. Here Morreall gives a great example why this theory doesn't always work.

"If I open the bathroom door to find a large pumpkin, I would probably laugh."

BUT

"If I open the bathroom door and find a big cougar in my tub, I would probably scream"

The point here is that in order for the Incongrouity theory to work it has to be in a particular case as shown above.

The last theory that needs to be looked at is the Relief theory. This theory put simply states that we laugh do to a build up of nervous excitment and then once it cant take it anymore we let it out in laughter. Now, I can see where this theory may be true but think about this.

Sigmund Freud was one of the people behind this theory, personally I think his name says it all he is a FRAUD.

Now as you can see I made a joke, now ask yourself this, where did you experience any nervous excitment? I didnt build you up for nothing, you just laughed becouse it was funny. So now we know why all these three theories, (although are true in most cases), do not account for all types of laughters.

Morreall's theory says:

"Laughter results from a pleasant psycohological shift."

This shift "must be sudden. to adapt we must be caught off guard by the change so that we cannot smoothly adjust to what we are experiencing." Also all psychological shifts must be fealt as pleaseants, "ex.., enjoying glory, being amused by some incongruity, realeasing nervous energy." all these are good feelings and cause us to laugh. On the other hand if the shift goes the oppisite way, unpleasant, then usually it will not lead into laughter.

To explain this theory in a simpler way Morreall turns to children and how they progress in understanding the world. When a infant starts to first laugh at about 3 or 4 months, it is not becouse he is responding to humor. At that age the child has no idea what humor is, and he also is not able to "percieve objects". The first kind of psychological shift in a child is not "conceptual", nor even, "perceptual", it is merely "a shift in sensory input". The best way to show this is by tickling them or throwing them up in the air, for the most part they will laugh. It is not till the child is few years older when he first begins to understand the "conceptual shift". By now the child can distinquish objects and starts to understand them. The child no knows "food from what is not food, and learns other patterns among things, properties, and events, things seem to happen. And now the child is developing "a conceptual system, or picture of the world, which is based on his experience and which is the basis for his expectations."

As you can see Morreall does a good job of summing up all three theo- ries and leaving us with one universal theory of why we laugh. But dont forget the three tradi- tional theories of laughter for they to have meaning in their own characterization of laughter.

------------------------- // End //

notes.30.december.2002.1900.berardi.txt

 30 December 2002 @ 19:00
----------------------// notes //
taken from:

 "Conceptual Structures"
 by John F. Sowa

 Copyright (c) 1984 by Addison-Wesley Publishing Company, Inc.

 ISBN = 0-201-14472-7

----------------------// start //

```
[idea: verb nodes in SemNet have links about agents, etc:

                [ BUY ] -----object---- (cake)
                /     \
               /       \
              /agent    \source
             /           \
          (Billy)       (Mark)

       * "Billy bought a cake from Mark"
       * "Mark sold Billy a cake" ]
```

(pg 127) a speaker only says enough for the listener to understand. Many implications are made in conversation

(pg 211) Chomsky (1980) believes we have an "organ" dedicated to language

(pg 212) all skills are better learned before puberty, but THEY don't have unique "organs"

(i.e. someone who starts playing chess at age 6 will be much better than an adult learning)

* does this contradict Chomsky's claim?

(pg 212) children often babble:
"Since the syllable 'ma' is common in babbling, the probability that a human baby will say 'mama' is high."

* if 'mama' is uttered around the mother, the baby is rewarded and begins saying it more until it makes the association

(pg 212) humans have a willingness to learn language

(pg 213) children learn language at a very rapid rate:
1.) build up a library of words
2.) make associations of words

(pg 213) first words: what is prominent on child's mind

(i.e. 'cookie')

(pg 213) Clark and Clark (1977): utterances of 15-month child:

[Utterance]	[Gesture]
more	reaching for a cookie
no	resisting being put in bed
mama	whining and reaching for object
poo	hand on butt after being changed
bye-bye	waving hand

(pg 213) "Language evolves out of gestures."

(pg 214) child next learns two-word sentences, where the listener must guess missing information.
(i.e. "Pammy kitty" might mean
"Pamela has a kitten")

(pg 214) limitations in sentence structure do not imply limitations in conceptual structure

(pg 214) Bloom (1968): utterances by 2-yr-old girl:
"raisin there"
"buy more grocery store"
"raisins"
"buy more grocery store"
"grocery store"
"raisin a grocery store"

* could not relate more than 2-3 concepts in one sentence
* child has complex conceptual structures, but lacks tools for translation into sentences

(pg 214) by age three, children have a rich skill in language

(pg 215) younger child = more varied associations

(pg 215) in responding to words: children often reply with a sentence fragment, while adults use single words:

[WORD]	[CHILD]	[ADULT]
obey	your mother	disobey
up	stairs	down
pickup	your toys	throw down

(pg 215) around age 7-8, children begin to rely more on concept types

by age 12, they are close to the skill of language possessed by adults

(pg 215) children are more sensitive to semantic errors than syntactic ones

(pg 215) learning of language:
1.) children associate words with basic concepts of the world

2.) learn syntax and improve linking of concepts to form better sentences
3.) master formal structures of the type hierarchy and refine their syntax

(pg 215) "children use semantics as a guide to learning syntax"

----------------------// end //

notes.31.december.2002.1300.brunetti.txt

31 December 2002 @ 13:00
----------------------// notes //
taken from:

"The Math Gene"
by Keith Devlin

ISBN : 0-465-01619-7

----------------------// start //

(pg 2) "The feature of the brain that enables us to do mathematics are the very same features that enable us to use language- to speak to others and understand what they say."

(pg 3) "Evolution of language is that it was driven by the need for ever greater communication." Language first was made due to a growth in the brain. Then it was used for communication purposes.

(pg 4) People usually lie in between two groups, those who cannot do mathematics, and those who can do mathematics.
(Why do some people have problems with 8*7, 9*6, 9*8)

Questions to consider

* Can you use language to help you be better in mathematics?
* Do mathematicians think in language?
* What does it feel like to a mathmatician to do math?
* Do mathematicians have diffrent brains?

(pg 8) "Mathematics is the science of patterns"

Examples:

* Number theory
  - patterns of numbers and counting
* Geometry
  - patterns of shape
* Calculus
  - patterns of motion
* logic
  - patterns of reasoning
* Probability
  - patterns of chance
* Topology
  - patterns of closeness and positions

(pg 9) Communitive property of addition

* a+b = b+a

Can also be written in English

* When two numbers are added, their order is not important.

(pg 9) "Mathematics can only be seen with the eyes of the mind"

(pg 10) - Humans are born with the knowledge of "Number sence" meaning we can recognize the diffence between a group of one, two, three. We also know what they mean; ex. 1<2<3.
- Ability to numbers and ability to count is learned
- We develop a sence of "cause and effect" at a very early age. develop this idea at the same time as we do language
- Everyone of us has a built in number sence and arthmetical ability when we are just a few days old

(pg 16) Answer the following questions as fast as you can:

1-1=?
4-1=?
8-7=?
15-12=?

Now pick a between 12 and 5 any number, the first that comes to your head.

The number was 7 why?
The reason is becouse the brain gets into a subtraction mode so as soon as it sees 12 and 5 it automatically decided to subtract and pick 7. Now if for some reason you didnt get seven you probably got 6 or 8. I know you didnt get ten becouse when you look at 12 and 5 ten seems so far away.

(pg 18) Number Comparison Test

1 and 50
5 and 4
25 and 24

For each of the pairs tell me which is greater.
It took longer to answer the second pair then the first and even longer to answer the 3rd question. Why? "A diffrence of 1 is some how more recognized then a for pairs of small numbers than large ones.

(pg 21) Being able to compare numbers of objects in a group is a survival benefit for humans as well as animals.

(pg 28) "Child at the age of two have a well developed sense of number and of number conservation."

(pg 38) "Even at the age of babies, they can recognize a
syllabic structure in a stream of sound adn, in
innate and subconscuios way, can detect diffrences
in the number of syllables."

(pg 38) Ranka Bijeljac: "Number sense cannot be learned, we can
learn facts about numbers, but those
facts have no meanings to us without the
number sense."

----------------------// end //

notes.31.december.2002.1515.berardi.txt

31 December 2002 @ 15:15

----------------------// notes //

taken from:

"Conceptual Structures"
by John F. Sowa

ISBN = 0-201-14472-7

----------------------// start //

(pg 216) study of language:
- Prosody = rhythm/intonation patterns
- Phonology = sounds
- Morphology = meaningful elements that build words
- Syntax = rules for putting words together in sentences
- Semantics = meaning
- Pragmatis = use of language, effect on listener

(pg 216) prosody has been ignored except in studies of poetry

(pg 216) before learning words, babies attempt to mimic the rhythm of adults

"Rhythm is not an extra feature that decorates an utterance, but a pattern that provides the slots into which other features are inserted."

(pg 230) language generation:
1.) determine what to say
2.) how response relates to listener
3.) how to form a sentence

(pg 264) ambiguity of pronouns: determining who or what they apply to. solutions:
- pragmatics
- semantics

(pg 264) possible to construct an ambiguous sentence if listener does not know a key fact.
(i.e. "William James cited Mozart's discussion of his composition."
* who is "his"? only someone who knows who Mozart and James are can flawlessly know)

(pg 270) "Metaphor is a normal means of adapting existing words to new situations."

Aristotle defines a metaphor as giving "a thing a name that belongs to something else"

Goodman (1968): "migration of concepts to new territory"

(pg 271) about 12 analogies account for most metaphors in common speech (i.e. time/money, war/argument)

(pg 271) Carbonell (1982): recognizing metaphors:
1.) if literal meaning not found, possible metaphor
2.) check library of "common" analogies
3.) try to interpret the metaphor
4.) if connection is made, remember it (likely will occur again in same conversation)

(pg 271) children's language mistakes are often simple misunderstandings, not from "calculated mistakes" of metaphors

(pg 271) Chukovsky (1963) studied child speech:
- extreme literalness
- absence of metaphor

four-year-old child (response to question):
Adult: "Betty, why didn't you provide a knife and fork for Mr. White?"
Child: "Because I thought he didn't need them--daddy said he ate like a horse."
(example of child taking something literally)

more info:

Chukovsky, Kornei (1963) "From Two to Five" University of California Press, Berkeley

Clark, Herbert and Eve Clark (1977) "Pyschology and Language"

----------------------// end //

notes.01.january.2003.1145.brunetti.txt

1 january 2003 @ 11:45

----------------------// notes //

taken from:

"The Math Gene"
by Keith Devlin

ISBN : 0-465-01619-7

----------------------// start //

(pg 40) "For collections of three or fewer objects, recognition of numerosity appears to be virtually instantaneous, and achieved without counting. For collections of four or more objects however it is at least plausible that the result is obtained by counting."

(pg 40) Datiaene: A patient in paris suffered a brain lession that destroyed her ability to count. Yet when three or fewer objects were shown to her, she could without any problem give the correct number.

(pg 41) Websters Law: It is much easier to distinguish the sizes of collection were the diffrence is relatively small.

<-0   0   0   0   0->

rather than

<-0 0 0 0 0->

(pg 44) - By the age of 2.5 children realize that number words are diffrent from other words.

- Around the age of 4 children realize counting provides a means to discover "How many"?

(pg 45) "Many of the words for a collection of two objects are restricted to cerain kinds of objects, consistent with the idea that the innate numbers one, two, and three are intimately connected with collections of physical objects."

* Two- a pair, a brace, a yoke, a couple, a duo
* Three- triple, tio, and treble

we can say a "pair of shoes" or a "yoke of oxen"
but we cannot say a "yoke of shoes" and a "brace of oxen"

(pg 46) Our base 10 system is evidence that counting began with our fingers. Since we only have 10 fingers.

(pg 51) Every number system in the world follows a certain pattern with the first 3 numbers. They take whatever character they choose and increase it by one. After 3 it starts another pattern.

* Roman = I, II, III
* Mayan = ., .., ...
* Arabic = 1, 2, 3

Now I know that youre probably thinking that in 1, 2, 3 there is no noticable pattern, but your wrong, ask me to show it to you and I will. I can't show it to you on NotePad.

(pg 54) If you base your thinking on symbols rather than the numbers they represent, it would make more of a diffrence.

Number Comparison Test

72 and 69
63 and 79
25 and 24

For each of the pairs tell me which is greater.
Now instead of looking at the whole number just look at the first digit of each number you know that 7 > 6 therefore 72 is greater than 69. Using this apprach cuts down your reaction time in half. Now this doesnt always work. For number like 25 and 24 you have to look at the second digit redering your reaction time slower.

(pg 55) "Digits are not just symbols to which meaning can be attached they are sumbols to which meaning is attached, and closely." Ex: 3 and 8; ask ME if you dont understand.

(pg 55) "On our mental line, the numbers are not spaced evenly apart as they are on a mathematicians line. Meaning the further you go along our mental number line, the closer together the numbers appear to be." Ex: Number comparison.

(pg 60) "Human mind is a pattern recognizer. Human memory works by association - one thought leads to another."

Human memory works by pattern association; Example:

- Grandfather = dads dad, lives in a blue house, disney world. likes peaches, very good at chess, war hero ect.

(pg 62) Why do most of us have problems with our multiplication tables, (not to mention any names STEVE BERARDI j/k). The reason is becouse like I said above "human memory works by pattern association.

* Charlie David lives on Albert Bruno Ave.
* Charlie George lives on Bruno Albert Ave.
* George Ernie lives on Charlie Earnie Ave.

Its the same in math

* 3 X 4 = 12		2 x 3 = 5 (No)
* 3 X 7 = 21	Also	
* 7 X 5 = 35		2 + 3 = 5 (YES)

We tend to work in association of things so thats why are reaction time is sometimes slower when recalling multiplication tables. Also when we see 2 x 3 we rember the number 5 becouse of addition, so that is the reason why we sometimes make mistakes like that. And that is also why a computer cannot make a mistake like that becouse computers when they look at a picture or object it doesnt mean anything to them. (Im not saying that it is not possible for this is one of the outcomes of doing this Project.) (Just to clear up things here.)

(pg 64) "The ability of humans to extend the number sense to a capacity to perform excat arithmitic seems to depend on language faulty." Example: Dad thinks in italian. Ask me if you dont understand.

(pg 65) To some people "3844" doesn't mean anything to them, except maybe their PIN. But to some its their friend when they see it they say "Hi 62 squared".

----------------------// end //

```
notes.01.january.2003.1220.berardi.txt

 1 January 2003 @ 12:20
----------------------// notes //
taken from:

 "Conceptual Structures"
    by John F. Sowa

  Copyright (c) 1984 by Addison-Wesley Publishing Company, Inc.

  ISBN = 0-201-14472-7

----------------------// start //

(pg 276) "To remember is to preserve something committed to
          memory; to know, by contrast, is to make each item
          your own, not to depend on a model and to be
          constantly looking back at the teacher."
             - Seneca (Letters to Lucilius 33)

(pg 286) "Only natural languages can serve all the functions
          of human communication within a common, flexible
          framework."

(pg 300) seperate action verbs from feeling verbs?
         (i.e. action = cut, throw ; feeling = like, hate)

(pg 300) how to disregard "nonsense" sentences?
          (i.e. "The grain of sand is good.")
           * 'grain of sand' has no degree of goodness
           * general or specific?
           * other nonsense words: molecule, integer, liquid

(pg 329) "making computers learn the way people do has been
          the dream of AI from its earliest beginnings"

         "nobody knows exactly how people learn"

(pg 329) theory of learning "apperceptive mass" or
          dominant system of ideas:
          * originally derived from Leibniz
          * extended by Johann Friederich Herbart (1816)
          * summary presented by Watson (1963)
            - only one idea can be attended to at once, unless
              multiple ideas join to form one complex idea
            - this one idea forces all others into background
            - a combo of related ideas form an 'apperceptive
              mass' (a mass that only allows acceptable ideas)
            - learning = building upon this mass of already
                         familiar ideas

(pg 330) Piaget: "learning progresses by stages, not by a
                  constant rate of accretion"

         Piaget's two modes of learning:
          - assimilation = new info is attached to existing
                           conceptual structures
```

```
          - accommodation = old structures modified because
                            new info does not fit old ideas

(pg 330) Rumelhart and Norman (1978), three learning modes:
          - accretion = new info added to episodic memory
          - tuning = minor changes to semantic memory
                     (adding new properties or generalizing
                      to higher superclass)
          - restructuring = major reorganization of semantic
                            memory due to complex ideas
                * occurs when semantic structure is too large
                  and needs to be broken up to preserve
                  effiency

(pg 330) plateau effect:
          1.) people rapidly learn a new skill up to an
              intermediate level
          2.) begin to slow improvement (plateau)
          3.) break through and progress rapidly again

(pg 331) modern method of learning = knowledge-intensive
          (much like Piaget's and R & N)

(pg 332) "Categorization is the simplest form of
          restructuring."

(pg 332) Pierce's notion of abduction learning:
          - deduction = logical inference derived from rules
                        of reasoning or common sense
          - induction = gathering and sorting new information
                        based on existing structures
          - abduction = making a hypothesis that introduces a
                        new data structure, followed by
                        deduction for finding consequences and
                        then by induction for testing its
                        reality/sense.

(pg 333) Pople (1975), implementation of abduction:
          1.) user enters list of symptoms caused by a disease
          2.) system queries user to get some background info
          3.) by abduction, system formulates a hypothesis
              based on symptoms
          4.) by deduction, system determines consequences and
              tests if they match the known symptoms
          5.) if results match, system outputs diagnosis
              if results dont match, formulate new hypothesis

----------------------// end //
```

```
notes.03.january.2003.1720.berardi.txt

 3 January 2003 @ 17:20
----------------------// notes //
taken from:

 "Conceptual Structures"
    by John F. Sowa

  Copyright (c) 1984 by Addison-Wesley Publishing Company, Inc.

  ISBN = 0-201-14472-7

----------------------// start //

(pg 339) "No theory is fully understood until its limitations
          are recognized."

(pg 339) Norbert Wiener (1948) created the term "cybernetics"
         referring to "the entire field of control and
         communication theory, whether in the machine or in the
         animal."

(pg 340) cybernetics = calculus, differential equations
         AI = discrete math

(pg 341) "Natural languages...have the vocabulary and means of
          expression for talking about anything within the scope
          of human experience."

(pg 342) problem with human mind in code:
          machines are precise, but humans are ambiguous and
          spontaneous

(pg 343) "The main difficulty in programming lies in deciding
          exactly what is the right thing to do. To put it into
          a programming language is relatively trivial."
             - I.D. Hill

(pg 344) concepts are never a perfect model of the world

         "People make black and white distinctions when the world
          consists of a continuum of shadings."

(pg 345) only concepts that can be precise are concepts that
         originated in the minds of men

         "The crucial problem is that the world is a continuum
          and concepts are discrete."

(pg 345) example of discreteness: TREE
            (uniform object, yet we divide it into trunk,
             branches, leaves, etc)

(pg 351) high creativity = strong sense of humor
         high intelligence = organized, low tolerance for chaos,
                             predictable
```

(pg 353) "Like the artist, the scientist is confronted with a chaos of data."

(pg 354) "Science is mythology plus discipline."

(pg 357) a true feeling is understanding why that feeling exists

(pg 358) "Until one is prepared to say that a computer system has emotions, needs, and intentions, one cannot say that it has understanding."

(pg 358) children learn definitions of words by seeing how adults use them

----------------------// end //

notes.03.january.2003.2335.gandhi.txt

3 January 2003 @ 2335
---// notes //
notes taken from

an online information site located at:
http://ct.essortment.com/childrenlanguag_rmck.htm

--// start //
*** On the topic of early Child Communication and Psychology***

-> Infant's communication
- cries of distress
- internal discomfort
- if the baby smiles this results in noises

-> what happens if the elders (parents/guardians) avoid to make noises with the baby?
- The child will begain to associate specific noises with specific actions

- ex 1:
"Mama's good little boy" means someone is going to pick him/her up.
"Is Daddy's angle hungry" means a bottle

-> At first, all the babies hears are nonsense syllables, which are not asso-ciated
with a perticular actions.

-> Children learn what they hear, if a child never hears real words for ob-jects
they will have to relearn language when they start interacting with peo-ple.

-> Childrens pick up language mannerisims from people they hear the most.

- ex 1:
"If you talk in slang with your child, then your child will learn this speech
mannerism. But in reality this child will have to learn English from scratch
because the English he/she knows is wrong.

-> If you speak clearly to your child but fail to speak in complete sen-tences, then
your child will do the same

-> when a child starts speaking:
- they use single words such as "sleep", "eat" and "drink". As skills
increase, children start to add words: "I sleep" and "I drink" and so on.

-> the words you use with your child will influence a child's vocab.

-> A child learns most of his words from context.

-------------------------// end //

notes.04.January.2003.0037.gandhi.txt

04 January @ 0038
---------------------// notes //
notes taken from:

an onlie library site located at:
http://www.questia.com/PageManagerHTMLMediator.qst?action=openPageViewer&docId=94275203

- subsource: Publication Title: The Psychology of the Child . Contributors: Jean Piaget - author, Bärbel Inhelder - author, Helen Weaver - transltr. Publisher: Basic Books. Place of Publication: New York. Page Number: 51. Publication Year: 1969

----------------------// start //
notes on indepth child psychology

-> sensori-moter level

- a childs language is still absent

- the infant lacks the symbolic function; this means she/he does not have representations by which he can evoke persons or objects in their absence.

- at this stage, the mental development of the child is very important. This is where the child constructs all the cognitive substructures that will serve as a point of departure for his/her perceptive and intellectual development.

-> the construction of reality

- sensori-moter intellignece organizes reality by making varius catogories of action which are the schemes of the permanent object, space, time, and causality, substructures of the notions that will later correspond to them

- at this time the child's initial universe is entirely focused on his/her own body and action in an egocentrism as total as it is unconscious.

- in the first 18 months, the child eventually comes to realize himself/herself as an object among others in a universe that is made up of permanant objects and in which there is at work a causality that is both localized in space and objectified in things.

-> the development of perception

- first, the sensori-moter structures constitue the source of the later operations of thought. This means that knowledge and intelligence proceeds from action as a whole, in that it transforms objects and reality, and that knowledge, whose formation is essentially an active and operatory assimilation.

- knowledge is a kind of copy of reality

- intelligence as deriving from perception alone

- perception constitues a special case of sensori-moter activity. But in reality in its figurative aspect where as an action as a whole is essentially operative and transforms the real. This is important because we can determine the relative roles of perceptions and actions (later operations) in the intellectual development of the child.

-> memory and the structure of image-memories

- there are two types of memories
    1. the memory of recognition that operates only in the presense of an object already encourtered and which consists in recognizing it
    2. the memory of evocation that exists in evoking the object in its absence by means of an image-memory

more information on these two kinds or image-memories:

- the memory of recognition is very precocious (in the lower invertebrates) and is necessarily related to action-schemes or habits

- the memory of evocation, the mental images, the first beginnings of language start more or less simultaneously

-> language

- for every child, language appears at about the same time as the other forms of semiotic thoughts

- in the other hand, deaf-mute; articulate language does not appear until well after deferred imitation, symbolic play and the mental image. This indicates that language is developed genetically, since its social or educational transmission presupposes the preliminary development of these individual forms of semiotics. But this development, as is proved by the case of deaf-mutes, can occur independent of language

-> the three levels in the transition from action to operation

- first, a sensori-moter level of direct actions upon reality

- at the age of 7 to 8, the level of operations, which concern transformations of reality by means of internalized actions that are grouped into, reversable systems

- in the middle of these two, there is another level, which is not mearly transitional

- at begenning we must consider the fact that a successful adaptive action is not automatically accompanied by an accurate mental representation of the situation performed. At the age of 1.5 and 2 the child is able to find his/her own way from a room to a garden. This child can make detours and return. Children at the age of 4 and 5 go to school by themself and return

-------------------------// end //

notes.04.january.2003.1300.berardi.txt

4 January 2003 @ 1300
-------------------------// notes //
notes taken from:

"Programs of the Brain"
by J.Z. Young

Oxford University Press

ISBN = 0-19-857545-9
-------------------------// start //

(pg 180) babbling:
- spontaneous
- expression of satisfaction
- form of play

(pg 180) first words are familiar items or actions
(i.e. "mama", "dada", milk, ball; "all gone", "bye bye")

early sentences contain a "pivot" word or phrase used
with a fixed relation to other "open" words
(i.e. "all gone shoe", "all gone car"). more info:
Greenfield, P.M. and Smith, T.H. (1976).
"The Structure of Communication in early Language
Development." Academic Press, New York.

(pg 180) Common relationships:
- possession ("mama shoe")
- agent->action ("mama read")
- action->object ("put back")
- position ("hat chair")
- absence ("all gone rattle")

[idea: until the child learns the name of an action or object,
they give it a symbolic name... somewhat like a "code"
(i.e. "@#(*!2hda%", but each character means something
so actions can be called later, each unique action or
object generates a unique symbolic name)]

(pg 180) many mistakes at first:
- grammar
- pronunciation
- wrong rules (i.e. "r" before a vowel sounds like
a "w", as in "wong" or "wule")

later throws out the wrong rules just as he throws out
wrong bodily movements as he uses the various parts of
the body

(pg 180) "Learning is by selection from the initial set of many
possible actions."

(pg 181) age 2 = sentences interpreted in terms of actor & action (pg 185) child's first vowel = "a"

(pg 193) thinking = retrieving knowledge to solve problems or make conclusions

(pg 193) animals think, but cannot think as intelligently and broadly as we do because they lack a code (language)

(pg 194) Ferenczi says children relate objects to parts of their body and the body's functions

(pg 194) "even the simplest act of comparison involves emotional factors"

(pg 196) children under age seven:
- incapable of indirect or reversal thinking
- undergeneralize (to avoid confusion)
  (i.e. chocolate is not food, but meals are; cows are not food, but stuffed animals are animals)

(pg 197) thinking = predicting ?

(pg 198) "There are no simple answers to most of the questions that arise in everyday life."

(pg 132) there is no language for emotion

evidence:
- heavy/light are good for description, but for the sake of physicists
- joyful/sad, likewise, is not enough for psychologists

[objective: what language can and cannot tell us]

(pg 140) goodness and other judgement is measured same way as something like yellowness (we cannot really define it, yet we know it from experience)

(pg 149) the child begins as a selfish being: crying for food, attention, expecting the love of his mother. Later, he realizes the mother also has needs and he may offer her items (i.e. his teddy bear)

the child learns by experimenting (tests hypotheses of the social world). he learns how to get things from people (attention, love, objects).

(pg 154) "to give is better than to receive"
- could be viewed simply as "giving means more receiving or atleast better chance of it" ?

(pg 155) "It is foolish to deny that a large element of selfishness remains in most adult loving."

"the individual requires satisfaction, the whole brain works that way"

(pg 76) "At all times the child is acting out its own life in
the immediate present."

(pg 81) we only learn if we experience a situation

[idea: forgetting = breaking of links not used recently]

(pg 71) children are born with many actions they don't learn
(smiling, temper tantrums). these actions develop, but
are actually created at birth, not through experience

(pg 71) blind children smile, cry, laugh, but these decrease
with age

[objective: decide what abilities are and are not present
at birth]

(pg 72) these born abilities act as center of further brain
development

(pg 75) children develop reversal after age seven:
- "truck pushes car" reversed is:
"car is pushed by truck"
- before age seven, they think in terms of agent->action

* reversal is not "learned", it is developed

-------------------------// end //

Appendix B

Fall Semester 2002 - Meeting Summaries

meeting.02.December.2002.1600.sheth.txt

Weekly Meeting

2 December 2002 @ 16:00

-> Attendance

-> Entering Harvey in a national competition, ACM SRC
- For more information visit www.acm.org/src/

-> Announcement from Research team:
- Harvey will be created as we are, from child to adult, learning as he ages
- Harvey will learn same way as we developed
- We (humans) make direct connections, Harvey needs to do that
- Degrees (depth)
- Childern have images to learn, Harvey doesn't.
- Researching how blind people learn/grow up.

-> Semantic Networking (Introduction/Questions/Goals, ideas for file structure)
- An Example (food)
- Looks like a tree diagram but its different since in semantic networking everything is connected
- Nodes, Links(verbs)...there is a website for tutorials on Semantic Networking (website is available at links page on Harvey website)
- PROBLEM: Need a way to store it in a file
- Jay Joshi: Storing files using triplets numbering (more on this later)

-> Promotion of Independent research, then sharing ideas/methods with everyone

-> Adding to notes
- If you read someone's research notes and get an idea, email Steven Berardi (sberar2@uic.edu) exactly where you got the idea, and the idea itself

-> Announcement of basic Input/Output procedures

[Input]
1.) unslang
2.) spell check
3.) semantically determine meaning

[Output]
1.) generate semantic response
2.) syntactically form a sentence
3.) slangarize

-> Programming team objectives:
- slang class
- spell checker
- file structure for semantic networks

-> Research team objectives:
- semantically determine meaning
- generating response semantically
- syntactically form sentence
- develop a method for child learning and development
- neural networking research

-> Next weeks meeting is on 9 December 2002 at 4:00 PM in the new lounge across the atrium.

This meeting is VERY important, as we will discuss working over winter break.

[Attendance]

NAME	What you've done last week.
Jay Joshi	Read English Linguistics.
Niket Gandhi	N/A (think).
Steve Berardi	researched Turing Test criticisms, things to look out for. Researched semantic, neural net-working and how our brain associates different items.
Nikhil Sheth	Looked at other bots.

------------------// end //

meeting.09.December.2002.1600.berardi.txt

Weekly Meeting

9 December 2002 @ 16:00

-> Attendance

-> Announcement: ACM has requested a semester report going over progress of the project.
This report is due after break. It need not be long, but for the project's sake, it should be 8-10 pages. Steve Berardi will most likely be writing all of it. it may also contain a section of journal entries by each member explaining how they view the progress of the project.

-> IRC Meetings over break: when and where?

- New network due to attacks of DALNet, most likely Rizon (more on this later)
- For now, meetings will be every Sunday, Monday, and Wednesday nights at 9:00 PM
- e-mail will be sent out by 14 Dec 2002 as to what network we will use

-> Offline meetings over break: when and where?

- goal to meet at least twice over break (all members, in person)
- first set date: 19 December 2002
    - meet at UIC library when it opens
    - research until lunch
    - lunch
    - research until dinner
    - dinner: discuss research and formulize ideas
    - movie, laser tag, etc... something fun to take our minds off harvey
    - more details on this meeting later
- attendance for entire length of meeting not mandatory, but the more people we have researching, the faster we'll get this project completed. working together, we'll have different people researching different ideas and perhaps "specializing" in certain areas. this will allow us to progress faster because we will all be together and be able to ask each other questions on one another's research.

-> [Idea by Jay Joshi]: research how children with mental illnesses learn/develop

-> Programming team objectives:

- file structure for semantic networks
- slang class
- spell checker

-> Research team objectives:

- semantically determine meaning
- generating response semantically

- syntactically form sentence
- develop a method for child learning and development
- neural networking research

[Attendance]

NAME	What you've done last week.
Jay Joshi	n/a, finals
Niket Gandhi	n/a, finals
Steve Berardi	n/a, finals
Nikhil Sheth	n/a, finals, wished to have dreams about harvey
Osman Azam	created slang.txt (contains basic online slang)

------------------// end //

meeting.15.December.2002.2100.berardi.txt

IRC Meeting - #harvey on EF-Net

15 December 2002 @ 21:00

-> Attendance

-> Propose research topics:
1.) Humor - what creates it?
2.) Semantic Networking - file structure
3.) Short/Long term memory, memory loss
4.) Metaphors, poetic beauty, the creative mind
5.) Child development psychology (learning language)
6.) Information retrieval time (i.e. how long does it take to mulitply 2322 by 453290?) - would involve surveying
7.) Mind association - how our mind associates objects

-> Choose topics:
- Osman Azam: Jolly Ninja
- Nick Brunetti: Humor
- Niket Gandhi: Child Development
- Steven Berardi:
    1.) Semantic Networking
    2.) Short/Long term memory
    3.) Mind Association
- Nikhil Sheth: how blind people develop

-> Meeting @ UIC Library on 19 December 2002:
- meet at 9:00 AM
- research until lunch
- lunch
- research until dinner
- dinner (discuss research, take notes)
- leave around 6-7 PM
- e-mail will be sent out, and meeting will be night before

-> Programming team objectives:
- file structure for semantic networks

-> Research team objectives:
- semantically determine meaning
- generating response semantically
- syntactically form sentence
- develop a method for child learning and development
- neural networking research
- research topics

[Attendance]

NAME	What you've done last week.
(nimar23) Niket Gandhi	n/a, finals

(SMNB) Steve Berardi	n/a, finals
(blasterma) Nikhil Sheth	n/a, finals
(dude101) Osman Azam	n/a, finals
(F-22_Rapt) Nick Brunetti	n/a, new to project

-------------------// end //