

9.00 Introduction to Psychology
Catch a Midterm by the Tale
16 October 2003
190 total points

Many of you will have read Philip Pullman's great trilogy "His Dark Material" ("The Golden Compass" is volume 1.) Fewer of you may know his Sally Lockhart trilogy. Frankly, it is not as good but volume three, "The Tiger in the Well" is a fine tale and will do for a midterm. PLEASE NOTE: I am using the story for its story but you don't need to know anything about it in order to do well on this exam. If you think that the story is confusing you, please ask and we will explain the meaning of any question. We are not trying to be tricky. Write your answers on the exam. Use the back of pages if needed (Tell us where to look!). Good luck.

SCORE

p1 _____ of 10

p2 _____ of 30

p3 _____ of 25

p4 _____ of 25

p5 _____ of 10

p6 _____ of 20

p7 _____ of 30

p8 _____ of 20

p9 _____ of 20

TOTAL

- 1) (5 pts) The novel opens with Sally in her garden on a sunny morning in London in 1881. Since it is sunny
 - a. It is probably too bright for Sally's cone photoreceptors to operate.
 - b. No, it is probably too bright for Sally's rod photoreceptors to operate.
 - c. Actually, in bright sunlight you get long and mid-wavelength sensitive cones and short wavelength rods operating which permits "trichromatic" vision.
 - d. No, no... the addition of rod function to cone function permits "duplex" or "stereoscopic" vision.
 - e. All of these are nonsense.
 - f. Some of these are nonsense, but sadly I do not know which ones.

- 2) (5) At the moment, Sally is happy (It won't last.). If I were to explain her happiness as the product of a particular pattern of neural activity in specific parts of her brain, you might call me a
 - a. dualist
 - b. a Cartesian (as in Descartes)
 - c. a behaviorist
 - d. an introspectionist
 - e. any or all of the above
 - f. none of the above

- 3) (10) The chief source of her happiness is her daughter. Harriet (age 1 yr, 9 months). She conceived Harriet at the end of Book One. She was not married to Fredrick Garland, the father AND Garland died in a fire immediately thereafter. This left Sally as the single mother of an illegitimate daughter but, at the moment, that is not a problem. She is happy because she is convinced

that her child is very clever. For example, she is convinced that her "brilliant" child could add and subtract when she was only 6 months old. Is that 'brilliant'? Is there any evidence that a 6 month old can add and subtract small numbers (say 1+1 or 2-1). Defend your answer with experimental evidence (How could you do the experiment?). If you have no clue, tell us something about how you could study the cognitive abilities of a 6-month old and we might give you some points. (ANSWER ON NEXT PAGE)

answer to #3:

- 4) (10) Harriet is in the two-word stage in her linguistic development. Sally is very impressed because she thinks Harriet's 'brilliant' two-word utterances show evidence of some grasp of **syntax**. What does this mean? (Defining "syntax" would be good.) Is this likely in a two-word speaker? What kind evidence could Sally present to make her case?
- 5) (10) A little background, Sally Lockhart is an unusually independent Victorian woman. She runs her own financial investment firm as well as managing the financial affairs of a photographic firm she set up with the deceased father of her child. In her financial work, she specializes in investing the money of other independent women like retired school teachers. She has noticed something that she thinks is odd. If she takes 100 pounds of someone's money and turns it into 150 within a year, her clients are very happy. If she takes 1000 pounds and turns it into 1050, the clients are not as happy. In both cases, the client is 50 pounds richer. What is going on? Please explain in some way that indicates your knowledge of the cognitive psychology of the value or "utility" money.

- 6) (10) These are the relatively early days of photography. People are amazed by how real the images look. However, no flat photograph can ever look perfectly realistic because there are depth cues that are available in the real 3D world but not in 2D pictures of the 3D world. Please name two such cues and explain why they cannot be obtained from a single 2D photograph.
- 7) (5) The firm of Garland and Lockhart made several series of pictures for sale. These were, for example, illustrations of famous stories. Suppose that someone looked at the photographs but could not identify any objects in the scenes. They could point to the locations of objects but they didn't know what they were, even though everyone else could recognize the objects. That person would be called
- a. A visual agnosic
 - b. A visual aphasic
 - c. A visual anemic
 - d. Dysphoric
 - e. Retrograde amnesic
 - f. could be A or E
- 8) (10) Do you think that this deficit in visual perception could be restricted to photographs (and other 2D representations like paintings)? Could someone be able to successfully identify visual objects in the real world while being unable to identify visual objects in 2D pictures? (Assume that these pictures were identifiable by other, neurologically intact people.) Please briefly explain your answer. Minimal credit for a simple "yes" or "no".

9) (10) Regardless of your answer to the previous questions, where would you look for brain damage in this person? Remember, he can see the objects, he can point to them, but he cannot identify them. Please briefly explain your answer.

10) (5) Sally likes to show pictures to Harriet. The first time Harriet sees a new picture, she says “oo ah!”. She says the same thing on the second and maybe the third time. After that, you don’t get much response. This “decline in the tendency to respond to stimuli that have become familiar” is called

- a. a recency effect
- b. directed forgetting
- c. habituation
- d. negative reinforcement
- e. punishment
- e. defenestration
- f. toddler rage

11) (5) This pleasant scene is ruined when a courier appears and serves her with court papers in which some man named Parrish seeks a divorce from her and seeks custody of her child. Since she has never married and does not know anyone named Parrish, this is first strange, then annoying, and finally frightening. If we were looking for neural locus of the anger and fear, a good place to look would be

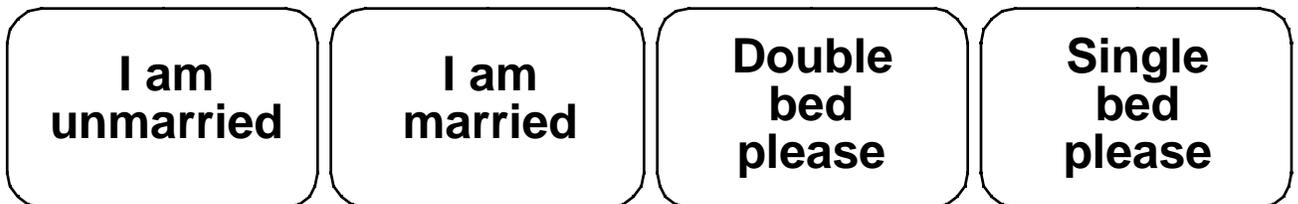
- a. the amygdala in the limbic system
- b. the hypothalamus (below the thalamus)
- c. the hyperthalamus (above the thalamus)
- d. parietal cortex
- e. adrenal cortex
- f. deep left field

12) (5) Sally goes into town to see her new lawyer (Her old one has died). It is not a pleasant experience. Every time Sally mentions Harriet’s name, the lawyer gives a little cough of disapproval. Eventually, Sally stops mentioning the name at all. Why? (The relevant technical terms are underlined for your viewing pleasure – Feel free to briefly explain your answer.)

- a. The naming behavior has been extinguished due by sensory preconditioning.
- b. The naming behavior has been suppressed by punishment.
- c. The naming behavior has been overshadowed by the lawyer’s behavior.
- d. The naming behavior has been extinguished by negative reinforcement.
- e. Actually, all of the above could be true.
- f. None of the above.

13) (10) In an effort to be nice, the lawyer gives Sally a candy with a flavor that she has never had before. In their conversation, he chooses to behave as though she really has been married to Parrish and has been lying about it. After an unsatisfying hour, she leaves his office feeling nauseated. She makes it to the lavatory and, sadly, becomes sick to her stomach. OK, let us review. Sally has been exposed once to a new lawyer and a new flavor. She has then become sick to her stomach. As a result of the nausea she could develop an aversion to the taste, the lawyer, both, or neither. What do you think will happen? Please explain in a manner that reveals knowledge that might have been obtained from the chapter or lectures on Learning (p150ff).

14) (10) If the lawyer is going to be an idiot, she had better help herself. She goes to Portsmouth to check the records in the church where she is supposed to have been married. They will have records if there was a marriage. She gets to Portsmouth late at night and must stay at an Inn. She fills in the registration form. On the front, she must say if she is married or not. On the back is a place to say if she wants a double bed. She puts the card on the desk with three others. Here is what you can see.



The innkeeper comes in and says. “The rule of this house is **If you are single, you must sleep in a single bed.**” Being a very lazy innkeeper, he wants to turn over the minimum number of cards to check if his rule is being obeyed. “Wow”, says Sally to herself, “this is just like the selection task described on pp300-301 of Gleitman and in the lecture. I wonder if he can figure out the minimum number of cards to turn over.”

What do you think? Please answer in a way that makes it clear that you know 1) Why these selection tasks are interesting and 2) what might make a particular version easy or hard.

ANSWER ON NEXT PAGE

Answer to #14

- 15) (5) After a troubled night's sleep (in a single bed), Sally goes to the church. The church warden offers to help find the record and asks for the name of the husband. When she tells him it is "Parrish". He says "'Parr – ish" , That is two morphemes. So, he says, he will look in the "Two Morpheme" section. Ignoring whether this is a sensible filing system, is he technically correct?
- Close enough. Two syllables is pretty close to two significant units of speech sound which would be two morphemes.
 - No, this is lame because "morphemes" refer to significantly distinct "types" in categorization.
 - No, this is stupid because morphemes are hypothetical building blocks of object shape (hence "morphing" two shapes).
 - No, this is wrong because morphemes are smallest significant units of meaning in language (and "ish" is not adding meaning to "Parr" here as it might in "fool-ish").
 - No, this is idiotic because morphemes are receptors for endogenous opiates in the brain (also stimulated by "morphine", an exogenous opiate)
 - Nah, it just isn't a word. Can't have more pheme, only less pheme.
- 16) (5) When Sally gets to the church the marriage record is really there. It is in the correct place in the chronological record. It cannot have been added later. Now, for the first time, Sally is shaken. Given this concrete evidence in front of her, she wonders if her memory is defective. If she has forgotten a marriage that took place several years ago, this would be called.
- retrograde amnesia
 - implicit memory
 - implicit amnesia
 - mnemonic
 - anterograde amnesia
 - spousal agnosia
 - diphtheria
- 17) (20) Sally feels sure that she has never been married to anyone named Parrish and she is certain that the deceased Fred Garland is Harriet's father. But, at the same time, she realizes that memory is fallible. Please describe **four different** experimental situations in which something that was remembered at one time might not be remembered later. Be sure that these are all different memory phenomena and that all are described in enough detail to be recognized as coming from the text or lectures. The examples DO NOT need to be relevant to Sally Lockhart's situation (but that would be very clever). (ANSWER ON NEXT PAGE)

answer to #19

- 18) (10) Meantime, back at the house, the servants are becoming concerned about the new man who sharpens the knives. For one thing, they think he drinks Sally's sherry when he comes to the house. They are right. He had been taking a little swig from the bottle each time he came over. He always drinks one ounce. The first month, the bottle held 50 oz and one ounce was less than a **just noticeable difference**. When he did not get caught, he figured that he could always have a one ounce nip and he would be safe. This month, however, the cook and the nurse caught him and accused him of violating **Weber's Law**. What did they mean? Why did he get caught? Your answer should make it clear that you know what Weber's law is and why it might be relevant here. If you have no idea, you could try Fechner's Law or write a good story with content from the course and pray for partial credit.

- 19) (5) The nurse and the cook also think that the knife man has been spying on the household by listening to their conversations. To scare him off, they put a drug in the sherry that has the effect of making his **basilar membranes** as stiff as a board for 24 hours. What would this do the knife man?
- It would make it difficult for him to form speech sounds normally.
 - It would lead to visual problems because the basilar membranes support the photoreceptors, both mechanically and by supplying nutrients.
 - It would disrupt vision because it would distort the optics of the eye.
 - This is silly, The basilar membrane disappears during development, usually before birth.
 - It would disrupt hearing if the membrane could not vibrate in response to vibration of the fluid in the cochlea.
 - The knife man would be very happy. Stiff as a board is just the way you want your basilar membrane.
- 20) (5) Meantime, the nurse is worried about the cook. The cook is getting really plump. It is as if she no longer knows when to stop eating. The nurse has several theories about what is wrong. Which do you think is plausible? Which of these signals are related to the act of *not* eating? (94ff)
- The stomach should be sending signals to the brain when it is loaded with a nutritious substance. Maybe this is not happening.
 - Hormones coming from the duodenum, the first part of the small intestine send “stop eating messages” to the brain. Maybe that is broken.
 - The nurse’s fat cells should be releasing leptin so that the hypothalamus can figure out that her body has enough fat. Maybe her leptin receptors aren’t working.
 - Maybe she has a lesion in a part of the hypothalamus. Lesions in the correct bit can make a rat eat until it looks like a furry football.
 - A & D f. B & D g. A & C h. A, B, C, & D
 - None of the above
- 21) (10) The nurse and the cook get into an argument about all of this. The cook insists that she eats because she likes to. The nurse insists that the cook is a slave to pleasure centers in her brain. She is just eating to produce more activity in little bits of brain tissue. Leaving aside the issue of “Free Will”, is there any real evidence for “pleasure centers” (or at least specific loci of reinforcement) in the brain? Please explain briefly.

22) (10) Sally comes back from Portsmouth on the train. It is a bumpy ride. When her car goes over a bump, the car lurches and Sally reflexively winces. She is in the second car. The first car hits the bump before the second car (amazingly enough). This makes a noise (“clunk”) about a second before Sally’s car hits the bump. After a few minutes of clunk -> bump, clunk -> bump. Sally winces in response to the clunk. That sounds like either Classical (Pavlovian) or Operant (Instrumental) Conditioning. I can’t remember. Can you clarify? Be sure to use at least some of the following terms (the appropriate ones!):

Positive reinforcer, negative reinforcer, unconditioned stimulus, conditioned stimulus, unconditioned response, conditioned response, insight, preparedness.

23) (10) A little kid on the train realizes that if he makes a “clunk” noise, Sally will make a funny face. Once the kid starts “clunking”, Sally realizes this, too, and decides she needs to extinguish the behavior. How can she get rid of this unfortunate habit. A really good answer will describe a method for curing the habit while she is still on the train.

OK...I am sure that will do....even if I didn't get far into the story.