Unit 1: Respondent Conditioning: Applications

The following text material for this unit can be found in Unit 1 of the Course Pack: Chance, P. (2009). Chapter 4: Pavlovian Applications. *Learning and Behavior*, pp. 93-117.

Goals of the unit: (a) Review basic principles of respondent behavioral relations, and respondent conditioning and extinction. (b) Present various applications of respondent conditioning.

HOW TO FIND THE ANSWERS TO THE STUDY OBJECTIVES: PAGE AND PARAGRAPH DESIGNATIONS

At the beginning or end of each study objective over the text, I have indicated the page number and the paragraph number of the text where the answer can be found. For example, if you see "2,3" at the beginning of the objective it means that the answer to that objective can be found on page 2 in paragraph 3 counting **down** from the top of the page. Sometimes I will refer to a section of the text that is at the top of a page but continued from a paragraph that began on the preceding page. I will indicate this as paragraph "0". Thus, "7,0" means that the answer can be found on page 7 at the top of the page. While I will be as accurate as I can be with these page and paragraph numbers, my computer sometimes makes mistakes. Please tell me if the page and paragraph numbers are wrong so that I can inform the other members of the class.

Note: Because this is the first unit, I am going to review some basic concepts before proceeding to study objectives over the text material. Thus, the first study objectives relate to that general material. The study objectives over the text start with Study Objective 14.

Basic Material (From lecture)

1. **A. TERMINOLOGY: Know all of these terms and abbreviations:** -1 on any exam for any incorrect usage.

NS = Neutral Stimulus **US = Unconditioned Stimulus** **CS = Conditioned Stimulus**

UR = Unconditioned Response **CR = Conditioned Response**

B. Here's some other abbreviations I will be using this unit, but you do NOT have to learn these for the exam: I'll ask you to learn them in U2 when we focus on operant relations.

Sc = Any type of consequence in an operant relation (it stands for stimulus consequence)

SR = Unconditioned reinforcer **Sr = conditioned reinforcer**

SP = Unconditioned punisher **Sp = conditioned punisher**

EXT = Operant extinction

SD = Discriminative Stimulus **SΔ (Greek symbol for "D") = S delta**

2. Diagramming respondent and operant relations.

I will be using the following basic diagrams to illustrate respondent and operant relations. Learn them and use them. Dr. Malott's box diagramming differs from the conventional way of diagramming contingencies. If you have trouble converting from his box diagrams to the ones below, ask one of the course assistants or me to help you.

FOR THE EXAM: I will not ask any specific questions over the diagramming conventions, however, I will take off one point on this and future exams if you do not use the correct diagrams in your answers.

A. Respondent: S → R (stimulus elicits/causes the response)

B. Operant: R → Sc (response is followed by a stimulus consequence, Sc. Sc is a symbol for a generic consequence – that is, when you do not want to specify what type of consequence it is).

C. Operant with a discriminative stimulus: SD:R → SR/Sr.

D. Operant with an S delta: SΔ:R → Ext

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If you took one of Dr. Malott's sections of PSY 3600 PLEASE NOTE:

Dr. Malott's diagramming procedure takes the form of:

BEFORE→BEHAVIOR→AFTER

Because students are used to using an arrow between "BEFORE" and "BEHAVIOR", they often diagram "SD:R→Sc" as SD→R→Sc. The "SD→R" will be considered an incorrect use of the arrow in the class. A colon should be placed between the SD and the R, as "SD:R".

Dr. Malott uses the arrow to indicate the temporal sequence (the timing) of each variable in the diagram). However, this is not how the arrow is typically used in diagrams in behavior analysis.

In most of the field the arrow denotes an IF-THEN *contingent* relationship between the stimulus and response or the response and the stimulus. For example, in a respondent relation, S→R, *if* the stimulus occurs, then the *response* will occur, and if the stimulus does not occur, the response will not occur.

In operant relations, R→S, if the target response occurs, then the consequent stimulus (reinforcement, punishment, etc.) occurs (or is presented). If the target response does not occur, then the consequence is not provided.

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3. <u>Definition of "stimulus." (Stimulus is singular, stimuli is plural)</u>.

Learn the technical definition of a stimulus given below - I won't accept any other. Note the boldfaced part of the definition - include those terms, they are important. You learned a different definition in PSY 3600 - while the definition you learned is not incorrect, it is not as technical or precise as the one I am using.

Stimulus : **an energy change** that affects the **organism** through its **receptors**. (A receptor is an organ that converts energy changes in the environment into nerve impulses.)

None of the following material in this study objective will be on the exam - it is for clarification purposes only.

Note that all of the following are stimuli: Unconditioned and conditioned stimuli in respondent behavior relations; all types of consequences in operant behavioral relations (reinforcers, punishers); and SDs and S deltas in operant behavioral relations.

Following are some examples that illustrate the technical definition of a "stimulus." Note that for each, a physical energy change is identified and specific receptors or sense organs are identified. I have boldfaced the critical features.

Vision: **Electromagnetic radiation** in the form of wavelengths between 380 and 760 nanometers (one nanometer is one billionth of a meter) and particles called **photons** (the physical energy changes) affect the **photoreceptors in the eye** (affect an organism through one of the sense modes).

Audition (hearing): **Vibrations of molecules** (physical energy change) between the ranges of 30 to 20,000 times a second - approximately - affect the **phonoreceptors** in the ear and are perceived as sound (affect an organism through one of the sense modes).

Gustation (taste): **chemical changes** that result when **molecules of a substance dissolve in the saliva** (physical energy change) and stimulate **chemoreceptors** on the tongue (affect an organism through one of the sense modes).

Olfaction (smelling): **chemical changes** that result when the **molecules of a substance affect receptors in the nasal passages** - the least understood sense - somehow also affects taste.

4. Two important points about stimuli: (a) environmental events are classifed/defined from the perspective of the behaver, and (b) the energy change must affect a receptor of the organism to be classified as a stimulus.

   A. **For the exam:** Based on the material below when given examples, be able to classify consequences for a person's behavior as a behavior or a stimulus.

   When analyzing the behavior of a particular person, the environmental events are always classified and defined from the perspective of the *behaver*. Learn this point.

   Often, the behavior of one individual serves as an SD or consequence for another individual or nonhuman animal. For example, when Johnny answers a question correctly, the teacher may say, "Very good, Johnny!" When analyzing *Johnny's* behavior, R (answers correctly)→Sr (Very, good Johnny!), we should refer to the "Very good, Johnny!" as a *stimulus*, not as a behavior. It is an *auditory stimulus* for Johnny even though it is produced by behavior of the teacher.

   Another example: Suppose a person is working with an autistic child and the person wants to increase the number of times the child makes eye contact. When the child makes eye contact, the person lightly strokes the shoulder of the child. R (makes eye contact)→Sr (stroke on shoulder). Again, when analyzing the behavior of the autistic child, the stroke on the shoulder is a *tactile stimulus* (and a *visual* stimulus as well), even though it is a behavior for the person working with the autistic child.

   B. **For the exam**: Based on the following material and using the technical definition of a "stimulus" (study objective 3 above), be able to state two reasons why an energy change may function as a stimulus for one organism but not for another, and be able to give an example of each one (it does not have to be original). *You must use the term "receptor" in your answer.*

   (1) If an organism does not have a receptor that can detect an energy change or (2) if the receptor is damaged in some way so that an energy change does not affect the receptors,

then the energy change cannot be a "stimulus" for that organism, even though it may be a stimulus for another organism.

For example, it is commonly known that dogs can hear higher tones than humans – thus, there are many dog whistles that dogs can hear but humans cannot. (technically, the phonoreceptors of dogs can be affected by faster vibrations of molecules than the phonoreceptors of humans). Thus, high pitched whistles can function as stimuli for dogs, but not for humans.

Similarly, humans cannot detect x-rays (or any other type of radiation). X-rays are an energy change; however, they cannot function as stimuli for humans because we do not have receptors that can detect them.

Finally, assume that a hunter's phonorecptors have been damaged because he or she has shot a lot of rifles. Because high frequency tones (fast vibrations of molecules) cannot affect that person's phonoreceptors, high tones cannot be stimuli for that individual.

5. Definition of behavior or response. Learn the following definition of "behavior"-no other will be accepted:

Behavior (or response): (1) movement of the skeletal muscles (also called striped or striated), (2) movement of the smooth muscles, and (3) secretion of glands

The following material on muscles will NOT be on the exam: it is for clarification only.

A. Skeletal muscles: muscles that move us around - attached to bones and move the bones when they contract. Moves fingers, toes, head, hips, arms, legs, back, vocal apparatus, etc.

B. Smooth muscles: located in blood vessels (dilation and constriction affects blood flow), around hair follicles (hair "standing up on end"), in the eye (pupil constriction and dilation), in the organs of the digestive system, reproductive system, respiratory system, etc. The cardiac muscle is also a smooth muscle. They are controlled by the autonomic nervous system.

C. Gland secretion: also controlled by the autonomic nervous system. sweat glands, salivary glands (watering in the mouth), lachrymal glands (tearing in the eye), pituitary gland, adrenal gland, etc.

6. Learn the types of behaviors that are typically involved in (a) operant behavioral relations and conditioning and (b) respondent behavioral relations and conditioning In general:

A. Skeletal muscles are usually involved in **operant** behavioral relations and conditioning:

B. Smooth muscles (including the cardiac muscle), and gland secretion are usually involved in **respondent** behavioral relations and conditioning procedures.

7. Even though the material in Study Objective 6 is GENERALLY correct, there are exceptions to the rule. Based on the above material in Study Objective 6, state why the following respondent relation is unusual:

US (pain to hand or foot)---->UR (hand or foot withdrawal).

8. After lecture, be able to state the difference between the terms "Behavioral relations" vs. "behavior". Also, if asked, be able to provide an example of either an operant or respondent behavioral relation. It does not have to be an original example - I just want to make sure you understand the difference between the two terms.

9. Three common misconceptions about respondent and operant behavioral relations.

After lecture be able to explain why each of the following misconceptions is incorrect. You do not have to memorize the three misconceptions – that is I will not ask you to list the three misconceptions.

A. Respondent behavior is inherited while operant behavior is learned.

B. Respondent behavior is physiological while operant behavior is not

C. Respondent behavior is involuntary and automatic while operant behavior is not.

10. Specific US-->UR relations

Next, I have listed and numbered several common US-->UR relations – you should know the common ones as psychology majors and be able to distinguish these from operant behavioral relations. Therefore, learn the reflexes numbered 1, 2, 3, 5, 6, 7, 11 (for 11 learn all three types of stimuli but for the response just learn "activation syndrome").

If, on the exam, I state what the US is, (or an example) be able to give the correct UR or if I state what the UR is, you give the correct US.

Some Human Unconditioned Relations or Reflexes

Unconditioned Stimulus	**Unconditioned Response**	
1. light intensity increase	pupil of the eye constricts	
2. light intensity decrease	pupil of the eye dilates	
3. touch to eye or chemical irritant (smoke, onion fumes)	lachrimal gland secretion (crying)	
4. irritation to the nasal mucosa	sneezing	
5. irritation to the throat	coughing	
6. low temperature	shivering surface vasoconstriction	
7. high temperature	sweating surface vasodilation	
8. cold or "fright"	hair erection on body	
9. food in mouth	salivation	
10. bad food in stomach	vomiting	
11. Stimulus that is painful, very intense or very unusual	**activation syndrome:** ("emotions") heart rate increase, adrenaline secretion, liver release of sugar into the bloodstream, constriction of visceral blood vessels, galvanic skin response, etc.	(Learn all three types of stimuli for this relation, but only "activation syndrome" as the response – that is, you do not have to list the individual behaviors that comprise the syndrome)

11. Define "emotions" from a behavioral perspective as follows:

Emotions consist of a **collection of respondent behaviors** that together are called the **"activation syndrome."** Note that the "respondent" in this definition is a very important part of the definition. All emotions are respondent, not operant behaviors. (Respondent relation #11 in the preceding study objective)

12. Lower-order and higher-order respondent conditioning. Respondent conditioning is also called Pavlovian or classical conditioning. See the end of this study objective for diagramming conventions.

    After lecture:

    A. Be able to diagram Pavlov's original study (where a tone was paired with food - as an example of lower-order conditioning);

    B. Be able to diagram an example of lower-order respondent conditioning if I give you the the US and NS.

    C. Be able to diagram an example of higher-order respondent conditioning if I give you the CS_1 and the NS.

    Not for the exam, but for some really cool examples from advertising, see the Chance article in U1 of the course pack, pages 102-104. In the George Clooney example in 102,1, what type of stimulus is George Clooney? What type of stimulus is the mouthwash? What's the CR1 and CR2? I might even use these examples on the exam.

    D. Be able to explain the difference between lower-order and higher-order respondent conditioning IN WORDS, not simply by diagramming the two types.

    E. Be able to diagram Watson and Raynor's study with Little Albert. (this study and its significance is actually described in the Chance article in U1 of the course pack, page 95,2. I will provide the diagram in class)

    Respondent conditioning diagramming conventions:

    RULE: a slash (not an arrow), is used to illustrate the pairing of two stimuli. Remember from Study Objective 2, an arrow is used to illustrate a contingent relationship between a stimulus and a response. **You will lose a point if you use an arrow to indicate the pairing of two stimuli in your diagrams**.

    Lower-order Respondent Conditioning Diagram:

    NS does not elicit R
    US---------->UR
    NS/US----->UR (repeated several times)
    CS--------- >CR

    Higher-order Respondent Conditioning Diagram:

    NS does not elicit R
    CS_1---------->CR_1
    NS/CS_1----->CR_1 (repeated several times)
    CS_2--------- >CR_2

13. Elicit. Use and spell "elicit" correctly. I will not ask you to state the rule or critical features of the rule, but I will require you to use it correctly. I will deduct one point from your exam score on this and future exams if you misuse or misspell this term. I may also give you

examples on the exam and ask you to identify whether "elicit" is used correctly in the sentence.

The "simple" rule is: USs elicit URs and CSs elicit CRs.

There are three critical features to this rule: 1. Elicit is used only in respondent relations; (2) Only **USs or CSs** (stimuli) elicit responses; and (3) only **responses** can be elicited.

Note very carefully that only STIMULI elicit responses. Organisms do not, by definition. Hence, "Pavlov's **dogs** do NOT elicit salivation." Rather, "**Meat powder in the mouth** elicits salivation." While this may seem to be a "trivial" distinction, it isn't. It is important because the stimulus in the environment is what causes the behavior to occur (elicits it); the organism (in my example, Pavolv's dog) is NOT the cause of the behavior. Keep in mind that in psychology, we are always concerned not only with the response/behavior but what causes it – therefore, we have to be careful about how we talk so that we correctly identify the cause of the response/behavior.

Now turn to the Chance text material in Unit 1 of the Course Pack

14. 95,2. Respondent Extinction: (a) Describe "respondent extinction" in words and (b) be able to state how you would specifically extinguish Albert's **fear** response (this is not provided in the text).

    Respondent extinction described:
    Repeatedly present the **CS (or CS_2) without** the **US (or CS_1)** with which it was originally paired.

    Note that it is INCORRECT to say simply "present the CS (or CS2) without the US (or CS1)." Why? You must include the "repeatedly." After respondent conditioning, unless you repeatedly present the CS without the US, the CS will simply elicit the CR.

    It is also INCORRECT to say "repeatedly present the US." If you repeatedly present the US and not the CS, the next time the CS is presented it WILL elicit the response.

    Finally, note that it is also incorrect to say "The CS is repeatedly *paired* without the US." Why? "Pair" means present together. Thus, you cannot "pair the CS without the US." What you can say, however, is that the "CS is repeatedly *presented* without the US."

15. Let's assume that Albert has not had any contact with white rats for 1 year after he left Watson and Raynor. If you showed him a rat, would he exhibit a fear reaction? Why or why not? This is not answered in the text, but you should have covered it in PSY 3600.

16. 96,5 Counterconditioning and Counterconditioning vs. Extinction: Note carefully that counterconditioning and extinction are NOT the same thing.

    A. After lecture be able to diagram how you could use counterconditioning to eliminate Peter's fear response.

    B. After lecture be able to answer the following: In the *first* line of the *counterconditioning* diagram, the rabbit is an NS even though it elicits a fear reaction. Explain why it is an NS rather than a CS in this diagram.

    C. Not for the exam, but notice the interesting material related to exposure therapy, systematic desensitization, and the use of virtual reality therapy in 96.6-99,4 to deal with all sorts of phobias such as fear of heights, fear of flying, fear of spiders as well as fear of public speaking and other types of anxiety disorders (post-traumatic stress disorders).

17. 100,2. Staats and Staats "nationality" study: Conditioning biased reactions.
    After lecture, be able to diagram the Staats and Staats study with the nationalities. You should supply three diagrams: (1) where the NS = German and paired with words that did not elicit emotional reactions; (2) where the NS = Dutch and paired with words that elicited pleasant emotional reactions; and (3) where the NS = Swedish and was paired with words that elicited negative or unpleasant emotional reactions. **Note carefully that this is an example of higher-order respondent conditioning**.
18. 100,2. Staats and Staats: The dependent variable of ratings and CRs.
    The dependent variable consisted of ratings of the extent to which the names were pleasant or unpleasant. Are the ratings an example of CRs? Defend your answer. If they are not, what are the actual CRs?
19. 105,4. Counterconditioning of salivation to a noxious/painful stimulus: Salivating dogs and masochists.

    What do salivating dogs have to do with masochists? To answer this, after lecture, you should be able to diagram Pavlov's study, using all the correct behavioral terms.
20. 111,4-112,1. Not for the exam, unless I have time to cover it in lecture – then I may add it; but how could respondent conditioning explain a person having an allergic reaction to an artificial rose? Would a person who has an allergic reaction to an artificial rose necessarily be "less miserable" than when exposed to the actual allergen?
21. 113,1-114,1. Not for the exam again, but if I have time, I may add it. I will talk about why/how respondent conditioning can account for drug overdoses when people die from taking the same amount of drug in a different environment. This is fascinating. It also can explain why people who "get clean" in rehab and move back to their home environments suffer a higher recidivism (relapse) rate than those who get clean and move to a very different place/location.

THE END

Unit 2: Operant Conditioning: Applications

Review of basic principles of behavior: Positive reinforcement, negative reinforcement (escape and avoidance), punishment and extinction.

Chance, P. (2009). Chapter 8: Operant applications and interpretations.

Meyerson, L., & Michael, J. L. (1964). Assessment of hearing by operant conditioning procedures.

Goals of the unit: (a) Review basic principles of behavior, (b) Review the development of conditioned reinforcers, (c) Present applications of operant conditioning, and (d) Increase/supplement understanding of SDs and S deltas.

1. TERMINOLOGY: Use all terms and abbreviations correctly: -1 on each exam for any incorrect usages.

Sc = Any type of consequence (it stands for stimulus consequence)

SR = Unconditioned reinforcer **Sr = conditioned reinforcer**

SR+ = Unconditioned positive reinforcer **Sr+ = conditioned positive reinforcer**

SR- = Unconditioned negative reinforcer **Sr- = conditioned negative reinforcer**

SP = Uconditioned punisher **Sp = conditioned punisher**

SD = Discriminative Stimulus **SΔ (Greek symbol for "D") = S delta**

2. Review of Basic Principles of Behavior

At the end of the study objectives for this unit, I have provided a review of our basic principles of behavior. Based on this material:

Be able to recognize examples of all of the basic principles of behavior including escape and avoidance which are both forms of negative reinforcement. On the exam, I will have examples similar to the ones I provide at the end of the study objectives.

3. Abbreviation for conditioned reinforcer

Note very carefully that the abbreviation for a conditioned reinforcer is Sr, NOT CR. CR = conditioned response, as you learned in Unit 1. This is a very common error. You will lose one point on this exam and all subsequent exams if you use the incorrect abbreviation.

Chance text material in Unit 2 of the Course Pack

4. 231,4. Advantage of Srs vs. SRs

Why did trainers establish the clicking sound as an Sr and use it as a reinforcer rather than using an SR? The answer is that it (a) can be used more immediately after behaviors when shaping a terminal behavior/responses, (b) does not interrupt the behavioral sequence, and (c) prevents satiation.

Many students in the past have missed this question, so let me provide an explanation. The "click" can be presented immediately after each behavior that occurs in a sequence (remember shaping your rat to press the lever in PSY 3600?) whereas most unconditioned reinforcers, such as food cannot be. For example, to shape the elephant to turn, walk to the edge of the cage and put its foot through the hole, the trainers had to reinforce behaviors that would lead to that final, terminal sequence of behaviors. (a) As soon as the elephant turned its head in the right direction, the trainers could immediately make a "click" - (b) then when

the elephant moved shifted its body weight and turned its body in the right direction, the trainers could immediately make another click, (c) when the elephant stepped in the right direction, the trainers could immediately make another click, and so on. If the trainers had used carrots, an unconditioned reinforcer, for example, they would have had to toss it into the cage, wait for the elephant to get it and then eat it, before proceeding with the training. Also, eventually, the elephant may have become satiated with "carrots" (food).

5. Diagram (a) how to develop and (b) how to test an Sr.

   231, 4. Be able to diagram as I do below, how the trainers established the clicking sound as an Sr for the elephant. Note very carefully in the 3rd sentence that trainers simply repeatedly paired the clicking sound with the carrot - there was NO BEHAVIOR involved -thus in your diagram, do NOT include a behavior. Compare this to the diagrams in study objective 13: it is VERY, VERY important that you understand how to develop both an Sr and an SD, and recognize the difference.

   To develop an Sr:

   When the elephant was food deprived: (Chance doesn't include this but it MUST be there):

   NS (clicking sound)/SR (carrot) (repeat several times) (Note that there is NO behavior)
   Click becomes Sr

   Note carefully:
   A. The NS precedes the SR in the pairing process
   B. The carrot, as food, is an unconditioned reinforcer, an **SR**
   C. The click becomes a conditioned reinforcer, an **Sr**

   Testing new Srs

   Be able to explain (after lecture) and diagram, as I have done below, how you determine whether an Sr really is an Sr after the above pairing process has taken place.

   R (any response)----->Sr (click)
   If the response increases in the future, then the NS has become an Sr (must be included).

   Note carefully:
   A. The response is **followed** by the conditioned reinforcer, thus R---->Sr.
   B. Only the Sr follows the response. You do NOT also present the SR.
   C. The response MUST increase in frequency in the future.
   D. In order for the click to continue to be an Sr, it must occasionally be paired with the SR. Otherwise, it will revert to an NS.

6. Difference between Respondent Conditioning and Development of an Sr

   Learn the following: With respondent conditioning an NS is paired with a US or CS; with the development of an Sr, an NS is paired with an SR or Sr.

7. 231,5. Not for the exam. The area of animal training and behavioral enrichment in zoos is fascinating. Behavior analysts have greatly influenced both fields. More on this in lecture. Dr. Doug Johnson has a really awesome presentation on this which can be found at: operant-tech.com/resources/zoos/

8. 232,1.

   A. State two things that zoo officials have done *to try* to make life better for captive animals.

B. What has been the effect of putting large balls and toys in the enclosures of animals? In other words, has that been effective?

9. 232,2.

A. What is the problem with most zoo enclosures, even if they are naturalistic? How does this differ from the life in the wild?

B. 233,0. Based on the material below, be able to explain behaviorally, what "the reason to be active" consists of: be sure to learn the diagram.

From a behavioral perspective "the reason to be active" consists of behavioral contingencies with food as the reinforcement that evoke the animals' typical species typical behavior. Thus R (species specific behaviors that are typically seen in the wild) --> SR (food).

10. From lecture: Learn the details of each example that illustrates behavioral enrichment. State the (a) name of the animal, (b) the specific procedure, (c) the specific behavior(s) that was/were reinforced, and the reinforcer for the species typical behavior.

Note that I am going to be talking about an elephant example. Use this example if I ask this question on the exam, not the example related to SO4.

You can locate descriptions of more enrichment activities at the Honolulu zoo web page. Markowitz was instrumental in helping design the Honolulu zoo and they have carried on his tradition. Disney also uses enrichment training/activities for their captive animals, and they describe how to develop a behavioral enrichment program on their web page.

11. Now turn to **245,2**

A. What was reinforcing the woman's delusional behavior that her head was falling off?

B. Note that the therapists actually did more than is presented to solve the problem. Learn the following components of the intervention.

1. They taught the woman to approach the staff in socially acceptable ways.
2. They had the staff interact with her when she approached them in socially acceptable ways
3. They had the staff extinguish (withhold their interaction) the delusional behavior.

C. Be able to answer the following: Why is this intervention a very nice example of an ethical intervention?

The inappropriate delusional behavior was being reinforced by interaction with staff. Thus, the therapists determined that "interaction with staff" was a reinforcer for the woman. **Instead of just extinguishing the inappropriate behavior (the woman's verbal behavior/delusion that her head was falling off) by withholding that reinforcer, they taught her a new behavior that would result in that same reinforcer, thus preserving "the quality of life" for her.**

Not for the exam: This has become a standard ethical principle in behavior analysis – you don't just punish or extinguish inappropriate behavior; rather, you simultaneously insure that the individual is provided with the same reinforcer – but for appropriate rather than inappropriate behavior.

12. 245,5. What did the therapist reinforce in the case of the "haggly old witch?"

13. 245,6-.246,0 How did the therapist determine that the patient's actual **belief** that the witch was following him actually declined (rather than just by what he said to the therapist)? That

is, how did the therapist know that the patient was not just telling the therapist what he wanted to hear?

Meyerson and Michael article that illustrates SDs and S deltas.: **For an interactive animated illustration of the Meyerson and Michael procedure, go to my web page. This was created by Dr. Johnson.**

14. In order to understand the procedure that was used in the Meyerson and Michael article, you need to understand what SDs and S deltas are, so I am providing the definitions below as a review. You **do not** have to memorize these definitions - I will not ask for them on the exam. I want you to understand the concepts of SDs and S deltas - you learned the definitions in PSY 360: I am just providing them here as a "refresher," but in the next study objective I will ask you to be able to diagram the development of an SD and S delta, to make sure that you do understand these important concepts.

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The definitions and symbols I use in this class::

A discriminative stimulus (SD) is a stimulus that precedes a response and evokes that response because that particular response has been reinforced in its presence and not in its absence (the response has been extinguished in its absence or in the presence of another stimulus). (The absence of the SD or the other stimulus becomes the S delta).

An SD**pun** is a stimulus that precedes a response, and in the presence of which a particular response is punished and in its absence that response is not punished.

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Malott's definition: A stimulus in the presence of which a particular response is reinforced or punished.

Pietras' definition: An event or stimulus that precedes an operant and sets the occasion for behavior. They change the probability that a response will be emitted based on a history of differential reinforcement - that is a behavior is consistently reinforced when that stimulus or event precedes the behavior and is not reinforced when that stimulus or event does not precede the beahvior.

15. <u>SDs: Diagram training and testing</u>. Provide the diagrams for SD training and testing.

SDs are stimuli in the presence of which a response is reinforced and in its absence the response is extinguished. **BOTH the SD and S delta training is necessary.** Assume you want to make a particular hand signal into an SD for a dolphin to jump out of the water and do a back flip, **to train**:

SD (hand signal): R (jump and back flip)------->SR (food)
S delta (no hand signal): R (jump and back flip)--->EXT (no food)

To test whether this training has been successful:
SD (hand signal):R (jump and back flip)
S delta (no hand signal or another stimulus): No R (no jump, no back flip).

If the dolphin jumps and does a back flip when the hand signal is made and does NOT jump and do a back flip in the absence of the hand signal, then the hand signal has become an SD.

16. <u>SDs immediately evoke a response, they do NOT increase the *future* likelihood or frequency of a response</u>. -1 on exams if you say that SDs affect the <u>***future***</u> frequency of a response.

SDs **immediately** evoke responses or **immediately** increase the likelihood that a response will occur, where "immediately" is defined within 60 seconds (Some say within 3 - 5 s, Malott says 60 seconds - so I am using Malott's definition of immediate). SDs do NOT evoke a response **in the future** or increase the **future** likelihood or frequency of a response. Learn this.

Below I explain why this is the case. I will not ask for the explanation on the exam, but this material is so that you understand why it is important that you indicate that SDs immediately affect a behavior and do NOT increase the *future* frequency of a response.

Explanation: SDs come right before a response and **immediately** evoke it. They do NOT change or alter whether or not the response will occur more frequently in the future – that is, **they do not condition a response – they "merely" determine whether or not the response will occur at a particular time (when the SD is present and not when it is absent)**. Therefore, it is incorrect, when talking about SDs to say that they increase the **future** likelihood of the response. Assume a rat has been trained to press a lever. In the presence of a light, the lever press is reinforced, in its absence, the lever press has never been reinforced. When the light is turned on, the light will evoke lever pressing **immediately, not in the future**. When the light is turned off, lever pressing will be immediately suppressed or will immediately cease (if the rat is well-trained).

In contrast to SDs which precede responses and immediately evoke them, reinforcers (and other consequences), follow a response and change the **future** frequency of a response. Said another way, consequences alter the organism's future repertoire and make a relatively permanent change in the organism- SDs do not, they only influence whether the response will occur at a particular point in time.).

17. SDs precede responses, **not other stimuli**. For example, a yellow light is NOT an SD **for a red light**. The red light is a stimulus, not a response of a person. The yellow light may be an SD for removing one's foot from the accelerator in a car, and stepping on the brake, but it cannot be an SD **for the red light**. Learn this point and if given an example, be able to explain why the antecedent stimulus is or is not an SD based on this material.
18. Terminology: Evoke and Evoke vs. Elicit .

    Use the term "evoke" correctly; review Study Objective 13 from Unit 1, and be able to use both evoke and elicit correctly. I may give you sentences on the exam and ask you to indicate whether these terms are used correctly. I will deduct one point on exams whenever these terms are used incorrectly. I will not ask you to state the rule, give the critical features of the rule or provide any part of the explanation on the exam. Those are for clarification purposes only.

    Evoke. The simple rule is: **USs, CS, and SDs** evoke **responses.**

    Critical features of the rule: (1) Only stimuli evoke (it can be used with USs, CSs or SDs; unlike elicit that can only be used with USs and CSs); (2) only responses can be evoked.

    Note carefully that (a) organisms do **not** evoke responses; (b) behaviors do not evoke consequences; and (c) reinforcement does not evoke behaviors!

    Explanation: The term evoke is restricted to antecedent stimuli that immediately influence whether or not a response will occur. The definition of the term "evokes" is "to call forth" or "to produce." Also, in psychology, the term evoke is restricted to environment stimuli.

Hence it is not correct to say that an organism evokes a response or a behavior evokes a consequence; neither are stimuli. Finally, you cannot say that reinforcement evokes behavior. Although reinforcement is a stimulus, reinforcement follows behavior - Only a stimulus that **precedes a response** can call it forth.

19. Before reading the detailed procedure read the summary of the study in 242,2. This will help you understand the procedure, but I won't ask anything about this material on the exam.
20. 239,1-240,0. Discrimination training, first phase M&M The procedure on 239,1-240,0 represents a discrimination procedure - an ingenious one! This procedure was conducted in the **first** 30-minute session.

    Provide the diagrams of the discrimination training. Note that there are FOUR diagrams.

Right Lever Pull (R1)

SD:	R1 ---------->	Sr/SR (VR8)
Tone on (only 500 cps)	Right lever pull	Trinkets
Right light on, Left light off		Edibles
S Delta:	R1 ---------->	Ext
Tone off	Right lever pull	
Right light off, Left light on		

Left Lever Pull (R2)

SD:	R2 ---------->	Sr/SR (VR8)
Tone off	Left lever pull	Trinkets
Right light off, Left light on		Edibles
S Delta:	R2 ---------->	Ext
Tone on (only 500 cps)	Left lever pull	
Right light on, Left light off		

21 Based on the material below, explain why there are 2 "discriminations" in the first phase of the training procedure.

There are two discriminations (a discrimination consists of both an SD and S delta) because an SD is an SD for a **particular response** and **there are two responses in this procedure: the RIGHT lever pull and the LEFT lever pull**. Note it is NOT correct to say that there are two discriminations because there was both a tone and a light used as the SD.

22. 240,2. Stimulus fading, 2nd phase M & M. Note that the material in 240,2 refers to what happened during the **second** 30-minute session).

Describe the procedure for bringing the lever pressing response under the control of only the tone. This procedure is technically referred to as "stimulus fading." If I describe the procedure, be able to identify it as "stimulus fading" or be able to describe the procedure if I ask what the stimulus fading procedure was in this study.

Not for the exam, but after stimulus fading, note what the SDs and S deltas were. The following may help (I will NOT ask for these diagrams on the exam):

Right Lever Pull (R1)

SD:	R1 ---------->	Sr/SR
Tone on	Right lever pull	Trinkets, edibles
S Delta:	R1 ---------->	Ext
Tone off	Right lever pull	

Left Lever Pull (R2)

SD:	R2 ---------->	Sr/SR
Tone off	Left lever pull	Trinkets, edibles
S Delta:	R2 ---------->	Ext
Tone on	Left lever pull	

23. 240,2-3. Stimulus generalization training, also, 2nd phase M & M.

    Note that a sequence of tones of different frequencies were introduced during the second 30-minute training session as well. This is "stimulus generalization training." During the first session, only one tone - with a frequency of 500 cycles at 40 decibels was presented.

    If I describe the procedure, be able to identify it as "stimulus generalization" or be able to describe the procedure if I ask what the stimulus generalization procedure was in this study.

24. 240,3. Why was stimulus generalization training necessary?

    Explain why different tones were introduced or in other words, explain why the stimulus generalization training was necessary - as I do below in this study objective. Note that this part of the study indicates the power of stimulus control - you cannot assume that the children would have pulled the right lever in the presence of any other tone other than the 500 cycle per second tone.

    Pulling the right lever was ONLY reinforced in the presence of a *500* cycle per second tone; the discrimination that the child may have developed was: SD (500 cps tone: R (pull right lever); SD (no tone or *any other tone)*: R (pull left lever). Thus, if the child heard another tone, he/she may well have pulled the left lever. In other words you could not assume stimulus generalization to other tones.

    Not for the exam, but: "Fixation" on one stimulus and the lack of stimulus generalization is often seen with individuals who are diagnosed with developmental disabilities and autism.

25. 240, 3 Hearing test responses

    During the third phase, the actual hearing test, if the child "hears" a tone that is presented, what will his/her response be? If the child does not hear a tone that is presented, what will his/her response be?

    This next part will not be on the exam, but it explains the hearing test procedure in the third phase. Note that during the hearing test, they presented tones of different frequencies at different loudnesses (decibels). A child might be able to hear a certain tone at one loudness level, but not when it was presented more softly. Thus, he/she could have heard the tone, and therefore responded correctly in the second training phase when the tone was presented at 40 decibels, but may not have been able to hear it when that tone was presented at 30 decibels. (If the child had not been able to hear a certain tone at all, then the child could not have been conditioned to pull the right lever when he/she heard that tone during the first and second training phases.) By presenting all of the tones and different loudness levels, the authors could determine the full range of hearing that the child had, and compare it to a "normal" range of hearing.

26. Not in the text, but for the exam.

    A1. When a tone is presented, what type of stimulus is the tone for a child's response of pulling the LEFT lever?

A2. When a tone is not presented, what type of stimulus is the absence of the tone for a child's response of pulling the LEFT lever?

Let me give you another example. Suppose a Mom is teaching her young child the alphabet. She holds up a card that has the letter M on it.

B1. The letter M is what type of stimulus for the child's saying "M?"

B2. The letter M is what type of stimulus for the child's saying "N?"

27. "Automaticity of reinforcement" illustrated in M & M.

The apparatus was used with children who had no verbal repertoire, yet they quickly acquired the appropriate discriminations in spite of the fact that the procedures are rather complicated - and difficult to describe verbally.

The fact that the children were able to acquire the discriminations is strong evidence that operant conditioning procedures work without the awareness of the individual (that they are automatic) -- that is, individuals do not have to be able to "understand" or be aware of the relationship between their behavior and its antecedents and consequences in order to be affected by them. LEARN THIS POINT.

C**arefully note that it is NOT the behavior of pulling the levers that the children are unaware of - they are quite aware they are pulling the levers - it is the conditioning process that occurs that without awareness.**

An interesting historical note: when the parents (and teachers) of these children were asked to give their consent to the research, most said that the study would be useless - they themselves could barely understand the procedures and therefore, there was no way that the children would be able to, believing that if the children could not understand or describe the procedures they would not be able to respond appropriately. They were wrong.

The End

U2: Review of Basic Principles of Behavior

Basic Principles of Behavior

This material should be a review for all of you, as these are covered in other courses, particularly in PSY 3600. Nonetheless, I want to make sure that you do understand these principles and can use these terms correctly, as well as recognize examples of the principles. See Study Objective 1 in this unit for the material you are responsible for with respect to the basic principles.

1. Reinforcement, reinforcer. A consequence (or stimulus) follows a response, immediately follows the response (within 60 sec or less) and as a result the response increases in frequency in the future. In the case of a response that is already at maximum frequency, reinforcement maintains that level of responding.
2. Positive reinforcement, positive reinforcer. A consequence is immediately **presented** or added after a response, and as a result the response increases in frequency in the future. In the case of a response that is already at maximum frequency, reinforcement maintains that level of responding.
3. Negative reinforcement, negative reinforcer. A response immediately terminates/decreases or avoids an already exiting aversive stimulus, and as a result the response **increases in frequency in the future.** The termination of the stimulus or the avoidance of the stimulus is the negative reinforcer. There are two types of negative reinforcement:

    A. Escape. The response **terminates or decreases** an already existing stimulus. An example: An alarm clock is sounding: Press the snooze button --->Alarm ceases. As a result, pressing the snooze button increases in frequency in the future.

    B. Avoidance. The response **prevents** an aversive stimulus. When a child plays quietly the playing quietly prevents criticism by the parent or teacher.

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Note that if someone asked you whether you would prefer (or "want") positive reinforcement or negative reinforcement, you should say you "want" them both – both are "good" things in the sense that with positive reinforcement, you get something "good" while with negative reinforcement, something you don't "like" is taken away. Remember, however, that what is "good" or what you "don't like" is always defined in terms of whether the behavior it follows increases in frequency in the future.

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4. Punishment, punisher. A consequence (or stimulus) follows a response, immediately follows the response (within 60 sec or less) and as a result the response **decreases** in frequency in the future.

    Interestingly, while most behavior analysts use the terms "positive and negative reinforcement" to distinguish between them, few use the terms "positive and negative punishment," although logically if you use one distinction you should use the other. However, because most behavior analysts do not distinguish between positive and negative punishment, I am not going to require you to learn these terms.

5. Extinction. A response has been reinforced in the past, and now when the response occurs, that reinforcement is **withheld**. As a result the response decreases in frequency in the future. Note that the reinforcement is with**held** (not presented), rather than with**drawn**. (If you

withdraw a reinforcer, it means that you are taking a reinforcer away after it has been provided, which is a form of punishment).

Identify each of the following examples as: Positive reinforcement, escape, avoidance, punishment or operant extinction.

A. Rafael gets a muscle cramp. He massages the muscle (the behavior of interest) and the cramp immediately decreases in severity. As a result, when Rafael gets a muscle cramp in the future, he massages it more frequently than he has done in the past.

B. A student wants to make a copy. He/she inserts his/her Bronco Card in a copy machine and pushes the button (the behavior of interest). No copies are made. The student pushes and pushes the button, but still no copies are made. Pushing the copy button on that particular machine decreases in frequency in the future.

C. Barbara calls her little sister a "scardy cat" (the behavior of interest) and the little sister immediately begins to cry. As a result, Barbara calls her sister a scardy cat more often in the future.

D. A worker is standing around with co-workers and puts on her hard hat before entering the construction area. Her supervisor sees this and immediately says, "Hey, that's great, Grace - thanks for making Safety First a reality!" As a result, Grace puts on her hard hat less often in the future before entering the construction area than she had in the past.

E. Jake gets bitten by bugs when he walks in the woods. One day, he puts on a new kind of bug repellant and does not get bitten by bugs. As a result, in the future, he puts on that new kind of bug repellant before he walks in the woods.

Unit 3: Multiple Effects of Stimuli, Performance Management Interventions, Schedules of Reinforcement

NOTE: I am going to start this unit with the Multiple Effects of Stimuli Material

1. The material on multiple effects of stimuli at the end of the study objectives. For a supplementary material on the multiple effects of stimuli, a review and practice exercises (the kind that will be on the exam), see my web page. Dr. Johnson created this.
2. Some parts of the Chance material from **Unit 2** of the Course Pack; and
3. The following articles in Unit 3 of the Course Pack. (a) Ayllon et al. article; (b) Gaetani et al. article; and (c). Sulzer-Azaroff et al. article

Goals of the unit: (a) Increase understanding of the effects of SDs, Srs, and CSs on behavior as well as understand that one stimulus can have multiple effects on the behavior of an individual; (b) Review and increase understanding of the basic schedules of reinforcement; (c) Review and increase understanding of the difference between "adventitious" or noncontingent reinforcement and contingent reinforcement, and (d) Present applications in performance management

Schedules of Reinforcement and Adventitious vs. Contingent Reinforcement

1. Four basic schedules of reinforcement: FR, VR, FI, VI: Be able to define all six basic schedules - you covered these in PSY 3600. I am providing review material for you below.

Rarely is behavior reinforced or punished each and every time it occurs. In the preceding unit, for example, Meyerson and Michael did not reinforce the lever pulls after each and every response. Rather, they used a variable ratio 8 (VR8) schedule of reinforcement. In two of the articles in this unit, schedules of reinforcement are referred to. Thus, I want to review the basic schedules of reinforcement that you learned in PSY 3600. If you recall, each of these different schedules produces different "patterns of responding." I am not going to review those patterns, but I do want to review the basic schedules.

Note that when learning the definitions:

1. Fixed always refers to a **specified** number of responses or time interval.
2. Variable always refers to an **average** number of responses or time interval.
3. Ratio always refers to **number** of responses;
4. Interval always refers to the passage of a time interval **AND** the first response that occurs after that time interval has elapsed. Note very carefully that all interval schedules have both (a) a time interval requirement and (b) a response requirement.
5. Time always refers to simply the passage of time, this is where there is no response requirement.

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Fixed Ratio (FR): Reinforcement is provided after a **specified number** of responses. For example, in an FR3 schedule of reinforcement, reinforcement would be provided after **every** third response.

Variable Ratio (VR). Reinforcement is provided after an **average number** of responses. **Do not simply say after a "variable" number** - that is not quite correct, since variable could mean something other than an average number. For example, in a VR3 schedule of reinforcement, reinforcement is provided after an **average** of three responses has occurred. That is, reinforcement might be provided after 1 response, then after 5 responses, then after

3 responses. 1 + 5 + 3 = 9. 9 responses/3 reinforcement deliveries = 3. Thus, reinforcement was provided after an average of 3 responses.

Fixed Interval (FI). Reinforcement is provided for the **first response** that occurs **after a specified time interval has elapsed**. Thus, in a FI 10 sec schedule of reinforcement, reinforcement would be provided immediately following the first response that occurred after 10 secs had passed.

Variable Interval (VI). Reinforcement is provided for the **first response** that occurs **after an average time interval has elapsed**. **Do not simply say after a "variable" time interval.** Thus, in a VI 10 sec schedule of reinforcement, reinforcement would be provided immediately following the **first response** that occurred **after an average of 10 secs had passed**. Thus, reinforcement may be provided for the first response that occurs after 5 secs has passed, then the first response after 15 secs has passed, etc. 5 + 15 = 20 sec. 20 sec./2 reinforcement deliveries = 10 sec.

Fixed Time (FT). Reinforcement is provided after a specified time interval has elapsed (there is NO response requirement). Thus, in an FT 10 sec schedule, reinforcement would be delivered every 10 sec regardless of what behavior the organism is emitting.

Variable Time (VT). Reinforcement is provided after an average time interval has elapsed (there is NO response requirement). Thus in a VT 10 sec schedule, reinforcement would be provided after an average of 10 sec has elapsed.

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Now go to the Chance text in Unit 2, page 252, the section on Gambling.

2. 252,3-4 Not for the exam, but notice that all forms of casino gambling are designed so that most of the time people lose. Also, note why "the fun of winning" is an inadequate explanation of gambling behavior.
3. 252,5.

   A. Payoffs in most casino games resemble what type of reinforcement schedule?

   B. What type of behavior is typically produced by such schedules?
4. 252,6. What might explain why some people become compulsive gamblers and others do not? Provide an example along with your answer.
5. 253,5-6. What, other than "wins" can function as reinforcement for gambling?
6. 253,8. What other factor that is not related to the gambling schedule itself may contribute to and/or account for excessive gambling? *State this behaviorally*, that is do not just say, "excitement." Be able to state the example from the text.
7. 254,1: <u>Superstitious behavior</u>. Be able to define superstitious behavior : Superstitious behavior is behavior that develops because it is followed by a reinforcer even though the behavior does not produce the reinforcer. That is, even though there is not a causal relationship between the response and the reinforcement.
8. <u>Adventitious/Coincidental (noncontingent) vs. Contingent reinforcement</u>

   Be able to define what "adventitious/noncontingent" and "contingent" reinforcement are and how they differ. I provide the definitions below.

   Contingent Reinforcement: Reinforcement **is contingent upon that response** (or on a sequence of responding as in ratio schedules or a designated schedule), and increases the

future frequency of the response. Contingent means that the response produces the reinforcement - that is, reinforcement is delivered when the response occurs but is NOT delivered when the response does not occur. This is what we typically refer to when we say "reinforcement."

Adventitious/Coincidental (or noncontingent) Reinforcement: Reinforcement immediately follows the response, **but is NOT contingent upon it**, and increases the future frequency of the response. That is, reinforcement follows the response but the response does NOT produce it. Reinforcement is provided regardless of any particular response that is occurring. For example, reinforcement may be provided after every 10 s regardless of any particular response. The response that just happens to occur right before the reinforcement is delivered will increase in frequency in the future. That response is referred to as "superstitious behavior."

9. Be able to indicate which of the following basic schedules of reinforcement represent adventitious reinforcement and which represent contingent reinforcement: FR, VR, FI, VI, FT (fixed time), and VT (variable time). Explain why.
10. 254,5 (again from Chance in Unit 2). State the name of the reinforcement schedule used by Skinner. Also, 255,3, state the *technical* name of the reinforcement schedule used by Wagner and Morris in their study with children.

Ayllon et al. article in Unit 3.

11. 2,0. Ayllon wrote this article in 1965 - our terminology has changed since then—you should never say that food (or any other reinforcing stimulus) was "paired" with a specific response—the proper way to say this is that food is provided contingently upon a response. **The term "pairing" should always be restricted to the pairing of two STIMULI** as in respondent conditioning or the development of a conditioned reinforcer. **You never ever "pair" a response with a stimulus.** -1 if you use this term incorrectly, but I will not ask any specific questions over it.
12. 3,0. (Not for the exam). Note the interpretations of the symptoms by the psychiatrists - my guess is that they were not too happy when this article was published. From these accounts, you can see that being a psychiatrist has some entertainment value if not any functional value! Actually it is amusing until you stop the think that the treatment that these individuals are getting in the institution depends upon the interpretation of their "symptoms."
13. 4,4. What specific type of reinforcement scheduled was employed: FR, VR, FI, VI, FT, or VT. Explain your answer.
14. 4, 5-6. Not for the exam, but note how long the behavior was reinforced - 294 days!! Also note that at one point during the reinforcement phase, the behavior was being emitted 40% of the patient's waking time!! Also, note, however, that once the authors began providing reinforcement only after an average of once every 60 minutes, the behavior started to decrease, and that the behavior was not maintained effectively when the average interval was extended to 480 minutes.
15. 4,9-5,0. Explain what the present study illustrates—there were two main points: (a) the point in the first sentence - a seemingly bizarre and meaningless behavior can be acquired and maintained by its consequences, and (b) that once it has been acquired it can be maintained by infrequent and occasional reinforcement (please don't forget this one - in the past many students have just given the first part, but this second part is just as important).

16. What is the point made in 5,3 -6,0 about the etiology - the cause - of psychotic symptoms and psychiatric disturbance **and the staff's role?** Several points are important - (a) **so-called psychotic symptoms** may result from **unsuspecting** staff **accidently reinforcing** such behaviors. In other words, the staff may be completely unaware that they are in fact providing reinforcement for such "symptoms" - it happens all the time in institutions with staff who do not have an understanding of our behavioral principles. Do not mix up the answer to this objective with the answer from the preceding objective.

Gaetani et al. article, Unit 3.

17. Effectiveness of feedback in OBM

    Gaetani et al. compared the effectiveness of feedback with the effectiveness of feedback plus monetary incentives. While feedback improved the performance of the workers, feedback plus monetary incentives was much more effective. This is a typical finding.

    In the past twenty years, over 60% of interventions in Performance Management (also called Organizational Behavior Management or OBM) have used some type of performance feedback. Below I provide some data with respect to the effectiveness of feedback alone and feedback in combination with tangible rewards. **Be able to provide the percentages**.

    From: Balcazar, Hopkins and Suarez (1985-86). Journal of Organizational Behavior Management

    A. Feedback alone: 28% of the research articles found consistently positive results
    B. Feedback plus tangible rewards: 90% of the articles found consistently positive results.

    What this means is that while feedback is sometimes quite effective by itself, it is much more effective when it is combined with tangible rewards. The study by Gaetani et al. nicely illustrates this point.

18. Paychecks are not FI schedules. (Not in the text, but for the exam) Gaetani et al. discuss several types of reinforcement schedules in their introduction. Gaetani et al. refer to a paycheck as an FI schedule, as do many people, but paychecks are NOT examples of FI schedules. State at least *two* reasons why paychecks are not examples of an FI schedule.

19. In lecture, I am going to talk about two examples of reinforcement procedures that were referred to as FR1 (or CRF) and FR3, but in fact were not. After lecture, be able to state why these examples were NOT examples of FR1 (CRF) and FR3.

20. Based on the following material, be able to answer the question, "Why isn't it surprising that in many applied settings, schedules of reinforcement have not resulted in the same performance patterns as the schedules used in the lab that have the same name?"

    Although the schedules implemented in many applied settings, are schedules of reinforcement, they are rarely the same as the laboratory schedules that have been studied under controlled conditions in the lab (with both humans and nonhuman animals).

    The next part will not be on the exam but why am I making such a big deal about the fact that most of the schedules of reinforcement that are implemented in applied settings are NOT the same as the "like-named" schedules that have been studied in the operant laboratory with both humans and nonhumans? The reason is that the basic schedules of reinforcement that have been studied in the lab do generate consistent, proven patterns of performance. But no one should expect the same patterns of performance to be generated by

different schedules – that is, those that people call the same thing but are not. Yet, because people call them the same thing, they DO expect the same patterns of performance and are "surprised" when they do not occur. In addition, when the "expected" patterns of performance do not occur, individuals often say that our basic principles of behavior are not valid because the schedules have not resulted in the same performance patterns as the schedules studied in the lab. I do not want you to make those same mistakes.

21. 56,2 Not for the exam. Note that the owner of the company refused to continue the reversal phase, Phase III for very long. This is a common problem when attempting to conduct research in real world settings. If a procedure is working, management is not likely to want to pull it out. This is one of the problems with a reversal design in a real setting.

22. 56,3-57,0. Be able to calculate the wages of an employee for the day if performance was above or below average - you do not have to memorize the amount of their hourly pay. You do have to know the percentage they earned as commission since this is a critical part of the intervention. This is a complicated procedure. Note that workers would not receive all of their hourly pay if performance dropped below standard. This is a risky procedure in terms of acceptance of the system by workers, however, Gaetani et al., argue in favor of its use in 61,1 - and they make a good point.

I am likely to give you an example to calculate on the exam. If you want to use a calculator, bring one to the exam, however, you cannot use a cell phone as a calculator. You will have to memorize the percentage of commission that was used. I will not give that to you in the exam question.

The calculations for the commission payment system follow:

Above standard example: Assume employee 1 charged customers an average of $180 one day, and the standard for the amount charged was $80.00.

A. $180.00 (amount charged) - $80.00 (standard) = $100.00 (over standard)
B. $100.00 X .05 (5% commission incentive) = $5.00 in commission
C. Hourly Pay = $5.00 an hour X 8 hours a day = $40.00 in hourly pay
D. $40.00 (hourly pay) + $5.00 (commission pay) = $45.00 total pay that day.

Below standard example: Assume employee 1 only charged customers $60.00 one day, and the standard was $80.00.

A. $60 (charged)/$80 (standard) = .75 (he performed .75 of the standard)
B. Hourly wages: $5.00 per hour X 8 hours a day = $40.00
C. .75 (proportion of standard) X $40.00 (hourly wages) = $30.00 total pay for the day.

23. 59,1. State the results of the feedback plus commission system in terms of the **specific** percentage increases over baseline for the two workers.

Sulzer-Azaroff et al. article

24. 100 - 101. The following material in this study objective will NOT be on the exam - it is only to help you understand the article. The major purpose of this study was to determine whether an intervention that targeted safe **behaviors and conditions** would decrease accidents and injuries (rather than an intervention that provided consequences for the accidents and injuries themselves). Although the intervention targeted behaviors and

practices, the researchers also kept track of the actual accidents/injuries to determine whether the accidents/injuries really decreased as well.

25. Based on the following material, learn the reasons why some maintain that safety research should focus on behaviors/practices. (By the way, all do not agree with this, and some programs, which I favor, target both behaviors/practices and accidents/injuries).

    Researchers and practitioners provide two major reasons why it is good to focus on behaviors/practices rather than just focusing on accidents/injuries.

    1. Some fear that if accidents/injuries are targeted for intervention, particularly if valued rewards (or penalties) are provided contingently upon a reduction in accidents/injuries, some workers may hide accidents or injuries. This is not good.
    2. Some fear that if you focus on accidents/injuries rather than SAFE behaviors and conditions, managers/supervisors will respond punitively, and use aversive control, rather than rewarding/reinforcing correct behaviors/conditions.

26. Look at the sample observation form in Figure 1. Only 13 behaviors and conditions were observed in this study. And, in 107,2, it indicates that it only took 10-15 minutes for the observers to complete the observation form.

    For the exam: Based on the following material:

    A. Explain why it is important to have only a small number of behaviors and conditions on the observation form.

    B. Provide the diagram that illustrates why it is important - when providing this diagram it is very important that you indicate that the consequence is a punisher, and specifically list the two things that serve as the punishers.

    It is important to include only a small number of behaviors/conditions on the observation form (study objective 24), and insure that the form does not take a lot of time to complete (study objective 25) **because measuring IS a behavior and thus if it is too labor intensive or takes too much time, the effort and time it takes will punish the observation behavior** and people will not do it. Include the concept of punishment in your answer (remember, this is a class in behavior analysis and I am attempting to get you to talk about things from a behavioral perspective). We often do not think about the fact that increases in time and effort to perform a behavior can function as punishers, but they can – and have been proven to do so in many studies.

    The diagram: R (measuring behavior)→ Sp (lots of effort, time)

27. Figures 2 -4 and 116, 0.

    A. What was the approximate average of the percentage of safety achievements during baseline for all three departments? The average is not given in the text. To get it, look at the three graphs, determine the average for each dept. during baseline, and then take the average of the three numbers - so you only have to report one number.

    B. What was the average <u>ending</u> performance? The average ending performances for each of the three departments are listed in 116, 0. Take the average of these three numbers so you only have to report one figure.

28. 117, 0. What was the estimated cost for ONE lost time injury? Note how high this is! This is important because it indicates that not only does safety program decrease human suffering

but it also can save the company a lot of money. Companies must be concerned about their bottom line, and thus the costs of any safety program cannot outweigh its benefits.

The End of the study objectives, but see the multiple effects of stimuli on the following pages.

UNIT 3: Multiple Effects of Stimuli

I want to make sure that you understand the differences between SDs (and S deltas) and consequences, and SDs and USs (CSs) as well as understand that one stimulus can have multiple effects on the behavior of an individual.

Some students find this material difficult. To assist those students who do, Doug has developed a self-instructional material for the computer that will permit you to review and practice this material on your own. Those who are interested should visit Doug's web site and do the program.

Note that to date we have covered the following stimuli:

Respondent Relations	Operant Relations
US, CS	SDs (SDpr, SDnr, SDpun) and S deltas Scs (all consequences: positive and negative reinforcement, punishment, extinction)

USs, CSs precede responses and elicit them in **respondent relations**.
SDs and S deltas precede responses in **operant behavioral relations.**
Scs follow operant responses in **operant behavioral relations.**

(For these exercises, it may help you if you recall that the following responses are part of respondent relations - thus any stimulus that precedes them, must be either a CS or a US: sweating, shivering, salivation, hair standing on end, coughing, sneezing, all "emotions" (the activation syndrome) These are responses that were part of the respondent relations.

One stimulus can have any number of different effects on the behavior of an individual: for example, it can increase the future frequency of the response that precedes it (reinforcement); it can immediately evoke a behavior because that behavior has been reinforced in its presence but not in its absence (SD); and/or it can elicit a respondent behavior such as an emotional response. **And, in behavior analysis, we label the stimulus depending upon its effect on behavior.** It is important when analyzing behavior to understand these differences. Some examples:

A simple rat example: Pull chain-->Light on: lever press ---> food reinforcement.

The light on serves as a conditioned reinforcer for the pull chain response, and will increase the future frequency of that response. It also functions as an SD as it evokes the lever press because that lever press has been reinforcement in its presence (and not in its absence).

It would be entirely INCORRECT to say that the "reinforcement" evokes the lever press. Reinforcement, by definition, does NOT evoke responses. Similarly it would be incorrect to say that the SD increases the future frequency of or reinforces the pull chain. SDs do NOT, by definition increase the future frequency of a response, rather they immediately evoke a response.

Human example:

Let's say, you invite a guest for dinner. The guest is sitting in the living room flipping through a magazine. You announce "Dinner is served!"

"Dinner is served" is the relevant stimulus. It can have all of the following effects on behavior:

(a). The dinner guest immediately walks to the dinner table
(b). The dinner guest "feels" happy.
(c). The dinner guest's mouth begins to water (salivate)
(d). The dinner guest flips through magazines more often in the future in similar situations

Dinner is served should be called an SD and only an SD when referring to its effect in (a). It should be called a CS, and only a CS, when referring to its effects in (b) and (c). It should be called a reinforcer, and only a reinforcer, for the effect in (d).

It may help if you diagram the situation out as follows (I have put letters next to the responses that correspond to the example:

Time 1: R (flipping through magazine) S (dinner is served) R1 going to dinner table
R2 feeling happy
R3 mouth waters

Time 2: The next time the person is waiting for dinner: R4 Flipping through magazines increases

Now you try it:

Assume that a person is driving down the road, looks into his rear view mirror and sees the flashing red lights of a police car. The flashing red lights has a number of different effects on the behavior of the driver. (a) He immediately says "%#*!" (b) He immediately breaks out into a cold sweat. (c) In the future he does not look in his rear view mirror as often. (d) He immediately pulls the car over to the side of the road. Which of the preceding behaviors would indicate that the flashing red lights was: (a) a CS; (b) a punisher; (c) An SD?

Again to diagram out the sequence of responses and stimuli

Time 1: R (looks in mirror) S (flashing red lights) R1 Immediately says "%#*!"
R2 Immediately breaks out into a cold sweat
R3 Immediately pulls the car over

Time 2: NEXT TIME: R4 looking in mirror decreases

Yet another example. Suppose a worker is graphing some of her performance data. Her supervisor says " Hey, Great work! Come into my office with me right now so we can discuss it. (a) The worker immediately gets up and walks to the office with the supervisor. (b) The worker blushes. (c) The worker feels proud. (d) And, the worker graphs her performance data more frequently in the future. Which of the preceding behaviors would indcate that the supervisor's statement was: (a) a reinforcer; (b) an SD; (c) a CS?

Now, let's "turn the example around" in the sense that I give you the type of stimulus and you have to indicate some behavior that would indicate that the stimulus was, indeed, the type of stimulus I asked you about.

Assume that a track star bends down to tighten her shoe laces and hears the starting gun go off.

1. What behavior on the part of the track star would indicate that the sound of the starting gun was an SD?
2. What behavior on the part of the track star would indicate that the sound of the starting gun was a punisher?
3. What behavior on the part of the track star would indicate that the sound of the starting gun was a CS?

Note that one of the perhaps difficult aspects of this question is that I have NOT given you the behaviors that would indicate that the sound of the starting gun was an SD or CS. You have to come up with something that is reasonable given the situation.

Let's try another.
A student inserts money into vending machine and pushes the button for a pop. No pop is dispensed. The student then hits the side of the machine, and the pop is dispensed. The critical stimulus is the sight of the pop being dispensed.

1. What behavior on the part of the student would indicate that the sight of the pop being dispensed is an SD?
2. What behavior on the part of the student would indicate that the sight of the pop being dispensed is a CS?
3. What behavior on the part of the student would indicate that the sight of the pop being dispensed is a reinforcer?

Sample exam questions. The questions on the exam will be similar to these. The answers and explanations are on the next page.

1. A night watch guard walks into a dark warehouse. He turns on his flashlight and immediately hears a gun shot (the stimulus of interest). Which of the following behaviors of the night watch guard would indicate that the sound of the gun shot is an **SD** (discriminative stimulus) for the night watch guard? Note that one or more than one of the behaviors may be correct. Write down the appropriate letter or letters next to the number of the question. (2: -1 for each error up to -2))
   A. He would immediately dive for cover.
   B. He would immediately draw his own gun
   C. He would immediately feel anxious.
   D. He would not turn on his flashlight as often when entering the dark warehouse in the future.
2. The owner of a parrot walks up to the parrot's cage, opens the cage and says "Pretty boy, Pretty boy." The parrot immediately flies over to the owner and sits on his shoulder (the stimulus of interest). Which of the following behaviors would indicate that the parrot's flying to the owner and sitting on his shoulder was a **CS** (conditioned stimulus) for the owner? There may be one or more than one correct answer. Write the appropriate letter or letters next to the number of the question. (2: -1 for each error up to -2)
   A. The owner would walk up to the cage, open the cage and say "Pretty boy, Pretty boy" more often in the future.
   B. The owner would immediately pet the parrot.
   C. The owner would immediately smile.
   D. The owner would immediately feel happy.
3. Peggy tip toes into her daughter's bedroom after the daughter has gone to bed. Her daughter says, "Mommy, I can't sleep. I love it when you read to me, will you read me a story?" (the stimulus for Peggy). What behavior emitted by Peggy would indicate that her daughter's statement was a *reinforcer* for Peggy? (2: all or none)
4. Felicia is outside playing and sees the neighbor's dog which is named Rover. Felicia calls out "Here Rover, come here Rover!" Rover starts running towards her (the stimulus of interest). What behavior of Felicia's would indicate that Rover's running toward her was an SD for Felicia? (2: all or none)

ANSWERS to the multiple effects of stimuli questions:

1. A and B (2: -1 for an error up to -2). An SD precedes an operant response; both diving for cover and drawing out his gun operant responses. C would indicate it was a CS because all emotions are respondent behavior; B would indicate it was functioning as a punisher, because the sound of the gun shot followed the behavior of turning on his flashlight and the night watch guard did not do this as often in the future.
2. Only D (2: -1 for each error up to -2). CS (parrot flies and sits on shoulder)--> CR (feeling happy). Remember all emotional responses are respondent behaviors. B & D would indicate it was an SD. In each of these cases the parrot's behavior precedes the owner's response, and each of the responses indicated is an operant response. A would indicate it was an Sr: R (opening the cage)→ Sr (parrot flying over and sitting on shoulder) and the owner opens the cage more often in the future.
3. Peggy would tip toe into her daughter's room after she had gone to bed more often in the future. If you said Peggy would read a story to her daughter or smile that is incorrect: those would indicate the stimulus was functioning as an SD. It is also incorrect to say that she would *read a story to her daughter more often in the future*. Reinforcers always follow a response; in this case, the daughter's request comes before the response of Peggy's reading the story. It is also incorrect if you said that Peggy would have some type of emotional response; such as she would feel happy - that would indicate the daughter's request is functioning as a CS. (2)
4. There are several answers that would be correct: Felicia could (a) immediately say, "Good dog!", (b) start running toward Rover, (c) raise and extend her arms toward Rover, (d) start clapping her hands, etc. SD (sight of Rover running towards her): R (some operant response). It would be incorrect to say that Felicia felt happy or delighted or had some other emotional response; that would indicate the sight of Rover running towards her was a CS: CS (sight of Rover running towards her)→CR (feeling happy/delighted). It would also be incorrect to say that Felicia would call out to Rover more often in the future when she was in the yard. That would indicate that the sight of Rover running towards her was an Sr. R (calls Rover)→ Sr (Rover runs towards Felicia), and as a result Felicia calls out to Rover more often in the future when she is playing in the yard. (2)

Unit 4: Higher Education and Teaching Technology

1. Michael article
2. Snyder article
3. Binder & Watson article
4. Watson article
5. Layng et al. article

Goals of the unit: (a) Analyze the behavioral contingencies that motivate college student study behavior; (b) Describe a behavioral analysis of college teaching and contingencies that both motivate students to study and increase the probability of their success in a college class. (c) Present an introductory overview of Precision Teaching, Direct Instruction and Headsprout Reading Program, and data indicating their effectiveness.

Michael article

1. Respond as Michael does to the criticism of the type of courses he describes as not teaching creativity or how to obtain new knowledge but only how to parrot back old knowledge. 230,1.
2. What are the two main problems with intrinsic interest as a motivational factor? Don't forget to include the "seize the moment" point. It is important. While studying can be postponed, many of the competing activities cannot, hence, students often postpone studying. 231,2
3. A. Why is it that the short-term advantages to the student from the newly acquired repertoire does not motivate studying in many content courses? Don't talk about the competing activities - you have already addressed this one in the previous study objective. 232, 1.

   B. But why are content courses that do not have short-term advantages important? 232,1.
4. Briefly describe the weakness of long-range payoffs **that is related to the details of the study assignment**. In other words, while the temporal remoteness is a problem, what is the even greater problem, according to Michael? 232,2
5. Not for the exam, but note why Michael maintains that are grades the best motivational factor for professors. (he gives three reasons here). 232, 3
6. A. What type of grading system produces vicious competition? Why? Note that the main thing that makes norm-referenced grading produce vicious competition **is the fact that when one student does well, it decreases the opportunity for another student to do well.** 233, 1 (first column)

   B. What type of grading system does not produce vicious competition even though it may produce friendly competition instead? Why doesn't this type of grading system produce vicious competition? 233,1 (first column)
7. The study procrastination scallop, 233,3-234,2.

   A. The relationship between what two factors influences studying?

   B. Explain how/why these two factors account for the fact that the amount of time spent studying typically **increases** as the day of the exam approaches. Use behavioral terminology, indicating, in your answer, the type of behavioral contingency that is involved (that is, it is an escape contingency, with the behavior of studying being the escape behavior).

   C. After lecture, be able to diagram the escape contingency that is involved.

D. According to Michael, what is the reinforcement or consequence for studying?

Be very, very careful how you word all of this analysis. Many students "translate" what Michael is saying into every day language. They think they are saying the same thing but they are not. As a result, some students lose points on this item on the exam - Michael describes this very carefully and very behaviorally.

Below are some cautions and additional explanations about the answer to this objective.

First, notice carefully that it is the **relationship** between **(a) the amount of material/task completed** and (b) **time passage** that is important – not simply one or the other. As the exam gets closer and the student has not yet completed the material, the situation becomes aversive, setting up an escape contingency. At the beginning of the interval, the situation is not very aversive because even though the student may not have much done, there is still quite a bit of time before the exam.

The scallop in studying occurs because as the exam gets closer *without the student having completed the assignment*, the more aversive the situation becomes, and hence the more studying occurs because studying immediately reduces the increasing aversiveness.

Two cautions about the above material.

1. *Note carefully that you can't just say that as time passes the situation becomes aversive.* This is not necessarily true. The situation is NOT aversive if the exam gets closer and *you have a lot of the material/task completed*. The situation only becomes more and more aversive if time passes and *you don't have a lot of the material/task completed*.

2. Note that studying does NOT become aversive – rather, studying is behavior that immediately reduces the aversiveness, and hence is negatively reinforced.

Third, the reinforcement for studying is the immediate decrease in aversiveness - it is NOT the avoidance of **bad grade** - Michael considers that to be too delayed to directly affect the study behavior.

8. Why does a large end-of-course activity (like a final exam worth 50 to 75% of the student's grade) weaken the relation between the exam grades and the course grades – that is, what can students believe because "this source of vagueness is enhanced?" Please note that Michael's point about this is NOT about the delay. Students tend to say this, particularly those who have taken Dr. Malott's 360, but it is NOT the correct answer. 235,2
9. The relation between **studying** and **exam** grade is often weakened by instructors' unwillingness to be sufficiently clear about the relation between text/lecture material and exam content. State the two reasons instructors give for NOT specifying the material. 235,3
10. In large enrollment courses, what does and what does not control lecture attendance? 236,2.
11. What are the three conditions under which the threat of a low grade will not motivate extensive study behavior? 237,1
12. 237,4 Not for the exam, but note Michael's discussion in the paragraph beginning "Before drawing some general conclusions…." This is important and prepares you to answer the next study objective.
13. Provide two reasons why exams that are given once every three weeks (let alone two exams per semester) will not have the same motivational effect as exams that are given weekly. 237,5-238,0. I have provided additional explanations below and boldfaced the critical material you should include in your answers.

Note that the first one is related to the study procrastination scallop. **Students will tend to leave studying until right before the exam and then there is simply not enough time in that week to study all of the material**. Consider my unit exams which require about 6-8 hours of studying for each exam. If I gave only a midterm and final, each exam would cover 4 units. Given that I covered the same amount of material, then it would require students to study 24-32 hours in order to get Cs on those exams. Given that most students will wait until the week of the exam, how many would study 24-32 hours that week? Not many!!

The second reason relates to the amount of material that can be tested for on the exam. This is the one students have trouble with. So let me explain. I only have 1 1/2 hours for each exam because the exams must be given during the regularly scheduled class period. When I give frequent exams, I can cover most of the study objectives I give you on the exam. If, however, I only gave a midterm, then given the 1 1/2 hour time restriction, I could not possible cover all the 70 or so study objectives I have assigned. Now, why does this reduce the amount of studying students will do? **Due to the time restriction for the exam that is dictated by the class period I can only cover a small proportion of the study objectives. Hence, students will begin to "gamble" about what will be on the exam, skipping study objectives that they think I will not have on the exam**.

14. What are the two reasons why, according to Michael, learning can't be fun and easy (as sometimes argued by proponents of Precision teaching and PSI)? Explain each one. 238, point 4, second column. Once again, I am going to provide the answers because for some reason, some students tend to have trouble with this item.

    Intensity: There is too much to learn in too little time.

    Assessment: There is a possibility that **the student will not get the grade he/she wants when the student is assessed** (by exams, papers, projects, etc). Note carefully that it is NOT the assessment by itself that makes the situation aversive – if, when one was assessed, one always got an A, the assessment would not make learning aversive. Rather, it is the possibility of NOT getting the grade the student expects/wants when assessed that makes the learning situation aversive.

<u>Teaching Technology</u>

The Binder & Walker article was published in 1990 and the Watkins article was published in 1988. Traditional educators **still** resist DI for the same reasons stated in the articles despite its effectiveness, I have included an article published in the Wall Street Journal in May, 1999. I have also included a newspaper article from 2001 about the success of DI in a Milwaukee, WI school. None of the material from the Wall Street Journal article or the Milwaukee school article will be covered on the exam, but it does bring the controversy a little more up to date for you. However, because of No Child Left Behind greater emphasis is now being placed on DI as well as programs such as Headsprout. So time will tell whether we will finally be able to get empirically-validated instructional materials in schools. For more information, see www.behavior.org.

15. State and **explain** the following three reasons why traditional educators are critical of both direct instruction and precision teaching: (1) they are not self-directed, that is, the methods are too controlled by the teacher; (2) they are not individualized - that is every child is exposed to the same material and must obtain the same goals before proceeding to the next unit of material; and (3) they do not focus on affective outcomes - that is, they do not focus on building self-esteem or making students feel good about themselves.

Not for the exam. It is also the case that many teachers do not like direct instruction and precision teaching because they feel that it is so structured that it does not give them any flexibility to use their education – that is, why did I spend so much time in school if all I am supposed to do is follow the scripts I am given? Interestingly, teachers tend to love Headsprout – they see it as helping them rather than hindering them and they do not have to learn any new skills to implement it since it is all web-based.

16. In lecture, I am going to discuss the results of an early study by Engelmann on direct instruction. I have summarized the essential aspects of this study below. I want to present some context for the importance of this study. Some people maintain that 60 - 80% of "intelligence" is genetic, and only 20 - 40% is a function of learning. In addition, they maintain that a person's IQ cannot be altered much after the first few years of life.

    For the exam, be able to answer the following questions about the study which is described briefly below the SOs:

    A. Disadvantaged children who received DI improved their IQ scores by how many points?

    B. Disadvantaged children who received traditional instruction improved their IQ scores by how many points?

    C. At the end of the study, how did the IQ scores of disadvantaged children who received DI and those who received traditional instruction compare to the IQ scores of middle class children who received DI?

    D. What are the two important implications of this study?

    Description of the Engelmann study:

    Participants: (a) 15 disadvantaged 4-year olds who were exposed to DI, (b) 15 disadvantaged 4-year olds exposed to traditional educational methods, and (c) 15 middle class 4-year-olds exposed to DI.

    Length of study: 2 years; Children exposed to DI had about 95 instructional hours.

    Results: (a) Disadvantaged 4-year olds who received DI instruction improved their IQ scores by about 25 points, (b) disadvantaged children who received traditional school instruction improved their IQ scores only about 5 points. (c) After 2 years, the average IQ scores of the disadvantaged children and the middle class children who received DI were about the same, but the IQ scores of the disadvantaged children who received traditional instruction was considerably lower.

    Important implications: (a) IQ scores can be affected by instruction and changed after early stages of life; and (b) DI can eliminate differences in the IQ scores of disadvantaged and advantaged children.

Snyder article: Obviously I am not asking many questions over the Snyder article. But you should know about Morningside Academy - it is "point of light" in our field and everyone in our field knows about it.

17. Not for the exam, but notice the guarantee that Morningside Academy makes to the parents of its students. Also, not for the exam, but note how many years Morningside has had this policy and whether it has *ever* had to make good on its offer. 29, 1, 1st column, 1

18. Not for the exam but notice the type of students that attend Morningside. 29, 2, 2nd column.

19. **For the exam:** Note the terrific results reported on page 30. During the last **two** years reported (89-90 and 90-91), the average increase in reading, language arts and math taken together was *3.07 grade levels per year*. Learn this average increase.

Practicum Opportunities at Morningside (Not for the exam, just FYI)

Dr. Johnson offers one, two and three week institute/practicum opportunities at Morningside Academy to graduate students in behavior analysis. Occasionally, however, they have accepted our undergraduates. For example, two years ago one of our undergraduates received a scholarship from Morningside and attended. For more information about this opportunity go to Morningside Academy's web site at www.morningsideacademy.org, click on the button "Morningside Teachers' Academy," then click on "Summer School Institute."

Last year, many students asked me where they could go to graduate school to learn about direct instruction and precision teaching. See www.adihome.org for more information about direct instruction (Association for Direct Instruction) and www.celeration.org for more information and a bibliography of articles on Precision Teaching. Also see www.behavior.org – education button.

Binder & Watkins article

20. Not for the exam but notice the factors that are often blamed for our educational crisis in America? What are the keys to the solution for educational failures? 75, 2nd column, 1.
21. Not for the exam. The reference to NSPI in 76, 1st column, 2 may be confusing to you. This article was published in the journal sponsored by that organization - which is the National Society for Performance and Instruction.
22. Not for the exam: Note that in Lindsley's measurement approach, what is being measured and charted are the number of correct answers per minute and the number of incorrect answers per minute. Children are asked to engage in timed practice of material, chart their performance, engage in more timed practice, and chart it again. If learning is not occurring then the instructional material is not working and is revised and the process is repeated. That is what is meant by Lindsley's emphasis on evaluation and revision. Don't worry about the logarithmic chart. 76, 2nd column, 1-78, 1st column, 0.
23. 80, 2nd colm, 1. What is fluency?
24. 87, 2nd colm, 5. As indicated earlier, teachers often object to DI because it is too teacher-oriented (structured). Why do the scripted presentations in DI support quality control of instruction? (The answer is provided in sentence that begins, "The particular examples and sequences…")

Watkins article

25. State the *primary* area of emphasis for the Basic Skills category, the Cognitive-Conceptual models, and the Affective-Cognitive models. 7, 3rd colm, 3
26. What conceptual category does DI fall into?
27. The author presents several results of Project Follow Through. It would certainly be unreasonable for me to ask you to learn all of them. There are three very important ones, however. Be able to describe the following three results of Project Follow (note very carefully the boldfaced material – it is important to include this material in your answer!): (a) DI was the **ONLY** model to produce gains in **basic skills, cognitive skills, and affective skills** - in your answer include the three basic skills area - don't just say "the three skill

areas" (see the figure on page 9; (b) **ranked first in all of these areas;** and (c) educational models, **other than the Basic Skills models**, in general, proved to be worse than the traditional education in the classroom in all three skill areas - in other words, these other experimental educational models that were tested appeared to be less effective than the typical teaching that goes on in schools now.

28. DI and the Kansas behavior analysis model ranked **first** and **second** in affective skills even though other models directly emphasized acquired skills in this area. What theory of the development of self-concept does the data support and what theory **DOESN'T** it support? 9, 1st colm, 2. These data are extremely interesting since one of the major criticisms of DI that remains today is that it does NOT focus on affective outcomes.
29. In lecture, I am going to provide a behavioral analysis of the relationship between positive self-concept and learning and put a diagram on the board depicting that analysis. Learn this analysis and that diagram.

Layng et al. article on Headsprout :Web site address: www.headsprout.com
Check it out! It's great!!

Headsprout is the name of an organization, started by behavior analysts, that developed a web-based instructional program to teach children how to read. It is phenomenal. The behavior analysts who started it include Greg Stikeleather (BA from WMU, MA), Kent Johnson from Morningside, Joe Layng (headed up Morningside's Malcolm X program in Chicago), and Janet Twyman. Two former WMU students, Kelly Hobbins (an undergraduate) and Melinda Sota (a master's student) have worked at Headsprout for a number of years.

The reading program was put on the web in 2002. The program is spectacular! However, it did cost over $6 MILLION to develop the first 40 lessons (the program now has 80 lessons).

30. 1,1 How many children have literacy problems? Over what percentage of our nation's fourth graders score below basic reading levels?
31. 2,1 Not for the exam, but note that (1) phonics is essential in order to teach children to read; (2) the absence of **explicit** phonics instruction can cause learning problems that put learners at a permanent educational disadvantage unless corrected by the end of third grade. How many of you were subjected to "whole word" language training?
32. 2,2 What is the probability that a child will remain a poor reader at the end of fourth grade if the child is a poor reader at the end of first grade?
33. Not for the exam, but the figures on pages 6-8 are hard to read. The journal in which this article is published is an on-line journal – so if you want to see the figures better, you can access the article on the web.
34. 9,1. How many learners participated in internet testing? What were the results of that testing?
35. Not for the exam, but you may be interested to know that individual parents can purchase the Headsprout reading program. It comes with a money-back guarantee as well as when schools purchase the program.

RECENT UPDATES ON HEADSPROUT – NOT FOR THE EXAM. SCORE Educational Centers, a subsidiary of Kaplan, contracted with Headsprout to provide the reading program to 4-7 year olds. And, just this past year, Headsprout was adopted by the entire Memphis, TN, school district.

THE END

The following article about DI appeared in The Wall Street Journal on May 12, 1999.

Effective Education Squelched

Lynne Cheney
American Enterprise Institute

After principal Eric Mahmoud introduced a new curriculum at Harvest Preparatory, a Minneapolis elementary school that serves many children from poor families, test scores shot up. Kindergartners, whose reading results had been at about the national average, were now in the 89th percentile.

The new curriculum that proved so effective at Harvest Prep was actually a venerable program with a remarkable record of success. It is called Direct Instruction, and if you haven't heard about it, the reason may be that the nation's education schools don't want you to. In their view, Direct Instruction is pedagogically incorrect. Direct Instruction teachers, operating from detailed scripts, tell kids what they need to know, rather than letting them discover it for themselves, as ed schools advise. Direct Instruction teachers drill students on lessons (a method education professors sneeringly call "drill and kill"). They reward right answers and immediately correct wrong ones, flying in the face of ed-school dogma downplaying the importance of accuracy.

How well Direct Instruction works first became evident in 1977, when the results of Project Follow Through, a huge educational experiment undertaken by the federal government, were made public. Kindergartners through third-graders who were taught by Direct Instruction scored higher in reading and math than children in any other instructional model. The Direct Instruction children not only proved superior at academics, but also scored higher on "affective" measures like self-esteem than did children in most other programs—several of which were specifically directed toward making children feel good about themselves.

The acolytes of John Dewey and Jean Piaget immediately went on the attack. Spurred on by the Ford Foundation, one group declared in the Harvard Educational Review that it simply wasn't fair to judge a program according to how well it taught children to read and calculate. After all, the program might have other goals, such as developing "a repertoire of abilities for building a broad and varied experiential base." An education professor from the University of Illinois weighed in with an essay condemning the Follow Through evaluation as too scientific. "Teachers do not heed the statistical findings of experiments when deciding how best to educate children," he wrote, nor should they be influenced by what "the rationality of science has to say about a given educational approach."

The attacks were effective. Instead of highlighting Direct Instruction's success, the Office of Education (predecessor of the Department of Education) disseminated data on other models as well, including some that had resulted in students having lower scores than control groups. At the University of Oregon, the only education school willing to give Direct Instruction a home, the developer of the program, Siegfried Engelmann, and his colleagues continued to refine their approach and gather evidence of how well it worked. But in 1998, there were only 150 Direct Instruction schools in the U.S.

A major hindrance has been that colleges of education do not teach future teachers and administrators about Direct Instruction; they have learn about it through happenstance. Thaddeus Lott, the principal of Wesley Elementary School in Houston, was searching for a program for the kids at his school, located in one of the city's poorest neighborhoods, when he chanced upon a book by Mr. Engelmann. Mr. Lott instituted Direct Instruction at Wesley, and for more than two

decades his students have been distinguishing themselves, producing test scores that put Wesley in the top ranks. Mr. Mahmoud happened to hear of Mr. Lott's success at Wesley—to the benefit of hundreds of Minneapolis children.

And still the ed schools continue their not-so-benign neglect. In recently reviewing dozens of textbooks used to teach future teachers, I found exactly one mention of Direct Instruction, a reference a few sentences long that described it as "prescriptive." A teacher at Mr. Lott's school, Brandi Scott, a recent graduate of the University of Houston, told me that her request to practice-teach at Wesley was initially refused by the college of education. Only after her father, a prominent Houston attorney, got involved was a plan worked out that let her do half her practice teaching at the school.

A recent report by the American Institutes for Research offers hope to those who think that ed-school silence on Direct Instruction should end. The report found that Direct Instruction was one of only two educational approaches with strong evidence of positive effect, a conclusion hard to ignore. Equally important, one of the report's sponsors was the National Education Association. If an organization as notoriously intransigent as the NEA can help bring recognition to Direct Instruction, perhaps at long last there is the possibility of persuading ed schools to give it the attention it deserves.

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Learning the drill

Siefert Elementary studies success with structured lessons

By ALAN J. BORSUK of the Journal Sentinel staff

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What's that slapping sound?

As you walk the halls of Milwaukee's Siefert Elementary School, you hear it frequently coming from the open doors of classrooms: The steady clap of a palm against a book or the back of a hand against a palm or some similar combination, producing a pop-pop cadence.

Each beat is followed by the sound of children's voices in unison, providing a word, a phrase, an answer.

If you ask the teachers, or look at the school's test scores, this is the sound of success, the sound of a school on the rise. Until four years ago, Siefert was, as Milwaukee School Board member John Gardner put it, a basket case, one of the system's worst-performing schools.

At that point, Principal Sarah Martin-Elam called the faculty together." My challenge to the entire staff was, 'It's just not working, so let's find something that is,' " she said.

What they found, after teachers and others examined possible programs, was Direct Instruction, a method that relies heavily on drills, repetition and scripted materials that dictate almost exactly what both teachers and students are supposed to say. It has been used since then for most of Siefert's reading and some teaching in other subjects, including math.

The results: The percentage of Siefert fourth-graders who scored proficient or better in reading on the state's standardized tests rose from 22% in 1997-'98 to 57% in 1999-2000. In math, the proficient or better score rose from 11% to 48% over the same period. In social studies, the increase was from 13% to 61%.

For third-graders, the number rated as proficient or better on reading in the state tests went from 58% in 1997-'98 to 72% in 1999-2000.

Based on last year's results, the 540-student school, at 1547 N. 14th St., just missed getting on the Milwaukee Public Schools' semi-official honor roll of schools with high reading scores paired with high percentages of minority students from low-income homes.

Another sign of changing times at the school: The School Board this week unanimously approved converting Siefert into a charter school, a step greeted by applause from about two dozen staff members in the audience. They hope charter status will give the school greater independence to pursue its curriculum choices.

Siefert makes a good poster school for those who argue that reading instruction should lean first on phonics, which largely uses drills to teach children how to associate sounds and letters, rather than on whole language, which puts greater emphasis on learning to recognize full words visually and on reading literature.

But that's only part of the school's new identity. Ask a gathering of more than a dozen staff members what makes Direct Instruction a success, and you get the kind of answer-by-chorus

heard during classroom drills:

"Structure," many of them answer simultaneously.

Music teacher Nicki Bryant said, "The structure gives our kids a sense of security."

Janice Reed, a reading specialist, said, "Teacher and student both know what is expected of them." That often applies almost literally word-for-word to the materials used.

According to a 1998 analysis from the Northwest Regional Educational Laboratory, a government-funded organization, Direct Instruction was launched as a curriculum in 1968, based on the work of Siegfried Engelmann, now a professor at the University of Oregon.

"Direct instruction uses highly prescribed curricula and classroom procedures. Instruction is fast-paced and demands frequent interaction between teachers and students," the analysis said.

Numerous studies of Direct Instruction "have found significant positive effects on student achievement in reading, language arts and/or mathematics," the analysis said. The program has been used mostly at schools in high poverty areas.

To critics, a heavy phonics program lacks the creativity and opportunity for individualized intellectual growth that can be found in less-scripted programs. Some have gone so far as to suggest Direct Instruction does psychological damage to students in the long run.

But phonics is in the ascendancy these days, and, according to SRA/McGraw-Hill, the company that publishes the materials used at Siefert, the school was one of 7,000 nationwide purchasing the curriculum this year.

When Direct Instruction was introduced at Siefert, not all the faculty agreed with the move. Some teachers opted to leave the school rather than adopt a method they didn't like.

Now, support among teachers is strong and some say the criticism from teachers elsewhere has given way to questions about what makes it work.

Kelly Collin, a first-grade teacher who now coaches other staff members on how to use Direct Instruction, said: "Teachers resent it because it's so scripted. But is it about me being happy or them (the students) learning?"

She's emphatic in her own answer to that: "They can read anything. . . . They're successful, and that breeds happiness."

A visit to Collin's classroom, where a group of students is reading aloud a relatively complex story about monsters, backs up her claim. Most of the students are working in the second- or third-grade textbooks in the Direct Instruction series. The school's goal is to have students finish the first-grade book before the end of 5-year-old kindergarten; some kindergartners are well into the second-grade book.

"We expect them to be reading above grade level," Martin-Elam said.

The first part of the school day at Siefert is devoted to reading, with almost every teacher, including specialty subject teachers, taking small groups of students. Groupings are flexible, so that a student can move up as quickly as material is mastered - or be kept at the same level until performance is reliable.

Students are tested often to see how they're doing. In addition, second- through fifth-graders must take standardized tests required by the state and MPS.

Martin-Elam admitted, "Sometimes it appears we're doing more assessment than teaching."

Bryant, who has been the school's music teacher for 11 years, said she sees the success of the program in her classes. Previously, so many students couldn't adequately read material she wanted to use in class that she had to alter her lesson plan. Now, she said, she can count on the kids' reading ability in choosing what to present.

Direct Instruction, she said, is "just absolutely the best thing we can do for our kids here."

Appeared in the Milwaukee Journal Sentinel on March 2, 2001.

Unit 5: Verbal Behavior

First, don't panic about the number of study objectives! There are actually only 28 that are required for the exam.

1. Sundberg, M. L. (2007). Chapter 25: Verbal Behavior. In J. O. Cooper, T. E. Heron, & W. L. Heward, *Applied behavior analysis* (2nd ed.), (pp. 526-547). Upper Saddle River, NJ: Pearson.
2. LaMarre, J., & Holland, J. G. (1985). The functional independence of mands and tacts. *Journal of the Experimental Analysis of Behavior, 43,* 5-19.
3. The following article is not required. I am including it because it really presents a fascinating line of research that shows how easily our "memory" (which consists primarily of our verbal behavior about past events) can be swayed by a listener/audience.

   Loftus, E. F. (2003). Make-believe memories. *American Psychologist*, 58, 864-873.

Goals of the unit: Introduction to Skinner's analysis of verbal behavior; understanding that the elementary verbal operants are "functionally independent" (that is, a word is *not* a word is *not* a word); and recognition of how the power of suggestion (verbal behavior of others) and feedback (reinforcement) can affect our memories.

Skinner's analysis of verbal behavior languished for years and years. Now, his analysis underlies most of the language training done with children diagnosed with autism and developmental disabilities. People realize its potential application with those who have brain injuries, those who have had strokes, seniors with dementia, etc., but these types of applications are only beginning.

Sundberg article

Note: "clm" refers to column of text.

1. 527, 1st clm, 2.
   A. What is meant by the formal properties of language? Be able to recognize that grammar, and the classification of words as nouns, verbs, propositions, etc. represent a formal property or analysis of language rather than a functional analysis of language.
   B. What is meant by the functional properties of language? Another way to say this is that the functional properties of language focus on *why* we say what we do.
2. 527, 2nd colm, 2. Not for the exam, but note that Skinner was *not* opposed to formal classifications and analyses of language; rather, he was critical of the fact that there was not an adequate analysis of the *causes* of language/words.
3. 528, 2nd colm, 4. Define "verbal behavior." Note carefully that the listener does **not** become the reinforcer – he or she mediates/provides the reinforcer.
4. 528, 2nd colm, 5. Note that non*vocal* behavior can be verbal behavior according to Skinner's definition. I am going to return to this point soon; it is *very* important.
5. 529, 1st colm, 2, last sentence. Not for the exam, but again this is a very important point and one that often confuses people the first time they learn about Skinner's analysis. Most people (and most linguists) believe that we learn the "meanings" of words as a listener and then can "use" the words as a speaker. For example, most people believe that once we learn the "meaning" of milk, then we can use the word "milk" to identify a glass of milk, to ask for

milk, etc. Skinner says not so. Just because a child can point to milk when asked (as the listener), does not mean that the child can then "ask for milk" and/or correctly say "milk" when he sees a glass of milk as a speaker. Furthermore, as a speaker, just because a child can "ask for milk" when he wants it does not mean the child can correctly say "milk" when he sees a glass of milk. Yes, this is a very different approach to language.

6. 529, 2nd colm, 0. If given examples of (a) vocal verbal behavior, (b) vocal nonverbal behavior, (c) nonvocal verbal behavior, and (c) nonvocal nonverbal behavior, be able to classify them as such. S
7 529, 2nd colm, 2 Just so you know where we are headed, by the end of this unit I am going to ask you to be able to classify examples of verbal behavior as mands, tacts, echoics, or intraverbals. I am not going to ask you to classify examples as textual or transcription.
8. 529, 2nd colm, 2. What is the "plain English description/definition" of a mand?
9. 530, colm 1, 1.

   A. Now, technically, what antecedent event controls a mand?

   B. What type of reinforcement is provided for a mand?

   Some explanation that will not be on the exam: There are two terms in Sundberg's definition that you may not be familiar with.

   First, "form" of the response. This is simply the specific word. For example, you say, "*cookie*" if you want a cookie, but "*water*" if you want water. Cookie and water are "forms" of the response.

   Second, "motivating operation." I have talked about these in class before. The next unit, U6, is completely devoted to the concept of the "motivating operation." For this unit, it is OK to substitute "wanting something" for the motivating operation. However, it is NOT OK to use "wanting something" as your answer to 7A above.
10. 530, colm 1, 3. What verbal operant is the first to be acquired by a human child?
11. 530, colm 1, 3. What verbal operant is the only type of verbal behavior that directly benefits the speaker?
12. 529, Table 25.1. What is the "plain English description/definition" of a tact?
13. 530, colm 2, 1.

   A. Technically, what antecedent event controls a tact?

   B. What type of reinforcement is provided for a tact?

   Not anything specific for the exam, but 530, colm 2, 2 will help you correctly identify tacts.
14. Table 25.2. In this table, GCSR is used as an abbreviation for a generalized conditioned reinforcer. What is wrong with this?
15. Generalized conditioned reinforcement is not defined in the article. Based on the below, be able to define what a *generalized* conditioned reinforcer is and how it differs from a conditioned reinforcer.

   A generalized conditioned reinforcer is a learned reinforcer that has been paired with a *variety* of other reinforcers (when the individual has been deprived of those other reinforcers). Examples include praise, attention, money.

In contrast, a conditioned reinforcer is a learned reinforcer that has been paired with only *one* other reinforcer (when the individual has been deprived of that reinforcer).

16. Generalized conditioned reinforcer, cont. After lecture be able to indicate whether the following state is True or False, and why it is True or False.

    "The difference between a conditioned reinforcer and a generalized conditioned reinforcer is that a conditioned reinforcer reinforces only one behavior while a generalized conditioned reinforcer reinforces any behavior that it follows."

17. 529, Table 25.1. What is the "plain English description/definition" of an echoic?

18. 531, 1st colm, 1. What is the antecedent event that controls an echoic?

19. 531, 1st clm, 2. What is point-to-point correspondence? After lecture, be able to recognize verbal stimuli that have point-to-point correspondence and those that don't.

20. 531, 1st clm, 2. What is formal similarity? After lecture, be able to recognize verbal stimuli that have formal similarity and those that do not.

    Ok, another new term. NFE, but it will help you understand the material: Response vs. response product. As you learned in the first unit a response/behavior is defined as the movement of the skeletal muscles, movement of the smooth muscles, and secretion of the glands. The response *product* is just that, it is a product of the response.

    Examples:

    A. Movement of the vocal musculature when talking is the response. The response product is the auditory stimulus produced by movement of the vocal musculature. You "hear" yourself say "milk." (and others can hear it, too)

    B. Movement of the skeletal muscles when writing is the response. The response product is the visual stimulus of the written word that you have written. You write "milk" and see the word "milk" written on a piece of paper.

    C. Movement of the skeletal muscles when signing (making an American Sign Language sign) is the response. The response product is the visual stimulus of the sign. You sign "milk" and see the visual stimulus of the sign for "milk."

21. 531, 1st clm, 3. What type of reinforcement is provided for an echoic?

22. 531, 1st clm, 3 - 2nd, clm, 0. Not for the exam, but note carefully that "echoic" includes vocal echoics, motor imitations (someone makes a sign and the speaker makes the same sign), and written "copying a text" (you see the written word "milk" and you write "milk." Again this will help you correctly identify and classify this verbal operant.

23. 529, Table 25.1. What is the "plain English description/definition" of an intraverbal?

24. 531, 2nd clm, 3.

    A. Now, technically, what antecedent event controls an intraverbal?

    B. What type of reinforcement is provided for an intraverbal?

    Note that while it may seem that I am requiring you to memorize a lot, if you look at Table 25.2, and as Sundberg points out in this paragraph, all verbal operants except the mand produce generalized conditioned reinforcement.

25. 532, 1st clm, 0. Not for the exam, but note in the last sentence how mands, tacts, and intraverbals contribute to conversation.

26. 532, 1st clm,1-533, 1st clm, 0. I am not going to ask you to learn the remaining two verbal operants, textual and transcription. I will have examples of them on the exam and in the exercises I ask you to do, and you should just label these as verbal (but not a mand, tact, echoic or intraverbal). I will also include some examples of nonverbal behavior, which you should be able to identify as "nonverbal."

    On the other hand, I might just give bonus points if you can correctly classify textuals and transcriptions.

    I am only having you learn four of the six elementary verbal operants because I thought six was too many to learn and also, the certification exam for behavior analysts (which I will talk more about in U8) only requires that individuals be able to define, classify, and give examples of the four I am having you learn.

27. Try the examples in Table 25.3.

    Also, do the examples at the end of the study objectives. I have not given you the answers for theses - I will give you the answer key in lecture.

    The material in 533, 2nd clm, 3 and Figure 25.1 may help you.

    On the exam I will NOT ask you to provide examples of verbal behavior as Table 25.3 does at the bottom.

28. 533, 1st clm, 2.

    A. The listener not only plays a critical role as a mediator of reinforcement, but also becomes what?

        Note again that the listener does not become a reinforcer. When I have asked this question in the past, many students have provided this incorrect answer.

    B. Diagram and explain why a listener becomes/is an SD for the speaker.

29. Not for the exam. The rest of the chapter is excellent and intriguing. Much of what we call "thinking," "understanding," "consciousness," "memory," etc. is explained by verbal behavior. Skinner also analyzes (as does Sundberg) how we come to talk about "private events" correctly. That is, how do we learn to say "I have a headache" when only you can feel the pain from the headache? How do we learn to say, "It scratches" when only you can feel the itch?

    The material on multiple control is also fascinating, and also explains why we find "puns" entertaining. For example, why does the phrase "Love is just a *four letter word*?" make us smile/laugh? Advertisements, songs, and poems provide wonderful examples of multiple control and puns. Some more examples:

    1. Sanka coffee leaves no *grounds* for complaint.
    2. Mattress Mart advertisement: Say hello to *good buys*.
    3. Joni Mitchell song: "She'll wake up in the morning without him and go to the window and look out through the *pane*." (pain)

LaMarre & Holland article: This article demonstrates that the elementary verbal operants are, indeed, fuctionally independent and controlled by very different variables. In other words, it demonstrates that just because a speaker learns to mand "milk" it does not mean that the spekaer can tact "milk" and vice versa. This disputes the common notion that we learn "meanings" of words, and once we learn the meaning of the word (as a listener), we can use

that word in different situations. That is, this study provides clear evidence that a word is *not* a word is *not* a word!

Of course, as we get older and become fluent speakers, then we can and do generalize across the verbal operants. But the fact that young children can't means that we should be teaching verbal behavior with those who have trouble developing it (autistic and developmentally disabled children, for example) very, very differently than it has often been taught in the past.

30. Abstract. Not for the exam, but "on the right" and "on the left" would be mands if you said "on the right" or "on the left" because you wanted someone to place an object on the right or on the left. They would be tacts if you said "on the right" or "on the left" because you saw an object on the right or on the left of another object.

    So, basically, what the experimenters did is to first teach some children to mand "on the right" and "on the left" and then they tested to see if the children could spontaneously, without further training, tact "on the right" and "on the left."

    For control purposes, they taught some of the children to tact "on the right" and "on the left" first, and then tested to see if children could spontaneously, without training, mand "on the right" and "on the left."

    Then, once the children had learned to mand and tact correctly, they went a step further! They taught "reversed" mands - that is, when the child said, "put it on the right," the E would put the object on the left, and vice versa. The Es then tested to see if the tacts would reverse without further training.

    Similarly for some of the children, they reversed the tacts and tested to see if the mands would reverse without further training.

    Basically, for the reversed training, it is like teaching a child "red" and "green", but then reversing that training and teaching the child that "red" is green, and "green" is red.

    This is a VERY clever study!

31. 5, 2nd clm, 2. Using the example of "candy" that the authors use, explain what the authors mean when they say, "Although the functional relations labeled tacts and mands are different, the verbal responses participating in a tact and a mand may be identical in form."

32. 7, 2nd clm, 2 - 8, 1st clm, 0.

    A. What did mand training consist of?

    B. What was the reinforcer for the child's saying "on the right" or "on the left?"

    C. Although a bit unusual for mands that occur in the natural environment, what did experimenters require in order to confirm that the child really understood “on the right” and “on the left?”

    This got a bit complicated. As indicated in B, the reinforcer for the child’s saying “on the right” or “on the left” was the placement of the object on the right or on the left. Usually, with mands, this is where the verbal interaction stops (but see the following paragraph). However, the experimenters wanted to confirm that the children actually “understood” that the experimenters did the correct thing when they placed an object “on the left” or “on the right.” Therefore, the experimenters required the children to tell them whether or not they had correctly placed the object on the right or on the left.

    When a speaker emits a mand, it does not require that the speaker then reinforce the "listener" when the listener gives the reinforcer to the speaker. On the other hand, we often do. For

example, if we ask someone, "Please pass the salt" and the listener passes us the salt, we often do say "thanks!". And, to extend this a bit, what would you say if you asked someone to "Please pass the salt" and the person passed you the sugar? You would not reinforce their response.

33. 8, 1st clm, 1. What did the "collateral tacting" testing procedure? When the authors talk about "collateral tacting" what they mean is that they are testing to see if the child can tact "on the right" and "on the left" even though they are only being trained to mand "on the right" and "on the left."

    Note that there is a typo in line 5 of this paragraph: "asking where one of the *subjects* was." should be "asking where one of the *objects* was."

34. 8, 1st clm, 2. What did tact training consist of?
35. 8, 1st clm, 2. What did the collateral mand testing procedure consist of?
36. 15, 2nd clm, 2. What were the results? (just the first sentence will do, you don't have to go into detail).
37. 15, 2nd clm, 2. What does it mean that "establishing one repertoire clearly did not result in collateral development of another repertoire with the same response form"?
38. 15, 2nd clm, 3. Not for the exam, but just for you own interest, note the results from the reversed tact and mand training. 6 of the 9 children did not reverse their tacts after they learned to reverse their mands or did not reverse their mands after they learned to reverse their tacts.

    Notice how strange this seems! When the mands were reversed (right and left were reversed), for example, the children would still "correctly" say/tact that the object was on the left (when it actually was). So while the response form of "on the left" was actually being controlled by the placement of the object *on the right* as a mand, the response form of "on the left" was being controlled by the object actually being on the left as a tact!

None of the following study objectives on the Loftus article will be on the exam, but I may talk about this in lecture. I have no doubt that you will find this material fascinating and perhaps even a little "scary" because of its implications about memories and how unreliable they are. I wanted you to know about this work, but decided you already had enough study objectives for this unit.

Loftus article: Not for the exam.

39. 867, 2nd clm, 4, cont. on page 868. The main point here is that verbal SD will control different intraverbals (including "false ones") depending upon the response form that is part of the SD. (Clearly, Loftus doesn't talk about this way, but that, behaviorally is what is going on).

    By the way, the material is a bit unclear. What Loftus meant at the very bottom of 867, 2nd clm, 4 when she said, "led to more false reports of a broken headlight **than the same question asked with the verb *hit***" was when they asked the question, "Was the headlight broken when the cars hit each other?"

40. 868, 1st clm, 2. Note the different events that have been remembered incorrectly after participants were given misinformation.
41. 868, 1st clm, 3. What two things can lead to the misinformation effect?

42. 868, 2nd clm, 2. Interesting study with an alcohol placebo.
43. 869, 1st clm, 1-2. Again, very interesting that individuals can be so easily influenced to remember things that never happened - and they remember them confidently, provide details, and express emotion about made-up events that never happened!
44. 869, 2nd clm, 3. Researchers have even been able to plant false memories of things that are implausible or impossible, such as witnessing a demonic possession as a child and memory of meeting Bugs Bunny at a Disney Resort. What's wrong with the latter? Bugs Bunny is a Warner's Brother cartoon character and as whimsically put by a reporter, "the wascally Warner Bros. Wabbit would be awwested on sight" at Disney.
45. Anyway, you are now getting the picture. They have also shown that false memories can change a person's subsequent behavior - see 870, 2nd clm, 3-5. Even Alan Alda (Hawkeye Pierce from MASH) was influenced by this when he went to Irvine to report on this work for the TV show Scientific American Frontiers!
46. 871, 1st clm, 4-top of the 2nd clm. Note the two things that can affect memory: (1) simple suggestion can convince the person that even implausible events are plausible (again, verbal SDs have considerable affect over our intraverbals) and (2) "plying" the person with false feedback is a particularly effective way to convince a person that he/she actually experienced a false event (we would translate this into providing reinforcement - which can be very subtle - when an individual talks about the event as if it actually happened. And, you can successively shape a person's verbal behavior. In other words, at first the person may not believe strongly that the event actually happened, but, but even when the person says, well, wait, let me think a bit harder - a "good", a "nod", a smile, eye contact, etc. can be used as reinforcers to shape the person's verbal behavior to the point where a false event becomes real and then the verbal behavior of the listener as well as your own verbal behavior evokes further intraverbals related to the "details" of the false event!)
47. 871, 2nd clm, 1. Note the two take-home lessons from the work described in this paragraph.
48. 872, 1st clm, 0. Again, note the point, "Untruths are not necessarily lies." This certainly puts law enforcement as well as the rest of us in an interesting position - how do we determine a deliberate lie from an "honest" lie (not to mention of course, how do we determine something is a lie in the first place)?

THE END, but see the VB classification exercise on the next pages.

Verbal Behavior Practice Exercise

Classify each of the following examples using the following terms: Mand (M), Tact (T), Echoic (E), Intraverbal (IV), Nonverbal behavior (NV), or None of the preceding (N) (in other words, these may be textual or transcription - if you want, go ahead and try to classify the examples as TX, or TR).

	A tendency to:	Solely as a result of:
1._____	say "chimes"	hearing a clock chime the hour
2._____	say "water"	hearing someone say "bread"
3._____	write "wet"	hearing someone say "ocean"
4._____	sign "cat"	seeing someone sign "cat"
5._____	turn up the heat	it being too cold in the room
6._____	say "thanks"	wanting someone to help you again in the future
7._____	say "WMU"	seeing "WMU"
8._____	sign "tree"	seeing a tree
9._____	say "animal"	hearing a cow moo
10,_____	smile	seeing Jennifer come into the room
11._____	say "rough"	touching sand paper
12._____	write "apple"	seeing "apple"
13._____	say "Andrea"	seeing Andrea's boyfriend
14._____	say "awesome boots"	wanting further social interaction
15._____	say "operant"	hearing someone say "operant"
16._____	write "large"	hearing someone say "large"
17._____	sign "going up"	feeling the elevator go up

18._____	say "mand"	seeing "mand" written
19._____	write "red"	seeing a red apple
20._____	say "Psy 4600"	someone asking you what course is your very favorite course
21._____	say "Psy 4600"	seeing Dr. Dickinson
22._____	say "Psy 4600 rocks"	wanting Dr. Dickinson to like you more and give you a break on your grade
23._____	say "reinforcement"	seeing M&Ms
24._____	say "4"	someone saying "what's 2 + 2?"
25._____	write "loud"	someone yelling "GO BRONCOS"
26._____	say "ouch"	to get attention
27._____	say "ouch"	pulling off a bandaid
28._____	say "ouch	reading "no ouch bandaids"
29._____	say "lobster"	hearing someone say "lobster"
30._____	write "Skinner"	hearing someone say "Skinner"
31._____	say "Skinner"	hearing someone say "behavior analysis"

Unit 6: Motivating (Establishing) Operations and their Application

Read my summary before lecture. It will save you a lot of note-taking. I am going to go over the examples in lecture.

Assignment: The following articles in Unit 6 of the Course Pack:

1. Dickinson's paper on MOs.
2. Vollmer, T. R., & Iwata, B. A. (1991). Establishing operations and reinforcement effects. *Journal of Applied Behavior Analysis, 24*(2), 279-291.

Goals of the unit: Enhance understanding of motivation from a behavioral perspective and how it influences behavior in applied settings.

In the early 1980s, Michael introduced the term "*establishing* operations" to deal with the concept of motivation from a behavioral perspective. In 2003, Laraway, Snycerski, Michael and Poling recommended changing the term "*establishing* operations" to "*motivating* operations." I have adopted this term in my paper, however, earlier papers/works on the topic, such as the Vollmer & Iwata article refer to the concept as "establishing operations."

Dickinson's summary

1. 2,1. Provide the diagram illustrating the development of an Sr.
2. 2, 3. Why must the MO for the SR (or Sr) with which the NS is paired be present when the NS is paired with the SR in order for the NS to become a Sr?
3. 2,7. Be able to provide the diagram illustrating the effectiveness of an Sr. *Sometimes on the exam, I ask students to provide both the diagrams for the development of the Sr and the effectiveness of an Sr – some students provide the MO in the diagram related to the development of the Sr, but not for the effectiveness. If you do not provide the MO in the diagram for the effectiveness of an Sr, you will lose points. The MO is an essential concept in both diagrams.*
4. 3,4. State the name of the two **main** effects that MOs have, and describe them as I did in 3,4.
5. 7, Table 2. Be able to state the Reinforcer Establishing Effect and the Evocative Effect for the MOs listed in this table. On the exam, I may ask, for example:

   What is the reinforcer establishing effect of becoming too warm?

   What is the reinforcer establishing effect of an increase in pain?

   What is the evocative effect of sleep deprivation?

   What is the evocative effect of water deprivation?

   Note carefully, that in the first two questions, you should ONLY state the "reinforcer establishing effect" (not the evocative effect) and in the last two questions you should ONLY state the "evocative effect" (not the reinforcer establishing effect). Although these effects do occur simultaneously, they are very different effects.

   There are a few different ways to answer the above questions correctly. In lecture, I will use slightly different ways to say the same thing – students sometimes benefit from my "saying the same thing in different ways." That said, however, let me give you some language, or what we call "verbal frames" for the above answers that will perhaps make this easier for you:

Reinforcer Establishing Effect**:**

(What MO) makes **(what specific consequence?)** *more* reinforcing**.**

Evocative Effect:

(What MO) *evokes* behaviors that have resulted in **(what specific consequence?)** in the past**.**

On the exam, for the evocative effect, it is also OK to list specific behaviors that may be evoked as follows: ***What MO*** would evoke **(what specific examples of behaviors?).**

6. 7, Table 3. Be able to state the Reinforcer Abolishing Effect and the Abative Effect for the MOs listed in this table. On the exam, I may ask, for example:

   What is the reinforcer abolishing effect of water satiation?

   What is the reinforcer abolishing effect of becoming warmer?

   What is the abative effect of a decrease in pain or no pain?

   What is the abative effect of activity?

   Again, note very carefully that in the first two questions you should only state the "reinforcer abolishing effect" (not the abative effect) and in the last two questions you should only state the "abative effect" (not the reinforcer abolishing effect).

   Again, to help you out, I am going to give you verbal frames that you can use to answer these types of questions.

   Reinforcer Abolishing Effect:

   (What MO) makes **(what specific consequence?)** *less* reinforcing**.**

   Abative Effect:

   (What MO) *suppresses* behaviors that have resulted in **(what specific consequence?)** in the past.

   On the exam, for the abative effect, it is also OK to list specific behaviors that may be suppressed as follows: ***What MO*** would suppress **(what specific examples of behaviors?).**

7. 9, 6-7. Why are MOs most commonly confused with SDs? In other words, how are they similar? What is the main difference between SDs and MOs? (You do not have to learn the diagrams on pages 8 and 9. I have provided these simply to help you understand the difference between MOs and SDs.)

8. 11. In 11, 2, I give several examples of conditioned reinforcers that may be affected by food deprivation and satiation.

   A. State one potential conditioned reinforcer that might be affected by, let's say, (a) water deprivation and satiation, (b) becoming too cold, (c) slight bleeding from a cut by a knife, and (d) pain from a burn?

   B. Also, be able to state how the conditioned reinforcer would be affected – that is would it become more or less reinforcing?

My objective here is to get you to recognize the difference between unconditioned reinforcers and conditioned reinforcers, and apply that knowledge to common examples in everyday life.

9. 11-14. If given examples similar to those on pages 11-14:

   A. Be able to state the Conditioned Reinforcer Establishing Effect and what specific behavior is affected by it (and how that behavior is affected).

   B. Be able to state the Conditioned Reinforcer Abolishing Effect and what specific behavior is affected by it (and how that behavior is affected.

   Again, I am going to give you some verbal frames to make the answers to the above questions easier for you

   A. (1) Conditioned Reinforcer Establishing Effect:

   (What MO) makes **(what specific conditioned reinforcer?)** *more* reinforcing.

   (2) The behavior that is affected by the Conditioned Reinforcer Establishing Effect and how it is affected:

   (What specific behavior that precedes the conditioned reinforcer?) will increase in frequency *in the future* when **(what specific MO?)** is present.

   B. (1) Conditioned Reinforcer Abolishing Effect:

   (What MO) makes **(what specific conditioned reinforcer?)** *less* reinforcing.

   (2) The behavior that is affected by the Conditioned Reinforcer Abolishing Effect and how it is affected:

   (What specific behavior that precedes the conditioned reinforcer?) will decrease (or at least not increase) in frequency *in the future* when **(what specific MO?)** is present.

10. 14-17. If given examples similar to those on pages 14-17:

    A. Be able to state the SD Evocative Effect and what specific behavior is affected by it (and how it is affected.

    B. Be state the SD Abative Effect and what specific behavior is affected by it (and how that behavior is affected).

    The verbal frames:

    A. (1) SD Evocative Effect:

    (What MO) makes **(what specific SD?)** a *more* potent or powerful SD.

    (2) The behavior that is affected by the SD Evocative Effect and how it is affected:

    (What specific behavior that follows the SD?) will be evoked *immediately*.

    B. (1) SD Abative Effect:

    (What MO) makes **(what specific SD?)** a *less* potent or powerful SD.

    (2) The behavior that is affected by the SD Abative Effect and how it is affected:

    (What specific behavior that follows the SD?) will be *immediately* suppressed.

11. 17-19. These pages put all of the effects together and give examples. If you are able to answer Study Objectives 5, 6, 9 and 10, you should be able to analyze examples the same way I have analyzed them – without having to learn anything new.

Vollmer & Iwata: Because these authors use the term "establishing operations" rather than "motivating operations," I have also reverted to using the term "establishing operations" in the study objectives – the difference should not cause you any trouble, however.

12. Abstract. Not for the exam, but the abstract will help you understand why the authors conducted this study. In the first two sentences of the abstract, the authors state the rationale for conducting this study. The point they are making here is that (a) the effectiveness of reinforcers often varies "within and between" individuals and (b) it is possible that establishing operations are responsible for some of this variation.
13. 281, 0. Not for the exam, but notice that one feature of this study is that the authors used reinforcers from three different "categories" of reinforcers. This was a very nice feature in that the authors could determine whether EOs affected different types of reinforcers differently. They didn't. EOs affected all three types of reinforcers exactly the same way.
14. The following material may help you understand the study. The authors conducted 3 separate experiments, but all three were conceptually identical. Note that I do have a study objective after this explanatory material.

    There were three experimental conditions: Baseline, Deprivation and Satiation.

    Two critical variables (IVs) were manipulated across these three conditions: (1) the EO (deprivation/satiation) and (2) Reinforcement (the presence and absence of reinforcement).

    In baseline phases: (a) deprivation was present; (b) reinforcement was **absent.**
    In deprivation phases: (a) deprivation was present; (b) reinforcement was present
    In satiation phases: (a) satiation was present; (b) reinforcement was present.

    <u>For the exam, for each experimental condition, indicate how the two IVs were manipulated as I did above</u>. In other words, if I ask how were the EO and reinforcement manipulated in the baseline phases, you should say: (a) deprivation was present, (b) reinforcement was absent.

    Or, I may ask in which phase or phases was deprivation present and in which phase or phases was reinforcement provided/present?
15. To help you understand the experiments, I have provided summaries of the two I am going to cover in this class at the end of the study objectives (Experiment 1 and Experiment 3). You do not have to memorize these summaries - I am providing them to help you understand the studies and to enable you to better answer the study objectives over this article.
16. 282, 1. In the first study that examined the effect of food deprivation and food satiation, when were baseline sessions conducted? **This procedure represents manipulation of the EO. Because the sessions were conducted 30 min before lunch, the Ss were "naturally" food deprived.**
17. 282, 2. For the food items, how was satiation established? In other words, what procedures were used to food satiate the Ss? You must include the free access to the foods that were used as reinforcers during the session – this is an important part of the procedure.
18. 284, 3. Note that in every case, response rates during **deprivation** were higher than response rates during **satiation**. Given the similarities and differences in procedures between satiation

and deprivation sessions, what accounts for the higher responding during deprivation conditions? This is not in the article, but if you understand the procedures, you will be able to answer it (you may want to refer back to study objective 14).

19. 284, 3. Note that in every case, response rates during **deprivation** were higher than response rates during **baseline**. Given the similarities and differences in procedures between baseline and deprivation, what accounts for the higher responding during the deprivation sessions? Again, this is not in the article, but if you understand the procedures, you will be able to answer it (you may want to refer back to study objective 14).
20. 288, 0. Note that for Donny, during satiation procedures (when Es were "socially satiating" Donny 15 min prior to the actual sessions), the extensive social interaction as an EO: (a) made **termination of the social interaction** reinforcing; and (b) evoked behaviors that in the past had been reinforced with the termination of social interaction (moving across the room, running away from the E, and throwing objects at the E).

    Yet social interaction actually functioned as reinforcement when Donny was socially deprived. This is an important point - and a clear demonstration of the "power" and "momentary effects" of establishing operations. Under deprivation conditions, social interaction became reinforcing and evoked behaviors during the session that resulted in social interaction (placing the blocks in the container); yet under satiation conditions, during the pre-session satiation procedures, the **termination** of social interaction became reinforcing and evoked escape behaviors. (the satiation also suppressed block placement during the experimental sessions)

    For the exam: Be able to answer the following questions:

    A. During the **pre-session** satiation procedures for Donny, what was the conditioned reinforcer **establishing** effect of social satiation as an EO?

    B. During the **pre-session** satiation procedures for Donny, what was the **evocative** effect of social satiation as an EO? **Don't' just give a general answer** - state the specific behaviors that were affected and how they were affected.

    C. During the **experimental** sessions in the satiation phase (not the pre-session satiation procedure) for Donny, what was the conditioned reinforcer abolishing effect of social satiation?

    D. During the **experimental** sessions in the satiation phase (not the pre-session satiation procedures) for Donny, what was the **abative** effect of social satiation as an EO? (Don't just give a general answer here - be specific – **what specific behavior was affected, and how was it affected**).
21. 289, 3. What may failed attempts to apply reinforcement procedures result from? You should list and explain two things. In other words, in your answer explain what is meant by a "functional" reinforcer and what it means to "establish" a reinforcer.

    Students have had trouble with this in the past. *I want you to be able to explain these two things – not just list them. I am probing your understanding here – not your memorization. Can you explain to someone else what a "functional" reinforcer means, or what it means to "establish" a reinforcer??*

THE END

Summary of Vollmer & Iwata Studies

Summary of Experiment 1

Number of Participants:	Three - Craig, Sam and Lonny
Dependent Variable:	Number of blocks placed in a container per minute
IVs:	1. EO manipulation: Food deprivation vs. Food satiation 2. Reinforcement present/absent: Food reinforcement (nuts, raisins, dried fruit) vs. No reinforcement
Baseline Phase:	1. Food deprivation present Sessions conducted 30 minutes before lunch 2. Reinforcement absent No reinforcement for putting blocks in the container
Deprivation Phases:	1. Food deprivation present Sessions conducted 30 minutes before lunch 2. Reinforcement present Responding was reinforced on FR3, or FR5
Satiation Phases:	1. Food satiation present Sessions conducted within 15 minutes after lunch and free access to nuts, raisins, and dried fruit 10 mintues before each session. 2. Reinforcement present Responding was reinforced on FR3, or FR5

Summary of Experiment 3

Number of Participants:	Two - Donny and Sam (I am going to focus on Donny)
Dependent Variable:	Number of blocks placed in a container per minute
IVs:	1. EO manipulation: Social deprivation vs. Social satiation 2. Reinforcement present/absent: Social reinforcement (verbal praise) vs. No reinforcement
Baseline Phase:	1. Social deprivation present No social interaction with E for 15 minutes before sessions 2. Reinforcement absent No reinforcement for putting blocks in the container
Deprivation Phases:	1. Social deprivation present No social interaction with E for 15 minutes before sessions 2. Reinforcement present Responding was reinforced on FR10
Satiation Phases:	1. Social satiation present E interacted continuously with Donny and provided noncontingent verbal praise at least once every 15 seconds for 15 minutes before sessions 2. Reinforcement present

Responding was reinforced on FR10

Unit 7: Health

Article in U7 of the course pack:

1. Lutzker and Martin

The study objectives for behavioral gerontology are over the ppt presentation. There aren't any articles in the course pack for this topic.

Goals of the unit: Present applications in health care, behaviorally analyze pain-related behavior and overview of behavioral gerontology).

Lutzker & Martin

1. Note the important point made in 81,1. Although behavioral procedures have been successful in reducing seizures, it does not mean that seizures are learned - it's interesting and surprising that behavioral procedures can be used to ameliorate problems that arise from physiological, not learned, disorders.

   A. Why it is interesting and surprising that behavioral procedures can reduce seizures.

   B. Also, why is that relaxation procedures such as systematic desensitization may be effective in reducing epileptic seizures?

2. State what was maintaining the coughing behavior of the girl described in 86,1 (you should mention TWO things) and the names of the principles of behavior that are illustrated by each of the factors that were maintaining the behavior.

   I will not ask anything on the exam about the intervention but note that the inappropriate behavior was extinguished while more appropriate (and incompatible) behaviors were shaped and reinforced. Positive reinforcement in the form of attention is extremely powerful in the real world and has been shown to maintain a wide variety of "abnormal" behaviors: anorexic nervosa, colic attacks in infants, tantrums, stuttering.

3. 88,1. How did Fordyce conceptualize "pain?" Note that in Fordyce's program **the actual painful stimulation is not the *target* of the change - rather the targets for change are the *operant behaviors* such as complaints or immobility that are reinforced by others when the person is "in pain."**

   For the exam: In Fordyce's treatment of back pain, what is the target of change and what is **not** (boldfaced material above). Also, note when I ask this question, some students say that the *contingencies of reinforcement* are the *targets* of change. This is not correct, and points will be deducted for this answer. Although it is the case that the program involves changing the contingencies of reinforcement for the individuals, the *targets* for change are the *behaviors*. The problem here may be a misunderstanding of the way the word "target" is used in behavior analysis – the word "target" stands for what aspect of the *performer's repertoire* has been selected by experimenters or practitioners to change or alter; that is, what is being measured as the DV to determine the success of the intervention.

   None of the rest of the material in this study objective will be on the exam but it may help you to understand behaviors as the target of change rather than the painful stimulation. Think about it - when someone is in pain or discomfort, how do you react when the individual talks about it? Are you helping or hurting the person get better when you constantly reinforce operant behaviors associated with pain. This is an interesting situation - you don't want to ignore reports of pain in case some type of medical treatment is required and you certainly want to be sympathetic so that it is clear that you "care" - on the other

hand, Fordyce's very successful program certainly demonstrates that you can "help too much" and be "too sympathetic." We can easily make problems worse by reinforcing individuals for operant behaviors related to those problems.

Reinforcement of pain-related behaviors is NOT typically a major problem when individuals are ill for a short period of time. If a person has a cold/flu, the cold/flu will go away in a week or two. Once the cold goes away, care takers and others in the environment will not continue to reinforce pain- and sick-related behaviors. Thus, pain- and sick-related behaviors do not get reinforced sufficiently for them to continue once the cold/flu is gone (although the person with the cold might be a pain in the neck while he/she has a cold/flu again in the future). However, if a person is ill or in pain for very long periods of time, such as 6 months, a year or longer, then the pain related behaviors that are reinforced can become a problem for the individual and actually interfere with recovery or the quality of life of that individual.

4. One might ask why/how the care taker or significant other comes to provide so much reinforcement for the pain-related behaviors of a person who is ill. Below is a diagram of often what controls the behavior of the care taker and significant other. Note that this is a diagram of the CARE TAKER'S behavior. Also note that the response of the care taker serves to reinforce the pain-related behaviors on the part of the person who is ill. Learn this diagram.

   Analysis of the behavior of care takers:

SD	R	Consequence
Sight of ill significant other engaging in pain-related behaviors	"Oh poor baby!"	Ill significant other saying "Thanks for caring!" "I don't know what I would do without you." etc.

5. Should we refer to individuals who appear to engage in pain-related behaviors that are excessive as being "psychosomatic?" Why or why not? 88,1 Students have had trouble answering this question in the past so let me give you the answer.

   The answer is no. Operant conditioning is automatic - it can and does work without the "awareness" or voluntary control of the person who is in pain. When care takers and others in the environment frequently and heavily reinforce operant pain-related behaviors, those behaviors will increase in frequency in the future. Individuals are not "faking," nor is the difficulty "all in their heads." Rather the pain-related behaviors have been shaped up and are being maintained by reinforcement from others in the environment. To alter those behaviors, the reinforcement provided by others needs to be altered.

6 88, 2 There are three essential features of Fordyce's intervention. This objective and the following three are related to these three essential features.

   <u>Intervention related to all pain behaviors</u>. First, prior to the intervention, all pain related behaviors are typically reinforced by care takers and others. With Fordyce's intervention, all pain related behaviors are extinguished. The behavioral diagrams illustrating the "before intervention" contingencies and the "after intervention" contingencies are provided below. Note that the first (before intervention diagram) provides a behavioral analysis of WHY and HOW pain behaviors are developed and maintained. This is true for all types of operant pain behavior, not just those related to chronic back pain.

BEFORE INTERVENTION

All pain behaviors (e.g., Complaints, inactivity) ---> (a) positive reinforcement in the form of social attention
(b) negative reinforcement in the form of escaping/avoiding unpleasant activities.

AFTER INTERVENTION

All pain behaviors (e.g., Complaints, inactivity) Extinction

FOR THE EXAM: State two common reinforcers for pain behaviors and for each, indicate whether the reinforcer is a positive or negative reinforcer. You do NOT have to learn the diagrams.

7. In the AFTER INTERVENTION diagram above, negatively reinforced behaviors are extinguished as well as positively reinforced behaviors. How do you extinguish a behavior that has been negatively reinforced? Be able to diagram and explain the example I provide in lecture. This is not in the text.

8. 88,2 (Fordyce's intervention) <u>Second Fordyce intervention: Physical therapy</u>. Typically when individuals engage in physical therapy, the physical therapist will terminate the therapy session when the individual complains. Thus, "rest" and "freedom from pain" are consequences that reinforce the complaining behavior. In Fordyce's intervention, therapy goals are developed based on what the person is able to do during a baseline assessment, and the consequences of "rest" and "freedom from pain" are provided only when the individual completes the physical therapy requirements, not before and not when the individual complains. The before intervention and after intervention diagrams are provided on the next page. Note that in the intervention in study objective 6, the behaviors are the same, but the consequences are changed. In this intervention, the BEHAVIORS are different, but the consequences are the same.

   BEFORE
   Complaints when doing physical therapy -----> positive reinforcement of rest
   negative reinforcement, termination of pain

   AFTER
   Completion of physical therapy requirements --> positive reinforcement of rest
   negative reinforcement, termination of pain

   FOR THE EXAM: Before the intervention for physical therapy, what behaviors are reinforced? During the intervention, what is reinforced?

9. 88, 2 The third essential feature of Fordyce's treatment is changing the consequences for taking medication. Before the intervention, patients typically take medication **"on demand"** as long as they haven't exceeded the maximum dosages (although often individuals who are in severe pain will gradually exceed the maximum dosages). Taking medication on demand results in a lot of reinforcement. The following diagram illustrates how/why taking medication is shaped up.

   FOR THE EXAM: Learn the diagram, including the relevant technical behavioral terms.

Medication on demand:

MO	Response-->Sr+/SD		Response--------->Consequence	
Pain	Get meds	1. Sight of medication 2. Sight of others/care giver	Take medication	1. Decrease in pain **(SR-)** 2. Social reinforcement from others-Oh poor baby! **(Sr+)**

10. A. In the diagram above, one of the consequences is the decrease in pain: (a) What is the reinforcer establishing effect of pain as the MO? (b) What is the evocative effect of pain as the MO? (c) What is the SD evocative effect of the MO? (d) What is the conditioned reinforcer establishing effect of pain as the MO?

    B. Also, if I give one of the four effects on the exam, be able to choose/select the name of the effect from a list of MO effects that I will give you. For example, if I ask: The MO has several effects and, in the diagram, one is that the person immediately "gets meds" – what is the specific name of this effect of the MO? (you should select B, the evocative effect)

    A. Reinforcer establishing effect

    B. Evocative effect

    C. Conditioned reinforcer establishing effect

    D. SD evocative effect

    E. None of the above

    On the other hand, if I ask what is the specific name of the effect of the MO that is responsible for the fact that the person takes the medication, you should select "D", the "SD evocative effect.

11. In Fordyce's intervention, he changes how individuals take medication. Instead of taking "medication on demand," patients take medication based on time. In addition, he gradually decreases the amount (dosage level) of medication that the individuals take. All of this, of course, is done with the informed consent of the patient and close monitoring by a physician. The diagram below illustrates the contingencies when medication is **time-based** rather than taken on demand.

    FOR THE EXAM: Learn this diagram (and compare it to the one in Study Objective 9).

MO	R	Sr+/SD	Response----------->Consequence	
No or little pain	Get meds	1. Sight of med	Take medication	1. Little/no decrease in pain
		2. Sight of others		2. Little/no social attention (or at least less than in SO9)

12. For the diagram in 11 above related to the consequence of little or no decrease in pain: (a) What is the reinforcer abolishing effect of the MO? (b) What is the abative effect of the MO? (c) What is the SD abative effect of the MO? (d) What is the conditioned reinforcing-abolishing effect of the MO?

    Also, as in Study Objective 10, if I give one of the events, be able to choose/select the name of the effect. Again, as an example, if I ask: The MO has several effects, and one is that "the sight of the medication becomes less reinforcing" – Which of the following is the specific

name for that effect of the MO? (you should select "C", the "conditioned reinforcer abolishing effect.")

A. Reinforcer abolishing effect

B. Abative effect

C. Conditioned reinforcer abolishing effect

D. SD abative effect

E. None of the above

Note that the answers to 10 and 12 explain why people tend to take more medication when they take it "on demand" rather than when the medication is time-based.

13. 88, 3. Not for the exam, but note the seriousness of the problem - the patients had pain from 4 1/2 - 30 years and NONE had worked in over three years. The inpatient program lasted only 7 WEEKS - you may consider this a long time but not in comparison to the length of time these patients had been disabled! Also note in 90,0 the fact that the patients reported having less actual pain - that's an interesting finding because Fordyce's intervention does not target the actual pain, only the pain-related behaviors. Because pain is self-reported we don't know whether or not the level of pain actually changed – it may or may not actually decreased. Sometimes increased physical activity will lessen back pain, so it may be that the increased physical activity did indeed decrease the person's actual pain – we simply do not know. From an operant perspective, note that it really doesn't matter – the person "perceives" that his/her pain is less and is no longer disabled because of the pain.
14. 90,1. Answer the following questions about the results of the follow-up study reported by Reinhardt which is impressive, to say the least.

    A. What percentage of patients who completed Roberts' were living normal lives?

    B. What percentage of patients who refused treatment were NOT working? (which of course means that only 17% were working – this makes it easier to compare to the percentage in A).

    C. How many prescription medications were the successful patients taking?

    D. How many prescription medications were the patients who refused treatment taking?
15. Some interesting generalizations can be made from Table 5-4. The examples provided in 3-6 in the Table represent an avoidance contingencies. Note the low compliance in these situations. In contrast, the examples in 1 and 2 in the Table represent escape contingencies. Note the high compliance here. Be able to state what type of contingency results in high compliance with respect to taking medication and what type of contingency is less effective/not very effective.

    (this next part is not for the exam) In the Table, 7 a, b, and c describe the same behavior - taking Cholestryamine. B and C represent changes in the environmental conditions that will increase compliance. Note that in b, a salient environmental antecedent has been added as well as a consequence. In c, only a very powerful consequence has been added. Due to the powerful consequence in c, even though there is not a salient antecedent, compliance would be high.
16. Be able to explain/diagram why escape contingencies control behavior more effectively than avoidance contingencies:

With escape contingencies:): MO (aversive event): R → SR- or Sr- (termination of aversive event). That is, with escape contingencies there is an MO that is aversive and the response terminates or decreases that aversiveness

With (unsignaled) avoidance contingencies: No MO: R --> No immediate or salient consequence.

17. Now, let's apply the escape/avoidance analysis to an actual example. Be able to explain and diagram as I do below, why a person is likely to take medication to reduce a headache (which is an escape contingency) while a person is less likely to take medication to reduce his/her blood pressure (which is an avoidance contingency) even though the person's blood pressure will indeed decrease if the person takes the medication (that is the consequence of decreased blood pressure is certain).

    Answer: Taking medication to reduce a headache represents an escape contingency. Taking the medication reduces the pain, which **negatively reinforces** taking the medication, hence making that behavior more likely in the future.

    MO (pain from headache): R (take medication) --> **SR-** (relief/termination pain)

    On the other hand, taking medication to reduce high blood pressure represents an avoidance contingency. Because humans are not able to detect high blood pressure, there is no MO and when the person takes the medication there is no obvious consequence (because the individual cannot "feel" or detect the lowered blood pressure, even though it occurs – we have no receptors for changes in blood pressure and hence such changes cannot function as stimuli for humans).

    No MO (can't detect high blood pressure) R (take medication) --> No SR- (can't detect decrease in bld prssure)

18. There is a complication with the preceding analyses of human avoidance contingencies. Avoidance behaviors extinguish very quickly because there are no observable consequences that follow the avoidance behavior (such as taking medication to reduce your blood pressure). Most human examples of "avoidance contingencies" involve some type of verbal mediation – that is, the behavior is controlled by verbal "rules," not the actual contingencies themselves. I may or may not discuss this further in lecture. If I do, I may ask you to learn something about this for the exam.

Behavioral Gerontology: All study objectives are from the ppt presentation; there are no articles in the course pack over this material.

19. Slide 2: Aging in America
    A. How has the proportion of elderly changed in the 20th century?
    B. What is the proportion expected to be by 2030?

20. Slide 3: What effects have medicine had on life expectancy? (Answer: increased life expectancy by about 30 years from 1900 to 2000.)

21. Slide 4: What are the effects of aging and increased life expectancy on the cost of care, care needs, and the quality of life?

22. Slides 6-11
    A. State, in behavioral terms, three changes that affect the behavior of individuals as they age

B. Give an example of each of the three – from lecture (be sure to correctly identify the example as an example of one of the three changes – in other words, don't mix up an example of SD problems with MO changes and/or reinforcement contingencies that reinforce behaviors that are not good for the elder).

23. Slide 14:
    A. What is the major cause of caregiver stress?
    B. What is the most common cause of institutionalization of older individuals? (don't just say "I can't take it any more" – that doesn't include *what* the caregiver can't take any more – this answer is the same answer as in A.)
    C. What *is not* the most common cause of institutionalization?
    D. What proportion of individuals in nursing homes have behavior problems?

24. None of the questions below will be on the exam; but note slide 17, Anxiety and Depression. Many people believe that anxiety and depression are "normal" for seniors. No so!
    A. What percentage of healthy elders have clinical anxiety?
    B. What increases the rates of elders with anxiety?
    C. What is the rate of depression in elders?
    D. What two "subgroups" of elders have considerably higher rates of depression? (food for thought, for those in nursing homes - what comes first, the "chicken or the egg?" Does "depression" result in their being admitted to a nursing home, or does being in a nursing home cause "depression?" Think of the loss of reinforcers for an elder who moves into a nursing home.)

25. Slides 20-22
    See study objective below.
    The aggression problem. Remember, the most common cause of institutionalization of elders are behavioral problems. Up to 85% of individuals with dementia display physical aggression, which of course, is one of the behavioral problems that leads to placement in long-term care facilities, physical constraints and medication. Imagine trying to take care of Mom or Dad, or Grandma or Grandpa when they consistently aggress against you.

    A recent study indicates that 75% of the aggressive behavior of elders with dementia is **escape** from antecedent situations such as task demands, verbal prompts, and physical contact by care providers during activities of daily living (taking the elder to the bathroom, shaving, showering/bathing, brushing teeth, dressing, etc.).

    Typical interventions have involved the care provider stop the task (on the grounds that the elder is just too distressed or having bad day), and time out (a punishment procedure).

    For the exam: After lecture, explain/diagram why, from a behavioral perspective these typical "interventions" actually increase aggression, and what the care taker should actually do. (Hint, this is actually related to SO7 above)

    Not for the exam: Note while the above answer may "seem" cruel at first, the literature indicates that alternative interventions that were not based on a "functional analysis" relied primarily on punishment: physical restraints, loss of a desired reinforcer, and strong verbal reprimands. Are these "kinder?"

    Not for the exam: What about medication? Medication can reduce the aversiveness of the MO by "dulling" the elder and thus decrease aggression. But medications have systemic

effects and thus decrease the **entire** activity level of the elder. Do you want a doped-up Grandpa?

26. Slide 31: Bourgeois (1993):
    A. What was the experimental design? State the name *and provide the letters.*
    B. Describe first two results of the study that are listed on this slide.
27. Slides 32, 33, 35 and lecture: Heard & Watson (1999):
    A. A unique feature of this study was that the authors used a *functional assessment*. Be able to state this as the *unique* feature of this study (no one had done this before in any study with elder adults) and be able to explain what a "functional assessment" means.
    B. What were the three reinforcers that were maintaining wandering in different elders?
    C. Give the name of (do NOT abbreviate) and describe, in detail, the procedure used to decrease wandering (in other words be able to define the reinforcement schedule that was used).
    D. Slide 35 and lecture. The procedure decreased wandering by 1/2 for each participant. These results are noteworthy. Are they sufficient or good enough for the participants? Why or why not?
28. Slide 38 Engelman, Altus, & Mathews (1999)
    In this study the authors focused on increasing the engagement of 5 residents with dementia by changing the behavior of the CNAs.
    For the exam: What were the CNAs trained to do?
29. Slides 43, 44, and lecture Engelman, Altus, Mosier & Matthews (2003)
    A. What was the **general** problem stated in this slide that prompted these authors to conduct the study? A problem that is very common with well-meaning staff?
    B. Describe the least to most prompts: that is, what, specifically were the prompts that were used, and in what order?
    C *Explain why the prompts were used in this order.* Do not just say they were least to most prompts. Also include the rationale for using least to most prompts.
    D. Lecture related to Slide 44. There was no increase in time it took to dress the elder. Why is this an important finding?

THE END

Unit 8: Certification in Behavior Analysis and Professional Ethics

This is an unusual unit: Please read the following VERY carefully.

1. WMU's Human Subjects Institutional Review Board's (HSIRB) on-line training program
2. Dickinson's paper, *Ethics for Behavior Analysts: PSY 4600*. Unpublished ms.

In the course pack, but only for your reference:

3. *Declaration of Professional Practices and Procedures*. This is an example of the type of document that behavior analysts should give to every client they work with. Dr. Bailey and Dr. Burch created the document and hand it out in all of his workshops on ethics.

Unit Assessment

1. 15 points: Completion of 12 modules of WMU's on-line training program for research ethics (details are provided below).

   If you have already completed the on-line training, and completed it in *2008 or later*, you do not have to complete it again. You only need to access the web site and print out your completion record and turn that into me.

2. 20 points: Exam over certification in behavior analysis and professional ethics for the practice of behavior analysis (based on the study objectives that follow the material about the on-line training program)

WMU'S HSIRB On-line Training Program for Research Ethics

WMU has contracted with an organization to provide on-line training for faculty and students. All faculty and students involved in research must complete this training program before the HSIRB will approve their research protocol. This means that no one at WMU can conduct research without completing this training. This policy went into effect in July 2005.

Your assignment:

(a) Complete the 12 modules of the behavioral and social sciences training program (again, see the instructions below for details).

(b) Print off a copy of the computer screen indicating the score you received on the module quizzes and bring it to me on the day of E8.

Grading:

1. 15 points for turning in the computer page indicating you have scored *80% or higher across the 12 quizzes* that follow each of the modules *on the day E8 is administered*. This is WMU's criterion for "passing."

   Note that I will NOT accept a print out that just indicates that you have "completed" the modules - print off the page that contains the actual quiz scores.

   2. Grading scale for completing *fewer* than 12 units by the day E8 is administered (with an average of 80% for the modules completed, otherwise 0):

Number of units successfully completed	Number of points
0 - 4	0
5 - 6	5
7 - 8	7
9 - 10	9
11	11
12	15

3. You must give me the computer print out indicating the scores you got on the quizzes by the beginning of class period the day E8 is administered *or you will not receive ANY credit for this part of the assignment*. That is, you cannot turn this in late. It is just like the exam- you must complete it on the day it is assigned.
4. If you do not take E8, but instead elect to take ME2, I may require you to complete some the modules as part of the study objectives for that exam. I do not make up the study objectives for ME2 until I have administered and graded all of the exams therefore I will handle this subject matter the same way I handle other study objectives for ME2.

Instructions for accessing the on-line training program

1. Use your browser to go to "www.citiprogram.org"
2. Click on New Users "Register Here"
3. On the "Complete Registration Page:"
   A. "Select your institution or organization:" Go to "Participating organizations" and scroll down to "Western Michigan University"
   B. Complete the rest of the information on that page
   C. Click "Submit"
4. Note that the following steps might be slightly different than I have indicated below. I can't get beyond this point because I am already a registered user, and they may have changed the web page.
   A. For "Which course do you plan to take?"
      Scroll to **Group 1 – the Social and Behavioral Sciences Researchers**
      Select "**Basic Course**"
      DO NOT SELECT "REFRESHER COURSE": I will not accept this.
   B. For "Role in human subjects research:" Select: OTHER
5. After you have completed the modules, the computer gives you instructions for printing out a record of your work. Print out "Modules Completed" - *the one with the quiz scores*, and bring it to me on the day of E8 (or before).

THE MATERIAL FOR E8 STARTS ON THIS PAGE

Certification in Behavior Analysis (for additional information see www.bacb.com)
Some Introductory Material

The Behavior Analyst Certification Board (BACB) is a nonprofit corporation established to meet professional credentialing needs identified by behavior analysts, state governments, and consumers of behavior analysis services. Many organizations, particularly those that serve children and adults diagnosed with autism and developmental disabilities, now require staff to be certified behavior analysts as a condition of employment. For example, in the state of Pennsylvania, all teachers in the public school system who work with autistic children must be certified behavior analysts.

Certification was developed to protect the field of behavior analysis from those who claimed to be "behaviorists" but who did not have the requisite skills or training, and hence often misrepresented the field. Not only did their work often harm the field of behavior analysis in general, but it sometimes did considerable harm to their clients as well.

The certification process grew out of the state of Florida. The Florida Association of Behavior Analysis, largely due to the efforts of Dr. Jon Bailey, initiated the state-wide certification of behavior analysts well before certification became a national certification process.

There are two levels of certification: Board Certified *Assistant* Behavior Analyst (BCABA) and Board Certified Behavior Analyst (BCBA).

NOTE: Below, I present the current requirements for certification, certification renewal, and re-certification. The requirements, however, are subject to change. Always check the BACB web site for the current requirements.

1. Based on the material below, state the requirements for a Board Certified *Assistant* Behavior Analyst (you do NOT have to learn the material in the parentheses). Individuals must:
   A. Have at least a Bachelors Degree (not necessarily in behavior analysis or psychology)
   B. *135* hours of specific coursework in *behavior analysis* (if you are interested in the details, please see the web site; also this does NOT mean credit hours, rather contact hours - thus you could take a 3 credit hour course, but that would translate into many more contact hours)
   C. Meet experience requirements (The experience requirement require 1000 hours of supervised experience. The supervisor must be a BCBA or an individual who has applied to and been approved by the certification board to take the BCBA exam. The experience requirements are quite complicated and thus you should go to the BACB web site for additional information about them.)
   D. Pass the Behavior Analyst Certification examination.
2. Before applying to take the BCABA, which of the above requirements must be met?

   The answer: You must have a BA, you must have met the 135 hours and you must have met the experience requirements. In other words, you cannot apply to take the certification exam unless you have met the other three requirements.

3. When you graduate from WMU with a BS in psychology, which of the BCABA certification requirements have you met?

   The answer: The BA requirement and the 135-hour course work requirement in behavior analysis.

   None of the rest of the following material in this study objective will be on the exam – it's just information many of you may be interested in.

   Some universities and agencies have applied for and been granted approval for a course sequence that meets the 135 hour requirement. Western is one of them. The following course sequence has been approved as meeting the 135-hour requirement: PSY 3300, PSY 3600, and PSY 4600.

   A list of approved course sequences can be found on the BACB web site. If a sequence of courses has not been pre-approved by the BACB, then individuals must submit documentation of each course they are requesting.

   PSY 3570, the Croyden Avenue school practicum, provides about 140 hours of supervised practicum toward the experience requirement. Most applicants for the certification exam fulfill their experience requirements through employment in behaviorally oriented organizations after graduation, as it is difficult to obtain 500-1000 of supervised practice during school.

4. (A) How long does the original certification last and (B) what must be done to maintain certification?

   A. Once you pass the certification exam, certification is granted for 3 years.

   B. You must renew your certification each year by submitting an annual renewal application (which can be downloaded from the web site) and, apply for recertification before the 3rd year is up.

5. What are the requirements for obtaining recertification as a BCABA?

   Every three years, you must complete 24 hours of BACB approved continuing education or retake and pass the certification examination.

   The rest of the material in this study objective will not be on the exam – it is for your information only.

   The BACB web site provides detailed information about what constitutes "approved" continuing education credit hours (referred to CEUs – Continuing Education Units). For example, you can take a graduate level course in behavior analysis, you can go to a seminar, colloquium, conference presentation, workshop that has been approved by the BACB, or you can be an instructor of a graduate level course in behavior analysis or one of the preceding events approved by the BACB. You can also request that non-BACB approved seminars, workshops, etc. in *behavior analysis* count toward some of the hours, but you must provide documentation about the event and the BACB must then approve it.

6. Based on the material below, state the requirements for a Board Certified Behavior Analyst (not an *Assistant* Behavior Analyst but a Behavior Analyst). (You do NOT have to learn the material in the parentheses). Individuals must:

   A. Have at least a Master's Degree (not necessarily in behavior analysis or psychology)

   B. *225* hours of specific coursework at the *graduate level in behavior analysis* (if you are interested in the details, please see the web site. The BACB has approved our graduate

level course sequence as meeting this classroom requirement. For a matrix that indicates what courses are relevant to the specific coursework hours required by the BACB, see www.wmich.edu/psychology/BA/BACB.html)

C. Meet experience requirements (The experience requirement require 1500 hours of supervised experience. The supervisor must be a BCBA or an individual who has applied to and been approved by the certification board to take the BCBA exam. University faculty who teach at universities with BACB approved course sequences may count this teaching experience. The experience requirements are quite complicated and thus you should go to the BCB web site for additional information about them.)

D. Pass the Behavior Analyst Certification examination.

7. Not for the exam. I am not going to go into the other details about renewal and recertification for the BCBA certification, but they are similar to the ones required for continuation of BCABA certification. That is, you must renew the certification annually and apply for recertification during the third year. To obtain recertification, you must complete a specified number of continuing education credit hours (36) or retake and pass the BCBA examination.

Professional Ethics: Dickinson's paper in the course pack

8. For each ethics task statement, I provide three to five case studies. In lecture, I am going to go over some of these case studies, pointing out how each one relates to the task statement. It will help if you read these case studies and come prepared to discuss them in class. (I have not given you the answers to the case studies in the paper in the course pack.)

   For the exam, I will give you a copy of the seven task statements I cover in the paper (but not the corresponding sections of the Ethical Guidelines) and I will ask two types of questions about these and/or similar case studies:

   A. Which task statement or task statements is/are relevant to this case study?

      This type of question is designed to teach you how to identify and recognize ethical issues. As you will see in class, often one particular case study or situation involves more than one ethical task statement.

   B. Short open-ended questions such as "What should the person in the case study do?" "Is it OK for the person in the case study to start the intervention or research or does the person have to do something else?"

      The case studies I present in the paper and discuss in class will, if you understand them, prepare you for the questions on the exam.

The End