Unit 1: Basic Terms and Respondent Conditioning Applications

The following articles in Unit 1 of the course pack:

Chance, P. (2009). Chapter 4: Pavlovian Applications. *Learning and Behavior*, pp. 94-107.

Michael, J. (2004). Chapter 6: Common errors in the use of behavioral terms. *Concepts & Principles*, pp. 131-134,

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

At the beginning 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, "2,3" at the beginning of the objective means that the answer 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 am 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 getting to the material in the text. The first study objectives relate to that general material, so there are no page and paragraph numbers.

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. Below are 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.

Learn the following basic diagrams for respondent and operant relations. I will not ask any specific questions over the diagrams on the exams; however, -1 on this and future exams if you do not use the correct terms and symbols when I ask you to diagram something.

DIAGRAMS FOR THE EXAM:

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

B. Operant: R → Sc (response is followed by a stimulus consequence, Sc.)

C. Operant with an SD: SD:R → SR/Sr.

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

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Differences from Dr. Malott's PSY 1400 diagrams.

Dr. Malott's box diagramming differs from the conventional way of. If you have trouble converting from his box diagrams to the ones above, ask one of the course assistants or me to help you.

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 incorrect. A colon, not an arrow 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 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. Include the bold-faced terms, they are important. You learned a different definition in PSY 1400 - 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.

<u>Vision</u>: **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 classified 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*.

   Often, the behavior of one individual is said to serve as an SD or consequence for another individual. 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!), the "Very good, Johnny!" is a *stimulus*, not a behavior. It is an *auditory stimulus* for Johnny even though it is produced by behavior of the teacher. Thus, it is *not* the *behavior* of the teacher that functions as the consequence for Johnny, but the *stimuli* that are produced by the 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**: (a) 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. *You must use the term "receptor" in your answer.* (b) Also, learn my specific examples in both 1&2 below.

   (1) An organism does not have *a receptor* that can detect an energy change

   Examples: Dogs can hear high-pitched whistles that humans cannot hear. High-pitched tones are the result of very fast vibration of molecules. *The high-pitched tones are an energy change*; *however, they cannot function as stimuli for humans because while the phonoreceptors of dogs can detect them, the phonoreceptors of humans cannot*.

   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.*

   (2) The receptor is damaged.

   Example: assume that a hunter's phonoreceptors 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 <u>autonomic nervous system</u>.

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

6. Response versus response product (or response-produced stimuli). When given an example on the exam, be able to state the response and response product. (see below for examples)

<u>Explanation of why I am asking you to learn this distinction</u>:

It is often said that the behavior of one individual can serve as an SD or reinforcer for another person. That is not correct. It's the response product, or stimulus/stimuli that result from the behavior that is the actual stimulus. For example:

R (child says "thank you" to a relative) → Sr (father makes a thumbs up gesture)

Some would say that the father's behavior is the reinforcer. That is not correct. The father's behavior consists only of the movement of the skeletal muscles when making the thumbs up gesture. As I talked about in study objective 4 above, the actual reinforcer is the visual stimulus that results from the movement of the skeletal muscle. The distinction between response and response product, hopefully, will make you understand this better.

<u>Examples similar to the ones I will/may provide on the exam</u>.

A. When a person makes a thumbs up gesture:

What, technically, is the response? **Movement of the skeletal muscles**
What is the response product? **Visual stimulus** of the thumbs up

B. When a person says "That's awesome!"

What, technically, is the response? **Movement of the skeletal and smooth muscles** related to the vocal musculature
What is the response product? **Auditory stimulus** of "that's awesome"

C. When a person sweats:

What, technically, is the response? **Gland secretion** (from the sweat glands)
What is the response product? **Visual stimulus** of sweat on skin

D. When a person cries:

What, technically, is the response? **Gland secretion** (from the lachrymal glands)
What is the response product? **Visual stimulus** of tears

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

   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.

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

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

   Cautionary note: It is not correct to say that hand and foot withdrawal are <u>operant responses</u>. The hand and foot withdrawal are being elicited by pain and thus are part of a respondent relation and hence are respondent behaviors.

9. 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 <u>relation</u>. It does not have to be an original example.

10. A common misconception: Unlearned functional relations. Behavior analysis is widely, but erroneously, believed to be committed to the proposition that all human behavior is learned. Skinner wrote extensively about unlearned, inherited behavioral relations

    For the exam: State the following inherited relations – you do not have to learn the material in parentheses: (a) unconditioned reflexes, (b) released or instinctive behavior (which are more complex environment-behavioral relations such as mating behavior, nest building, and some aspects of care of the young in many species); (c) the capacity to be respondently conditioned, and (d) the capacity to be operantly conditioned.

    The following material will not be on the exam, but note with respect to (d), that although people say, correctly, that all operant responses are **learned**, we **inherit the capacity to be operantly conditioned –** that is part of our biology. That means that, in fact, all principles of behavior (respondent and operant) are descriptions of built-in capacities.

11. It is often claimed that behavior analysis denies the importance of innate endowment. After reading the material at the end of the U1 study objectives be able to answer the following questions:

    A. Behavior analysis readily acknowledges that innate determination accounts for what?

    B. In regards to innate/genetic determination, what are most people in our culture interested in?

    C. Behavior analysts resist the above until what? Why?

12. Specific US-->UR relations

    On the next page, 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)	lachrymal gland secretion (crying)	(learn the technical term)
4. irritation to the nasal mucosa	sneezing	
5. irritation to the throat	coughing	
6. low temperature	shivering surface vasoconstriction of blood vessels	(learn both responses)
7. high temperature	sweating surface vasodilation of blood vessels	(learn both responses)
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)

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

    Emotions consist of a **collection of *respondent* behaviors** that together are called the **"activation syndrome."**

    Note carefully that all emotions are respondent, not operant behaviors; relation #11 in the preceding study objective.

14. Lower-order and higher-order respondent conditioning. Respondent conditioning is also called Pavlovian or classical conditioning.

    After lecture:

    A. Be able to diagram Pavlov's original study (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 in the Chance article 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**. 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

Chance text material in Unit 1 of the course pack

15. 95,2. **Respondent Extinction**: (a) Describe "respondent extinction" in words and (b) be able to state how you would extinguish Albert's **fear** response (this is not provided in the text).

    Respondent extinction described in words:
    Repeatedly present the **CS (or CS_2) without** the **US (or CS_1)**

    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."

16. 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.

17. 96,5 **Counterconditioning and Counterconditioning vs. Extinction**: Note 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).

18. Skip ahead to 105,4. I want to deal with one more example of counterconditioning before moving on: 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, be able to diagram Pavlov's study, using all the correct behavioral terms.

19. Now, turn back to 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**.

20. 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?

Michael common errors article in U1 in the course pack.

21. 133, 3-134, 1. Elicit, emit, and evoke. Be able to use these terms. Also, be able to recognize correct and incorrect usages if I give you sentences such as those on page 135 (for now, just concern yourselves with the sentences that relate to elicit, evoke, and emit.

    From here on, -.5 on this exam and on future exams if you misuse or misspell these terms. I have given you some "simple" rules below, which may make this material easier for you. I have also stated the essential features of each. You do not have to learn the essential features. I will not ask you for them on the exam but you do need to able to use these terms correctly and recognize when they are used correctly and incorrectly.

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

    There are three critical features –I will not ask you to list these for the exam, but as indicated above, I will deduct a point if you use it incorrectly: (1). Elicit is used only in respondent relations; (2) Only **USs or CSs** (stimuli) elicit responses; and (3) only **responses** can be elicited.

    Note 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 (i.e, 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.

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

Critical features: (1) Only stimuli evoke, not organisms; (2) it can be used for either respondent or operant relations; (3) 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!

Emit. The simple rule is: An organism emits an operant response.

Critical features: (1) Only organisms (people and other animals) emit a response; (2) Emit is only used with operant responses; (3) only responses can be emitted.

22. 134, 3. Is the following statement correct or incorrect? Why?

    Respondent behaviors are physiological responses while operant behaviors are behavioral responses.

    Hint: a nice answer would be: Most behaviors in operant relations consist of movement of the striped muscles; these are just as physiological as movement of the smooth muscles and secretion of the glands.

23. 134, 7. Is the following statement correct or incorrect? Why?

    Respondent functional relations are innate and unlearned while operant functional relations are learned.

    Hint: The answer is in the sentence that begins "This is quite incorrect…" that continues on the next page.

THE END, but see the material on the next page about innate determination – the material related to study objective 11.

Study Objective 11:

Why is it so often claimed that behavior analysis denies the importance of innate endowment?

The following has been taken from:

Michael, J. (2004), Chapter 4. Behavior Analysis: An Overivew. In J. Michael (2004), *Concepts & principles of behavior analysis* (page 107). Kalamazoo, MI: Association for Behavior Analysis International.

Between-species differences are often explained in terms of phylogenic provenance; that is, behavior analysts readily attribute to innate endowment many behavioral characteristics that are shared by all members of a species and that can distinguish one species from another. So why is it so often claimed that behaviorism denies the importance of innate endowment?

There are several reasons ..... but the main problem is that laymen and professionals in various fields are not primarily interested in the kind of innate endowment relevant to differences between species. The important innate endowment for most people is the one that might help to explain behavioral differences among different people. The behavioral position regarding this type of inheritance does not radically differ from the general view, but typically does not go far enough to suit most nonbehaviorists. Certainly people must inherit physiological characteristics that make them behave differently than other people. It is completely unreasonable to assume that we are all exactly alike in all behavioral characteristics (e.g., in rate of learning new stimulus-response relations). This admission is easily obtained from most behavior analysts, but they are likely to become reluctant to attribute any specific difference to inheritance.

There seem to be two reasons for this reluctance. Often such attribution is simply based on ignorance of any other relevant variables, and in this sense inheritance is nothing more than an explanatory fiction. But in addition, the basic issue is really a matter of degree. The behaviorist is very likely to argue that there is already strong evidence for large environmental effects, which must be well understood before one attributes much to innate determination.

Take athletic ability, for example. It would be quite unreasonable to assume that we are all born exactly equal with respect to the ability to run a fast mile. There must be many relevant inherited characteristics, such as height, body proportions, lung capacity, and more complex neuromuscular characteristics. However, it would certainly be a mistake to attribute the large differences between mile times of members of a randomly sampled group of humans to innate endowment. It seems quite reasonable to expect that the range of such differences would be

greatly reduced if all members of the sample had been trained from birth to be mile runners. Even after such training there would, of course, still be differences, but they might not be very interesting. And in terms of practical matters, a training program would clearly guarantee large effects in a relatively short time as compared with a selective breeding program. The same is true for so-called personality characteristics—before we accept a predominantly genetic explanation of such individual differences, we must have a better understanding of the obviously relevant environmental factors.

So, behavior analysts readily acknowledge innate determination, but when it comes to the only kind that most people are really interested in, they become increasingly resistant and are then quite justifiably credited with a preference for environmental explanations.

Study objective 11: Summary

Behavior analysts readily acknowledge that innate determination is responsible for many behaviors that are shared by all members of the species and distinguish one species from another. However, most people are interested in the innate/genetic determination that results in differences between people. Given strong evidence for the large effects that the environment has on behavior, behavior analysts are resistant to attributing large differences to inheritance until environmental factors can be ruled out.

Unit 2: Operant Conditioning: Applications

Review of basic principles of behavior: Positive and negative reinforcement (escape and avoidance), positive and negative punishment (response cost and time-out) and extinction.

The following articles in U2 in the course pack:

Chance, P. (2009). Chapter 8: Operant applications, pps 231-233: Zoo life.

Markowitz, H. (1978). Engineering environments for behavioral opportunities in the zoo.

Poling, A., Weetjens, B., Cox, C., Beyene, N. W., Bach, H., & Sully, A. (2011). Using trained pouched rats to detect land mines: Another victory for operant conditioning

Poling, A., Weetjens, B., Cox, C., Beyene, N., Durgin, A., & Mahoney, A. (2011). Tuberculosis detection by giant African pouched rats.

1. TERMINOLOGY: Use all terms and abbreviations correctly: -.5 on each exam for any incorrect usages, except for the errors I talk about in SO3 below.

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

SR = Unconditioned reinforcer	**Sr = conditioned reinforcer (any kind)**
SR+ = Unconditioned positive reinforcer	**Sr+ = conditioned positive reinforcer**
SR- = Unconditioned negative reinforcer	**Sr- = conditioned negative reinforcer**
SP = Unconditioned 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:

   Identify examples of the basic principles of behavior, including positive and negative reinforcement and positive and negative punishment, and extinction correctly. The exam will have examples similar to the ones at the end of the study objectives.

3. Abbreviations for unconditioned reinforcer and conditioned reinforcer: -1 on this and future exams for these errors. They are common errors, particularly now because of texting in which terms and phrases are commonly abbreviated using the first letter of each word.

   Unconditioned reinforcer = SR, not UR. UR = an unconditioned response.

   Conditioned reinforcer = Sr, not CR. CR = conditioned response.

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: it (a) can be provided more immediately after behaviors, (b) does not interrupt the behavioral sequence, and (c) prevents satiation.

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

   Be able to diagram as I do below, how the trainers established the click as an Sr. Note 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

To develop an Sr:

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

NS (click)/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.

SAMPLE EXAM QUESTION: Answer at the end of the study objectives

Assume that a direct care worker wants to use a light touch on the shoulder as a conditioned reinforcer to reinforce a developmentally disabled child when the child makes eye contract with her. The light touch does not initially function as a reinforcer for the child.

A. Diagram what the worker should do to make the light touch into a conditioned reinforcer, labeling all parts of the diagram with the correct behavioral terms.

B. Now diagram what the direct care worker should do to make sure the light touch really has become a conditioned reinforcer. Also, after the diagram, add the critical thing you need to do.

6. <u>Difference between Respondent Conditioning and Development of an Sr</u>

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. Although respondent conditioning and the development of an Sr are separate and distinct processes, they can and do often occur at the same time.

For example, in the diagram in SO5, the click will not only become an Sr, but it will also become a CS that elicits salivation as follows.

NS (click) does not elicit salivation
US (carrot in mouth) → UR (salivation)
NS (click)/US (carrot in mouth) → UR salivation
CS (click) → CR salivation

For the exam: Go back to U1, SO14A, where I asked you to diagram Pavlov's original study.

A. Diagram how the NS (the tone) would become an Sr.

B. Diagram how you would test to make sure the tone had become an Sr, using the response of the dog touching his nose to the floor.

You do not have to diagram how the tone became a CS; only how the tone could also become an Sr. See SO5 (this unit) for the diagrams.

8. Be able to answer the following: When will a stimulus become both a conditioned stimulus and a conditioned reinforcer via one pairing process? Answer: When the NS is paired with a stimulus that is both a US and an SR, or both a CS and an Sr.

9. Back to Chance, 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?

10. A. 232,2. 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. Also learn the diagram (be sure to include "species specific behaviors in your diagram).

    "The reason to be active" consists of behavioral contingencies in which the animal's species-specific behaviors are reinforced. Thus:
    R **(species specific behaviors** in wild) --> SR (food, or other reinforcers).

11. From lecture: For each example of behavioral enrichment. State the (a) name of the animal, (b) the specific enrichment procedure, (c) the specific behavior(s) that was/were reinforced, and (d) the specific 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 site.

Markowitz, H. (1978). Engineering environments for behavioral opportunities in the zoo. Markowitz was the behavior analyst who started behavioral enrichment in zoos. It has taken almost 40 years for the field to gain traction.

12. None of the material in this SO is for the exam, but it may help you understand the article.
    A. Title of the article: Markowitz originally called "Behavioral **Enrichment"** in zoos "Behavioral **Engineering"** in zoos. But people didn't resonate to the term "engineering" because it did not sound "humanistic" enough, or perhaps I should say it sounded too "controlling", thus he subsequently changed the name to behavioral "enrichment."
    B. 34, 2. "Instrumental" conditioning means "operant" conditioning. It was an earlier term for the field that is not used very much anymore.

13. Not for the exam again, but notice in 37, 1st clm, 2-3, the method that was developed for allowing the public to interact with the gibbons, and the result in terms of the money raised for future research. It does make you wonder, who (or what creature) is reinforcing whom?

14. Not for the exam. In order to understand the procedures that were used in Markowtiz's article, you need to have a good understanding of SDs and SΔs, so I am providing the definitions below as a review. You **do not** have to memorize these definitions. You learned them in PSY 1400 and reviewed them in 3600: I am just providing them here as a "refresher," but the next study objective asks you to be able to diagram the development of an SD and SΔ, to make sure that you do understand them.

****

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 SΔ (S delta).

****

15. <u>SDs: Diagram training and testing</u>. Provide the diagrams for SD training and testing and be able to apply them to an original example on the exam.

    Note carefully that **BOTH the SD and SΔ training are 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)
    SΔ (no hand signal): R (jump and back flip) →EXT (no food)

    To test whether this training has been successful (note testing is done under extinction):
    SD (hand signal): R (jump and back flip)
    SΔ (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.

    SAMPLE EXAM QUESTION: Answer at the end of the study objectives

    Assume that the owner of a pet rat wants to train his rat to turn in a circle when he makes a clicking sound, but does not want the rat to turn in a circle when he does not make a clicking sound.

    A. Diagram what the owner should do to make the click into an SD (and don't forget, you also need SΔ training).

    B. Now diagram what the owner should do to make sure the click has become an SD (again, don't forget the SΔ).

16. <u>SDs precede responses, **not other stimuli**</u>: Learn this point and if given an example, be able to explain why the antecedent stimulus is or is not an SD based on the following material.

    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**.

17. Even though students have had PSY 1400 and PSY 3600, some still talk about the effects of SDs and reinforcers as if they were the same. They are not. For the exam, after reading the following material be able to answer the following question for the exam:

    A. State the two differences between an SD and a reinforcer that I asked you to learn.

    B. Also, -1 on this exam and henceforth for saying SDs increase the **future** frequency of the response, which is an error that students commonly make.

    An SD **precedes** a behavior and increases the frequency of the behavior **immediately** (or immediately evokes the behavior); at the very moment it is presented.

    A reinforcer **follows** a behavior and increases the frequency of the behavior **in the future**.

18. Back to Markowitz, 38. The apparatus used with the diana moneys requires some additional explanation that is not provided in the article. Carefully note that there were three platforms, a top, middle and bottom platform. I have diagrammed the sequence below.

    SD1:
    Light at top platform and
    and top light at middle platform on

    R1 → Sr+/SD2:
    Pull chain, top platform Bottom light on at middle platform
    (Light at top platform off)
    (Top light at middle platform off)

    R2 → Sr+/SD3:
    Pull chain, middle platform Token dispensed
    (Bottom light at middle platform off)

    R3 → SR+
    Insert token in slot, bottom platform Food

    For the exam: Be able to answer the following questions about this procedure:

    A. What was the reinforcer for pulling the chain at the top platform?

    B. What was the SD for pulling the chain at the middle platform?

    C. The token at the middle platform was a reinforcer for what behavior?

    D. The token at the middle platform was an SD for what behavior?

    E. The token no doubt also became a CS: For what behavior?

19. 40, 5-6. For the mandrill game: At the end of the study objectives I have the diagrammed the contingencies. The material at the bottom of the diagram will help you answer the following questions!

    A. In the first link of the chain, what behavior was reinforced in the presence of the SD?

    B. In the first link of the chain, what was the reinforcer for pushing the "I want to play" button? Note that given that there were several "buttons" you must indicate that one of the three reaction time buttons lit, not just that the button lit up – that could refer to the "I want to play button", which would be incorrect.

    C. Given your answer in B, how would you extinguish the response of pushing the "I want to play button" when it is lighted? Careful, this answer may not be as obvious as you think!

D. I have only diagrammed the SD contingencies. But when there is an SD there must always be an SΔ. What is the SΔ in the first link of the chain?

E. What behavior would have been extinguished in the presence of the SΔ? How would it have been extinguished – be specific – don't just say the reinforcer would have been withheld – what, specifically would have been withheld?

20. 42, 1. None of the material in this study objective will be on the exam, it demonstrates how basic research can assist captive animals.

    What problem with elephants was discovered through basic research, that is, testing the "memory" of a light-dark discrimination task?

    What led the researchers to discover this problem?

    An anecdote. When Markowitz first suggested that the elephants had a visual problem, the zoo keepers dismissed it on the grounds that the elephants were very adept at moving around their enclosure - they never ran into things and easily walked over to obtain their food. Markowitz pointed out that (1) the daily requirements for the elephants were not very demanding, and (2) visually handicapped individuals very skillfully move around their homes, and the elephants had been in this enclosure for years and years.

Poling et al. article on detection of land mines: Note: clm means "column" on the page

To see many of the training procedures discussed in the Poling et al. articles, go to youtube.com and search for APOPO rats. They rats are often referred to as "HeroRATS". The videos are fascinating.

21. 351 abstract. State the name of the country in which this particular study took place (and spell it correctly).

22. 351 abstract. Why were giant African pouched rats used as the land mine-detection animals? Include the material at the end of the sentence that explains why it is important that they are native to sub-Saharan Africa.

23. 351, 1st clm, 1- 2nd clm, 0. People in how many countries are adversely affected by mined areas and nearly how many people live with injuries inflicted by mines?

24. 354, 1st clm, 0. A. Were indicator responses reinforced during actual demining? Why or why not? (Hint the material in the sentence that begins with "Because").

25. 354, 1st clm, 1. What was the miss rate of the rats, both for the group of 34 rats and for each individual rat? How do they know that this miss rate was accurate? (the answer to this is in the sentence before the miss rate is stated).

26. 354, 1st clm, last sentence – 2nd clm. Fifty-four other ERWs (explosive remnants of war) were also located although the rats were not directly trained to detect them. This is an example of stimulus generalization. Be able to state this as an example of stimulus generalization.

27. 354, 2nd clm, 1. Not for the exam but notice the low false alarm rate. The reasons why false alarms are important are not mentioned in the article; but basically, it is due to the time and expense of personnel/machinery that are called into remove the mines when discovered.

Poling et al. article on detection of TB

28. 48, 1st clm 0. In sub-Saharan Africa and in developing countries, what is the major reason for the scarcity of TB testing in people with HIV and in the general population at large?

29. 48, 1st clm, 1. Diagram, as I do below, the specific training procedure used to train the rats to detect TB when it was and was not present. Basically, what I want you to realize that in both of these articles, the authors used SD/SΔ training to train the rats.

    SD (TB odor sample): R (pause for at least 5 s above hole with the sample) → SR

    SΔ (other odor samples): R (pause for at least 5 s above hole with the sample) → EXT

30. 51, 1st clm, 2 and Table 1. Based on the material in the article and the material below, state how the rats' ability to detect those with TB (sensitivity) and to detect those without TB (specificity) compares to microscopy.

    Both rats and microscopy detect those who do not have TB very accurately; however, the rats detected those with TB much more accurately than what is typical with microscopy!

31. 51, 2nd clm, 2 - 52, 1st clm, 0. In the study conducted by **Poling et al. (2010)**, rats' evaluations increased the case detection rate over microscopy by what percentage? Note carefully, I am asking about the increase in the **Poling et al. (2010)** article stated on page 52, NOT the percentage increase in the initial results reported by **Weetjens, Mgode, Davis, et al. (2009)**, that is stated in 51, 2nd colm, 1st paragraph.

The End but see the answers to the sample exam questions below and the supplementary material on the following pages

ANSWERS TO SAMPLE EXAM QUESTIONS

Study objective 5:

A. When the child is somewhat food deprived (not necessary to receive credit):
NS (light touch on shoulder)/SR (food) (repeatedly) (no behavior should be included)
The light touch becomes an Sr (2)

B. When the child is again somewhat food deprived (this part is not necessary for credit).
R (eye contact, or any other R)-> Sr (light touch on shoulder)
If the behavior increases in the future, the light touch has become an Sr. (2)

Study objective 15:

A. SD (click): R (turn in circle)----> SR (food)
SΔ (no click): R (turn in circle)--->Ext (no reinforcement)

B. SD (click):R (turn in circle)
SΔ (no click): No R (does not turn in circle)

Study Objective 2: Review of Basic Principles of Behavior

This is review material. 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. I have found in the past that some students were still having trouble identifying examples.

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.
   A. 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.
   B. Negative reinforcement, negative reinforcer. A consequence (a punisher) is immediately taken away (withdrawn), terminated/decreased or is avoided, 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:
      1. 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.
      2. Avoidance. The response **prevents** an aversive stimulus. When a child plays quietly the playing quietly prevents criticism by the parent or teacher.

****

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.

****

2. 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. Malott calls this "penalty" but I will not accept that term on the exam because the rest of the field refers to this procedure as punishment. Because people have such negative reactions to the term "punishment", it is quite reasonable that Malott changed this term. I am sympathetic to his effort, but again, the fact remains that the rest of the field still refers to this procedure as punishment.
   A. Positive punishment, positive punisher. A consequence is immediately **presented** or added after a response, and as a result the response decreases in frequency in the future.
   B. Negative punishment, negative punisher. A consequence (a reinforcer) is immediately **taken away (withdrawn)**, terminated or decreased, and as a result the response decreases in frequency in the future**.** The withdrawal/termination/decrease of the stimulus is the negative reinforcer. Unfortunately, the terms/definitions of different types of negative reinforcement are not consistent within the field. There are two types that are often referred to (although still not consistently defined by individuals):

    1. Response cost. A tangible consequence (a reinforcer such as money, food, points, tokens) is immediately withdrawn/removed (and permanently withdrawn/removed), and as result the response decreases in frequency in the future.
    2. Time-out. Access to a consequence (a reinforcer) is immediately withdrawn/removed (but only temporarily withdrawn/removed), and as a result the response decreases in frequency in the future.

3. Extinction. A reinforcer that has followed the response in the past is **withheld**, and, 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).

Study Objective 2: Basic Principles, cont.

Identify each of the following examples as: positive reinforcement, negative reinforcement (escape, avoidance), positive punishment, negative punishment (response cost, time-out) or operant extinction. The answers are on the next page.

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. Nate pulls the tail of his cat (the behavior of interest) and the cat immediately scratches him. As a result, in the future, Nate doesn't pull the cat's tail as often as he had in the past.

E. 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.

F. Andrea's parents give her an allowance of $5.00 a week. Andrea has started screaming at her parents when she wants something rather than approaching them and asking them for what she wants in a "normal" tone of voice. Now, when Andrea screams, her parents take away twenty-five cents. As a result, in the future, Andrea does not scream at her parents as often as she had in the past.

G. 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.

H. Suzie is a 5-year old who loves the beach – playing in the sand, running around, splashing in the water. She throws sand at her two cousins (very hard) and her parents immediately require her to sit on the beach blanket for 5 minutes (a time-out). As a result, Suzie doesn't throw sand at her cousins as often in the future.

Answers:

A. Negative reinforcement (escape): The muscle cramp is (a) a pre-existing aversive stimulus, (b) the behavior decreases the pain from the cramp and (c) the behavior increases in frequency in the future.

B. Extinction: Putting the Bronco Card in the copy machine and pressing the copy button (a) has been reinforced by copies in the past. Now, (b) that behavior is not followed by reinforcement, and (c) decreases in frequency in the future.

C. Positive reinforcement: Calling the sister a scardy cat is (a) immediately followed by her sister's crying (something is added after the behavior), and (b) increases in frequency in the future.

Note that some may mistakenly call this punishment because her sister's crying would "appear" to be a bad thing to us. However, given that Barbara's behavior increases in frequency in the future, it is an example of positive reinforcement. How many of you had siblings who teased you? Guess what the reinforcement was? Your protest, crying, signs of distress or irritation, etc.

D. Positive punishment: Pulling the tail of the cat is (a) immediately followed by pain from being scratched by the cat, and (b) decreases in frequency in the future.

Note, some might mistakenly call this avoidance because Nate avoids pulling the tail of the cat in the future. However, by definition, avoidance is a form of negative reinforcement in our field and means avoidance of "something bad" (in lay terms). Avoidance always, always **increases** behavior in the future. Punishment **decreases** the behavior.

E. Positive punishment: Putting on the hard hat is (a) immediately followed by her supervisor's statement (b) decreases in frequency in the future.

Note again, some may mistakenly call this reinforcement because the consequence was her supervisor's praise. But again, her behavior decreased in frequency in the future – possibly because of conflicting contingencies. Her male colleagues might, for example, consider her a "wimp" for putting on the hard hat.

F. Negative punishment (response cost). Andrea's screaming is immediately followed by taking away twenty-five cents (removal of a tangible reinforcer permanently) and decreases in the future.

G. Negative reinforcement (avoidance): In the past, Jake has gotten bitten by bugs in the woods. (a) The behavior of putting on a new kind of bug repellant, (b) avoids the aversive consequence of being bitten and (c) increases in the future.

H. Negative punishment (time-out): Throwing sand was immediately followed with a time-out (during which her reinforers were withheld, including the reactions from her cousins when she threw the sand at them), and as a result the behavior decreased in frequency in the future.

Some might mistakenly call this extinction. However, the reinforcement was **withdrawn**, not **withheld**.

Study Objective 19:

Mandrill Reaction Time Game

SD:	R →	Sr+/SD:	R →	Sr+/SD:
"I want to play" button lit	Push button	One of three reaction time time buttons lit	Push the reaction time button quickly	One of three reaction lights lit One of three counter lights lit

SD behavioral chain continued

R →	Sr+/SD:	R →	Sr+ and SR
Push lit reaction time button quickly	One of three reaction lights lit Two of three counter lights lit	Push lit button quickly	Three of three counter lights lit and Food

NOTES: In the SD diagram, the reinforcer for each response in the chain is the reinforcer that **immediately** follows that specific response. Thus:

1. The reinforcer for pushing the lit "I want to play button" is one of the three reaction time buttons turn on.
2. The reinforcer for pushing the reaction time button quickly the first time is that again one of three reaction time buttons light but also one of three counter lights comes on.
3. Food is the reinforcer for only the last response in the chain. However, if food is never provided for the terminal response, then the Srs will lose their reinforcing effectivenss.

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.

1. The material on multiple effects of stimuli at the end of the study objectives. For supplementary material on the multiple effects of stimuli including practice exercises (the kind that will be on the exam), see my web page. Dr. Johnson created this.

Articles in the course pack, U3:

2. Chance, P. (2009). Chapter 8: Operant applications, pps 252-257
3. Three page summary of Fordyce et al. (1973)
4. Gaetani et al. (1985). Engineering compensation systems: Effects of commissioned versus wage payment.
5. Sulzer-Azaroff et al. (1990). Improving occupational safety in a large industrial plan.
6. Michael common errors article from **U1** in the course pack

Multiple Effects of Stimuli Material at the end of U3 Study Objectives

1. When given examples similar to the ones provided in that material and in the ppt:

   A. Be able to identify which of the four/five behaviors (that I will give you as part of the question) would indicate that the stimulus is a CS, SD, or reinforcer/punisher – See the sample test questions numbered 1&2 at the end of that material, on page 32;

   B. Be able to state a behavior that would indicate that the stimulus is a CS, SD, or reinforcer/punisher – See the sample test questions numbered 3&4 at the end of that material, on page 32.

<u>Schedules of Reinforcement and Adventitious vs. Contingent Reinforcement</u>

2. <u>Six basic schedules of reinforcement: FR, VR, FI, VI, FT, and VT:</u> Be able to define all six basic schedules - you covered these in PSY 1400 and 3600. I am providing review material for you below. Schedules of reinforcement are an important part of our analysis of behavior and I have found that some students need more practice with them.

   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. 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; there is no response requirement.

****

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.

****

Now go to the Chance material, page 252, the section on gambling

3. 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.
4. 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?
5. 252,6. What might explain why some people become compulsive gamblers and others do not? Provide an example along with your answer.
6. 253,5-6. In the Kassinove and Schare study with college students, what, other than "wins" functioned as reinforcement for gambling?
7. 253,8. What 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 say,

"excitement." This issue has to do with the lack of reinforcement for alternative behaviors. Be able to state the example from the text.

8. 254,1: Superstitious behavior. 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.
9. Adventitious/Coincidental (noncontingent) vs. Contingent reinforcement

   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**, 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 "just happens" to follow the response but the response does NOT produce it.
10. Which of the following basic schedules of reinforcement represent adventitious reinforcement and which represent contingent reinforcement: FR, VR, FI, VI, FT, and VT. Why?
11. 254,5 (Chance). 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.

Three page summary of Fordyce et al. in Unit 3 in the course pack.

12. 88,1. What did Fordyce target and what didn't he target for intervention?
13. 88,1, last two sentences. State two common **conditioned** reinforcers for operant pain behaviors and for each, **indicate whether they are positive or negative reinforcers.**
14. 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. Learn this diagram.

    Analysis of the behavior of care takers:

SD	R	Sr
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.

15. 88,2. Time-contingent or time-based medication reduces medication taking in comparison to pain-contingent medication. Explain why in words and learn the diagrams.

    With pain-contingent medication, taking medication is strongly reinforced by pain reduction and attention from others. With time-based medication, if the dosage is correct, the person will not be in much pain when he/she takes the medication; hence taking medication is less strongly reinforced, and may even undergo extinction.

Pain-contingent: MO (pain): R (take medication) → SR (pain reduction)
Sr+ (attention)
Sr- (escape unplst activities)

Time-based: MO (little or no pain): R (take medication) → little or no pain **reduction**
little or no attention
little or no escape unplst actv

16. 88, 3. Not for the exam, but note the seriousness of the problem, the short-length of the program, and the results. They are impressive

17. 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?

Gaetani et al. article.

18. <u>Effectiveness of feedback in OBM</u>

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.

19. <u>Paychecks are not FI schedules</u>. (Not in the text, but for the exam) 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.

20. 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.

21. 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.

    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 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.

22. 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.

23. 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. 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.

24. 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

25. 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.

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

27. 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.

Answer: Because measuring IS a behavior and if it is too labor intensive or takes too much time and effort, the time and effort will punish the observation/measuring behavior and people will not do it.

B. Provide the following diagram that illustrates the above - it is very important that you indicate that the consequence is a punisher, and list the two things that serve as punishers.

Answer: R (measuring behavior)→ Sp (lots of effort and time)

28. 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.

29. 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.

Michael, common errors article in U1 of the course pack

30. Are the following phrases correct or incorrect? Why or why not? For the explanation, I am only looking for what is correct (if the statement is not correct). -1 on this and future exams for A&B, -.5 on exams for C&D. A&B are not only terminological errors, but conceptual errors, which is why I have assigned a higher point deduction. And, they are definitely going to cause you trouble in the future in this course if you don't fix them now.

    A. 134, 2. "Reinforcing a stimulus." (see also p. 135, the sentence starting, "Training…"

    B. 134, 4. "The behavior was reinforcing or became reinforcing." (see also p. 135, the sentence starting "As a result of the training…"

    C. 135, 2. "The response became extinct." "The response was extincted."

    D. 135, 3 "The stimulus was adversive." "In the escape contingency, the behavior terminated the pre-existing adversive stimulus."

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. On my web site, there is a link to self-instructional material that will permit you to review and practice this material on your own. The examples in the material are the types of examples that will be on the exam. Dr. Johnson developed this material for me.

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)

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).

One stimulus can have any number of different effects on the behavior of an individual. For example: (a) it can affect the future frequency of the response that precedes it (reinforcement, punishment, extinction); (b) it can immediately evoke a behavior because that behavior has been reinforced in its presence but not in its absence (SD); and/or (c) it can elicit a respondent behavior such as an emotional response.

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 say, "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 basketball player has the ball. He does a lay up (a type of basketball play). The ball goes through the hoop. The sight of the basketball going through the hoop is the stimulus. Which of the following behaviors would indicate that the sight of the basketball going through the hoop was functioning as an SD (discriminative stimulus) for the basketball player? One or more may be correct. Write down the appropriate letter or letters. (2: -1 for each error)
   A. He immediately feels excited.
   B. He does more lay ups in the future.
   C. He immediately makes a victory gesture.
   D. He immediately smiles.
2. A zoo visitor goes to the polar bear exhibit at the local zoo. He sees a polar bear engaging in some strange begging behavior. Which of the following behaviors would indicate that the sight of the polar bear begging (the stimulus of interest) was a CS (conditioned stimulus) for the zoo visitor? Note, there may be one, or more than one correct answer. Write down the appropriate letter or letters. (2: -1 for each error)
   A. He would immediately feel delighted.
   B. He would immediately say, "ahhhh, how cute."
   C. He would visit the polar bear's exhibit more often in the future.
   D. He would immediately toss the bear some of his popcorn.
3. Parents of a child are entertaining guests. The child, who has already been put to bed, walks into the room. The father says, "Angelica, sweetie, come over and give me hug." What behavior on the part of Angelica would indicate that the father's saying "Angelica, sweetie, come over and give me hug" was a reinforcer (Sr) for Angelica? (2)
4. Habib opens a can of tuna fish using an electric can opener. His cat runs to him and rubs up against his ankle (the stimulus of interest). What behavior of Habib's would indicate that the sight of the cat running to him and rubbing up against his ankle was an **SD** (discriminative stimulus) for Habib? (2)

ANSWERS to the multiple effects of stimuli questions:

1. C and D (2: -1 for an error up to -2). An SD precedes an operant response; both making a victory gesture and smiling are operant responses. The probable reinforcement would be cheers from the crowd, some gestural or vocal approval from team members, etc. Making a victory gesture and smiling would not be reinforced if the ball did not go through the hoop. A would indicate it was a CS because all emotions are respondent behavior; B would indicate it was functioning as a reinforcer, because the sight of the ball going through the hoop followed the behavior of the lay up and the player then did more lay ups in the future.
2. Only A (2: -1 for each error up to -2). CS (begging by bear--> CR (feeling delighted). Remember all emotional responses are respondent behaviors. B & D would indicate it was an SD. In each of these cases the sight of the begging behavior precedes the response, and each of the responses indicated is an operant response. D would indicate it was an Sr: R (visiting the polar bear exhibit)→ Sr (begging behavior) and visiting the exhibit increases in the future.
3. Angelica would get out of bed and walk into the room when her parents had guests more often in the future. If you said she would hug her father or smile that is incorrect: those would indicate the stimulus was functioning as an SD. It is also incorrect to say that she would *hug her father more often in the future*. Reinforcers always follow a response; in this case, the father's statement comes before the response of Angelica's hugging him. It is also incorrect if you said that Angelica would have some type of emotional response; such as she would feel happy - that would indicate the father's statement is functioning as a CS. (2)
4. There are several answers that would be correct: Habib could (a) bend down and pet the cat, (b) he would feed the cat, (c) he would smile, (d) he would say "nice kitty!". SD (cat's rubbing Habib's leg): R (Habib emits some operant response) → Sr (perhaps the kitty purrs or licks his hand). It would be incorrect to say Habib felt good or had an emotional response; that would indicate the cat's rubbing his ankle was a CS: CS (cat's rubbing ankle)→CR (joy). It would also be incorrect to say that Habib would open a can of tuna fish using the can opener more often in the future. That would indicate that the cat's rubbing his ankle was an Sr. R (opens can of tuna)→ Sr (cat rubs his ankle), and as a result Habib opens a can of tuna fish with the can opener more often in the future. (2)

Unit 4: Higher Education and Teaching Technology

1. Michael article
2. Snyder article
3. Binder & Watson article
4. Watson article that will be handed out in class:
   Watkins, C. L. (1988, July/August). Project Follow Through: A story of the identification and neglect of effective instruction. *Youth Policy*, 10 (7), 7-11.
5. Layng et al. article

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. Why are courses that don't have any short-term advantages still 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.

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, 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**.

    The second reason relates to the amount of material that can be tested for on the exam. **Due to the time restriction *for the exam that is dictated by the class period* the faculty member *can only cover a small proportion of the study objective*s. Hence, students will begin to "gamble" about what will be on the exam, skipping study objectives that they think the professor won't ask**.

    This second one 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.
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. Some students have trouble with this item, so see the below.

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

    Assessment: T**he student may not get the grade he/she wants when assessed** (on exams, papers, projects, etc). Note carefully that it is not the assessment 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 you expect/want when assessed that makes the learning situation aversive.

<u>Teaching Technology</u>

15. State the following three reasons why traditional educators are critical of both direct instruction and precision teaching: (1) they are not child centered because the teaching is too controlled by the teacher; (2) they are not individualized because every child is exposed to the same material and must meet the same goals; and (3) they do not focus on 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 the Headsprout early reading and reading comprehension programs– 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 exam objectives:

    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: Morningside Academy is "point of light" in our field and everyone in our field knows about it. I have included some recent testimonials at the end of the study objectives from zillow.com You can also view videos at: http://www.morningsideacademy.org/about-morningside-academy/video/

17. 29, 1st clm, 1 What guarantee does Morningside Academy make to the parents of its students.

    Not for the exam, but as of 2016, Morningside *has only had to refund .1% of its tuition* (and yes, that is .1%, not 1%!).

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

19. 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 *~3.0 grade levels per year*. Learn this average increase.

Binder & Watkins article

Binder & Walker republished this article in 2013 along with an "update" article. The reference for the update is: Binder, C., & Watkins, C. L. (2013). Article update: Precision Teaching and Direct Instruction – Measurably superior instructional technologies in schools. *Performance Improvement Quarterly, 26* (2), 96-115.

This article contains recent resources (books, web site addresses) and research about the effectiveness of PT and DI. It does present fascinating success stories with diverse groups such as low social economic African Americans in Baltimore, Native Americans in a Bureau of Indian Affair Schools, Aboriginal Australians, and children diagnosed with developmental disabilities and autism spectrum disorders. However, the article doesn't add to the "basics" or history about PT and DI. Thus, I am not using it in this course.

Traditional educators **still** resist DI for the same reasons stated in the articles despite its effectiveness, I have included three articles at the end of the study objectives that are more recent. But they all say the same thing: DI is effective but is still being largely ignored by public school systems although more charter and private schools have adopted DI. I will not ask any questions over these articles, but they are quite startling (and, I find them sad and frustrating).

That is not to say, there hasn't been some progress (one could say it is about time given that we have known about the effectiveness of these teaching technologies for about 45 years now). In the late 1990s, both the American Federation of Teachers and a joint commission of the National Education Association and the American Association of School Administrators identified DI as one of only a very few models that had strong evidence of positively impacting student achievement. Perhaps in another 15-20 years???

20. 75, 2nd column, 1. 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?

21. 76, 1st column, 2. 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…")

    At the end of the study objectives, I have included examples of two simple DI lessons: one to teach the concept "over" and one to teach the concept of "steeper". Obviously, these are simple, but notice the use of examples and non-examples. That is one of the strategies of DI.

Watkins article that will be handed out in class

25. 7, 3rd colm, 3. State the *primary (first)* area of emphasis for the Basic Skills category, the Cognitive-Conceptual models, and the Affective-Cognitive models.
26. What conceptual category does DI fall into?
27. The author presents several results of Project Follow Through. It would 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 increase **basic skills, cognitive skills, and affective skills** (see the figure on page 9; (b) **DI ranked first in all of these skill areas;** and (c) educational models, **other than the basic skills models**, were worse than the traditional education (in other words, except for basic skills models, these other experimental educational models that were tested were less effective than the typical teaching that was being done in schools).
28. 9, 1st colm, 2. 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. 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.

    What theory of the development of self-concept **do** the data support and what theory **don't** they support?
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.

You can see samples of the Headsprout early reading and reading comprehension programs at headsprout.com. Check them out! They are terrific!

Headsprout was started by behavior analysts, specifically, Greg Stikeleather (BA from WMU, MA from NorthEastern), 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. It 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 Learn the following two points about phonics: (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. A. How many learners participated in Internet testing? B. 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 lessons. The last time I checked they cost ~$199.95. They come with a money-back guarantee – whether parents or schools buy them.

THE END

Testimonials about Morningside Academy from: http://www.zillow.com/seattle-wa/schools/morningside-academy-153711/

Testimonial 1

Morningside academy changed the course of my son's life dramatically. They know how to correctly teach students with dyslexia ADHD and high functioning autism giving them not only academic skills but also social psychological skills that will help them be successful the rest of their lives. My son went up three grade levels in one year and no longer has meltdowns but is able to use his words now. His anxiety is almost completely gone and he loves school now!! Morningside is the real deal! Public school should be modeled after Morningside Academy.

Testimonial 2

Morningside is exceptional! Our son is bright and capable. He has struggled academically in public schools with large classes and a lack of ability to teaching to his learning style. Morningside is changing our son's perception of himself little by little everyday. His confidence is building and his potential is being unlocked. A quote "You know Mom last year (before Morningside) I was an underdog in everything but math and recess." Then he stopped. There was a pause. I wasn't sure how I would reply and then he said "I"M NOT ANYMORE.

Testimonial 3

We are very new to the Morningside family and started on January 5th 2015. I would like to share my story of how MA has helped my son. It really amazes me every time I think of how far he has progressed since he has been at MA. My son transitioned to MA in the midpoint of his 4th grade year on January 5th 2015. I had learned on October 1st 2015 that he was still being bullied which had started in the 3rd grade for being dyslexic. *His reading level (SRI) has been at a level 0 since he has been in the 1st grade* and I found out his 3rd grade teacher had posted his reading level up in the classroom which displayed to all the students that he was at a Kindergarten/1st grade reading level. My son had an IEP since the 3rd grade received extra tutoring weekly since the 2nd grade went to the library weekly and we even tried Sylvan. I learned that if children can't read by the 3rd grade the success rate of actually graduating from high school decreases and kids are proven to drop out. *His SRI score was a 6 when he left his school on 12/15/15. Just after being at MA for 20 DAYS I received a message from my son on my cell phone of him proudly reporting his SRI score was 285!* I have this message saved and play it often and share it with people. I think back to all the nights he came home crying asking me why he can't read; all the nights he agonized and we struggled doing homework. Working with him each night knowing we had to get this homework done but he didn't know the basics to understand what he was doing. On Friday 3/27/15 we attended the MA school dance. I couldn't believe he was out on the dance floor when just months ago he would run away from kids at the playground because he was scared. I am so thankful and blessed that my son is a part of the MA family. I truly believe Morningside Academy has helped save and change his life.

The Root: Getting The Best Teaching Tools To Schools

by JOHN MCWHORTER

For some, teaching children to read can be a challenge, but others insist that the best teaching methods already exist.

November 16, 2010

Last week the media dutifully reported the typically depressing news about black boys' scholarly chops from the NAEP (National Assessment of Educational Progress) survey. More than three times as many white fourth-grade boys as black ones read proficiently or better. By eighth grade, white boys are doing almost four times as well as black ones in math.

Numbers, though, cannot always speak to us as clearly as words: The most depressing result in the survey is that inner-city black boys generally do worse in the aggregate than white boys with learning disabilities.

There has been the usual hand-wringing about what this news means for the prospects of a generation, and so on. It's a "national calamity," according to the Rev. Al Sharpton. But overall, there has been only so much hand-wringing, and it's partly because these NAEP reports so rarely tell us much new. After decades of discussing a black-white gap in reading and math scores that has not narrowed meaningfully since the '80s, one should be pardoned for wondering if there is much more left to say.

We are to think that black kids will continue to lag behind Scarsdale Sarah and Port Washington Peter until they get to go with them to well-appointed, lushly funded suburban schools. But especially because that doesn't exactly seem to be on the horizon, it's easy to think that these NAEP scores are just the way it's going to have to be indefinitely, like global warming. Or you might chalk it up to the fact that, as articles on the survey have noted, black kids are less likely to have health care, or two parents.

The tragedy is that the discussion about black kids in school — boys as well as girls — takes place as if there were some great mystery about how to teach children from disadvantaged homes how to read. An entire plangent and circular conversation drifts eternally over a problem that, at least in the case of reading, was solved way back during the Nixon administration.

Back then, in the early '70s, Siegfried Engelmann led a government-sponsored investigation called Project Follow Through. It compared nine teaching methods and tracked their results among 75,000 children from kindergarten through third grade. It found that the Direct Instruction (DI) method of teaching reading — based on sounding out words rather than learning them whole (phonics), and on a tightly scripted format emphasizing repetition and student participation — was vastly more effective than any of the others. And for poor kids. Including black ones.

A half-day preschool program in Illinois that Engelmann and his associates founded showed that DI can teach even 4-year-olds to understand sounds, syllables and rhyming. The students entered kindergarten reading at a second-grade level, with their mean IQ jumping 25 points. No fewer than nine other sites nationwide yielded results of that caliber. In other words, Project Follow Through nailed it — period. And yet most of us are more likely to know the name of Sammy Davis Jr.'s second wife than to have heard of this miraculous instantiation of sheer common sense.

Decade after decade, DI has continued to kick serious butt all across this great land. Houston, Baltimore, Milwaukee — you name it; I am unaware of anywhere it hasn't worked, and it's hard to even choose one example as a demonstration. In 2001, students in the mostly black Richmond district in Virginia were scoring abysmally in reading. With a DI-style program, just four years later, three-quarters of black students passed the third-grade reading test. Meanwhile, over in wealthy Fairfax County, where DI was scorned, the minority of black students taking that test — despite ample funding — were passing it at the rate of merely 59 percent.

Even sadder is that conventional teacher-training programs at education schools keep alive the canard that teaching poor kids to read is an elusive, complex affair requiring a peculiarly intense form of superhuman dedication and an ineffable brand of personal connection with young people. The poor child, the popular wisdom tells us, needs freedom to move about the classroom, or Ebonics, or less soda, or more leafy green vegetables, or any number of things other than being taught how to sound out words and read. Distracted by the hardships in their home lives, surely they cannot be reached by just having the facts laid out for them the way lawyers' kids can be reached.

But what seems plausible to ed schools is not, as DI's endless successes have shown beyond a shadow of a doubt. What this means is that if we want to make a difference for black boys, such that NAEP surveys will look different in 10 years, we must take the reins ourselves. In a better America, schools that do not use DI to teach kids from poor households should be seen as vaguely criminal. People should point them out as they drive by them, like crack houses.

So Sharpton suggests that "pre-K programs should be expanded." Indeed — and they should be required to start kids out with DI methods. "Teachers should be truly held accountable," Sharpton continues. Yes — and teaching with DI should become the measure of effective teaching. Note also: DI wouldn't require us to wait until that great day when all teachers are stellar. DI is designed, with its set scripting, to be teacher-proof.

"We dare not fail," Sharpton announces.

Right — but fail we will, if we do not start demanding that our local school boards use methods of teaching reading that actually work.

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.

Original URL: http://www.jsonline.com/news/metro/mar01/siefert02030101a.asp

Learning the drill

Siefert Elementary studies success with structured lessons

By ALAN J. BORSUK of the Journal Sentinel staff

Last Updated: March 1, 2001

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.

Study Objective 24

Examples of Two Simple Direct Instruction Lessons: “Over” and “Steeper”

Unit 5: Verbal Behavior

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; however, I may add a study objective or two over it during lecture. 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.

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.

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 9A 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. 529, Table 25.1. What is the "plain English description/definition" of an echoic?

16. 531, 1st colm, 1. What is the antecedent event that controls an echoic?

17. 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.

18. 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.

19. Review of response product, which we first covered in U1, SO6. This distinction is especially important for verbal behavior, which is why I am having you review it here.

    A. State the difference between a response and a response product as below.

       A response/behavior is movement of the skeletal muscles, movement of the smooth muscles, and/or secretion of the glands. The response *product* is the stimulus (or stimuli) that results (is produced) from the response/behavior.

    B. When given examples like the ones on the next page, be able to state what the response is and what the response product is.

Examples:

1. When you say “milk”

   (a) What is the response? Movement of the skeletal and smooth muscles involved with the vocal musculature

   (b) What is the response product? The **auditory stimulus** of “milk”

2. When you write “milk”

   (a) What is the response? Movement of the skeletal muscles when writing “milk”

   (b) What is the response product? **Visual stimulus** of the word “milk”

3. When you sign “milk”

   (a) What is the response? Movement of the skeletal muscles when signing “milk”

   (b) What is the response product? **Visual stimulus** of the sign for “milk”

20. 531, 1st clm, 3. What type of reinforcement is provided for an echoic?
21. 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.
22. 529, Table 25.1. What is the "plain English description/definition" of an intraverbal?
23. 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.

24. 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.

25. Try the examples in Table 25.3.

    Also, do the examples at the end of the study objectives. I have provided the answers after the examples.

    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.

26. 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. **Be sure to include the SΔ diagram as well.**

27. 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.

28. Define “functional independence.”

Answer: Functional independence means that the verbal operants (mands, tacts, IVs, echoics, etc.) are controlled/caused by different variables and just because a speaker can say a particular word, such as, “milk” as a mand, it does not mean the speaker can say it as a tact or intraverbal.

Incorrect use of “function.” In the past some students have said that functional independence means that mands, tacts, IVs, echoics have different “functions,” in the sense that they have different “purposes.” This is not what we mean by functional independence. -1 for saying this on the exam.

29. 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!

30. 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."

    OK, I will give you a little help here. The same word, “candy”, can be a tact or a mand, but the controlling variables (what causes the child to say “candy”) are very different. “Candy” is a mand if the child says it because he/she wants candy. But it is a tact if the child says “candy” because he sees candy.

31. 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. 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 (this is the answer to B above). Usually, with mands, this is where the interaction stops. 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 (the answer to C).

32. 8, 1st clm, 1. Describe the "collateral tacting" testing procedure? Be careful with this one. I am not asking you to tell me what “collateral tacting” means (as I do below) but rather how, specifically, they did the collateral tacting testing.

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."

33. 8, 1st clm, 2. Describe the tact training procedure? **Note, that you should not repeat the first sentence in the paragraph**. Rather, I want you to describe the procedure in sufficient detail so that the person you are describing it to could actually do it.
34. 8, 1st clm, 2. Describe the collateral mand testing procedure? Again, describe it in sufficient detail so that the person you are describing it to could actually do it.
35. 15, 2nd clm, 2. What were the **results**? (just the first sentence will do, you don't have to go into detail). Be sure to include the information that the results were the same for **all** participants. This is important.
36. 15, 2nd clm, 3. What were 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 unless I add one or two in lecture. If I have time, I will 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.

37. 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?"
38. 868, 1st clm, 2. Note the different events that have been remembered incorrectly after participants were given misinformation.
39. 868, 1st clm, 3. What two things can lead to the misinformation effect?
40. 868, 2nd clm, 2. Interesting study with an alcohol placebo.
41. 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!

42. 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.

43. 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!
44. 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!)
45. 871, 2nd clm, 1. Note the two take-home lessons from the work described in this paragraph.
46. 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). The answers are on the next page.

	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 favorite
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._____	say "ouch"	to get attention
26._____	say "ouch"	pulling off a bandaid
27._____	say "ouch	reading "no ouch bandaids"
28._____	say "lobster"	hearing someone say "lobster"
29._____	write "Skinner"	hearing someone say "Skinner"
30._____	say "Skinner"	hearing someone say "behavior analysis"

PSY 4600, Verbal Behavior Exercise Answers

	A tendency to:	Solely as a result of:
1. T	say "chimes"	hearing a clock chime the hour
2. IV	say "water"	hearing someone say "bread"
3. IV	write "wet"	hearing someone say "ocean"
4. E	sign "cat"	seeing someone sign "cat"
5. NV	turn up the heat	it being too cold in the room
6. M	say "thanks"	wanting someone to help you again in the future
7. V-TX	say "WMU"	seeing "WMU"
8. T	sign "tree"	seeing a tree
9. T	say "animal"	hearing a cow moo
10, NV	smile	seeing Jennifer come into the room
11. T	say "rough"	touching sand paper
12. E	write "apple"	seeing "apple"
13. T	say "Andrea"	seeing Andrea's boyfriend
14. M	say "awesome boots"	wanting further social interaction
15. E	say "operant"	hearing someone say "operant"
16. V-TR	write "large"	hearing someone say "large"
17. T	sign "going up"	feeling the elevator go up
18. V-TX	say "mand"	seeing "mand" written
19. T	write "red"	seeing a red apple
20. IV	say "Psy 4600"	someone asking you what course is your favorite
21. T	say "Psy 4600"	seeing Dr. Dickinson
22. M	say "Psy 4600 rocks"	wanting Dr. Dickinson to like you more and give you a break on your grade
23. T	say "reinforcement"	seeing M&Ms
24. IV	say "4"	someone saying "what's 2 + 2?"
25. M	say "ouch"	to get attention
26. T	say "ouch"	pulling off a bandaid
27. V-TX	say "ouch	reading "no ouch bandaids"
28. E	say "lobster"	hearing someone say "lobster"
29. V-TR	write "Skinner"	hearing someone say "Skinner"
30. IV	say "Skinner"	hearing someone say "behavior analysis"

Unit 6: Motivating (Establishing) Operations and their Application

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.

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, 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 essential in both diagrams.*
4. 3,4. State the name of the two **main** effects that MOs have, and describe them as I do.

****

VERBAL FRAMES FOR SOs 5&6

There are different ways to answer the questions in SOs 5&6 correctly. In lecture, I will say the same thing different ways – students sometimes benefit from that. However, below is some language, or what I call "verbal frames" that might make this material easier for you.

A. Reinforcer Establishing Effect (SO5)**:**

(What specific consequence) becomes *more* reinforcing**.**

B. Reinforcer Abolishing Effect (SO6):

(What specific consequence) becomes *less* reinforcing**.**

C**.** Evocative Effect (SO5):

Behaviors that have resulted in **(what specific consequence)** in the past will be *evoked***.**

Also OK: **(What specific examples of behaviors)** will be *evoked*.

D. Abative Effect (SO6):

Behaviors that have resulted in **(what specific consequence)** in the past will be *suppressed***.**

Also OK: **(What specific examples of behaviors)** will be *suppressed*.

****

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?

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

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, in the first two questions you should only state the "reinforcer abolishing effect" and in the last two questions you should only state the "abative effect".

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. State (1) the Conditioned Reinforcer Establishing Effect, (2) the specific behavior in the example that is affected, and how that behavior is affected.

      Verbal frames:

      1. **<u>(What specific reinforcer in the example)</u>** becomes *more* reinforcing.

      2. **<u>(What specific behavior in the example)</u>** will *increase in the future* when **<u>(that MO)</u>** is present.

   B. State (1) the Conditioned Reinforcer Abolishing Effect, (2) the specific behavior in the example that is affected, and how that behavior is affected.

      Verbal frames:

1. **(What specific reinforcer in the example)** becomes *less* reinforcing.
2. **(What specific behavior in the example)** will *decrease (or at least not increase) in the future* when **(that MO)** is present.

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

A. State (1) the SD Evocative Effect, (2) the specific behavior in the example that is affected, and how it is affected.

Verbal frames:

1. **(What specific stimulus in the example)** becomes a *more* potent or powerful SD.
2. (**What specific behavior in the example)** will be *immediately evoked*.

B. State (1) the SD Abative Effect, (2) the specific behavior in the example that is affected, and how that behavior is affected.

1. **(What specific stimulus in the example)** becomes a *less* potent or powerful SD.
2. **(What specific behavior in the example)** 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 used that term in the study objectives.

12. Abstract. Not for the exam, but in the first two sentences of the abstract, the authors state why they conducted this study: Is it possible that EOs are responsible for the fact that the effectiveness of reinforcers often varies within and between individuals?
13. 281, 0. Not for the exam, but notice that the authors used reinforcers from three different "categories" of reinforcers. This was a very nice feature because the authors could determine whether EOs affected different types of reinforcers differently. They didn't. EOs affected all three types exactly the same way.
14. The following material may help you understand the study. The authors conducted three separate experiments, but all three were conceptually identical.

For the exam. Based on the material below, indicate how the two IVs were manipulated in each condition. In other words, if I ask how the EO and reinforcement were 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?

The studies:

There were three experimental conditions: baseline, deprivation, and satiation.

Two critical variables (IVs) were manipulated: (1) the EO (deprivation/satiation) and (2) reinforcement (present or absent).

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.

15. Again, 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.
16. 282, 1. In the first study that examined the effect of food deprivation and food satiation, when were baseline sessions conducted and why were they conducted at that time? Answer: **Baseline sessions were conducted 30 min before lunch when 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. 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. Also, 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. For Donny, during the satiation procedures (when Es were socially satiating Donny 15 min before 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 **establishin*g*** 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 Donny emitted.

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, including examples to illustrate each.

    In other words, in your answer you need to explain what is meant by a "functional" reinforcer and what it means to "establish" a reinforcer. And, for the latter, you cannot just say, "may be failure to establish functional reinforcers via manipulation of antecedent variables. The authors are referring to the manipulation of a particular type of antecedent variable and you need to state what that antecedent variable is in your answer.

    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: Gerontology and Staff Management

Articles in U7 of the course pack:

1. Engstrom, E., Mudford, O. C., & Brand, D. (2015). Replication and extension of a check-in procedure to increase activity engagement among people with severe dementia. *Journal of Applied Behavior Analysis, 48,* 460-465.

2. Baker, J. C., LeBlanc, L. A., Raetz, P. B., & Hilton, L. C. (2011). Assessment and treatment of hoarding in an individual with dementia. *Behavior Therapy, 42*(1), 135-142.

3. Reid, D. H., O'Kane, N. P., & Macurik, K. M. (2011). Chapter 17: Staff training and management. In W. W. Fisher, C. C. Piazza, & H. S. Roane (Eds.), *Handbook of applied behavior analysis* (pp. 281-294).

Goals of the unit: Present overviews of behavioral gerontology and staff management; two fields that are growing and becoming increasingly important.

IMPORTANT NOTE: I will hand out study objectives for the gerontology material in class. I will be starting with the gerontology material even though I have provided the study objectives for the staff training material first.

Introduction to Staff Management, from ppt presentation

1. Why is staff management so important?
2. What three OBM courses should human services professionals take?

Reid et al. article in the course pack

3. 282, 2nd colm, 2.
   A. What do the typical training procedures in human services rely on?
   B. What may these typical training procedures be useful for?
   C. What are the typical training procedures rarely effective for?
   D. What type of training is necessary to train staff in skills necessary to perform the job? **Include the material after "such as"**.
4. 283, 2nd colm, 1. State the major point (the one in italics) about staff training as a way to enhance staff job performance. The entire sentence is important – not just the first or second part.
5. 283, 2nd colm, 3. State the difference between "antecedent" interventions and "consequence" interventions, in terms of their purposes.
6. 284, 1st colm, 2. State the most common antecedent intervention and two other common antecedent interventions (any two of the others that are provided).
7. 284, 1st colm, 2. Why are antecedent interventions so popular?
8. 284, 1st colm, 2. What does the research say about the effectiveness of antecedent interventions?
9. 285, 1st colm, 2. State the reasons why feedback is not a common practice in human service settings.
10. 285, 1st colm, 2. Effective presentation of feedback to staff by supervisors is likely to require what? Please read the next study objective and do not include the answer to that one as part of the answer to this one. The answers are different.

11. 285, 1st colm, 3. Although there is not a lot of research on the effectiveness of punishment as a staff management procedure, what do the available results indicate?
12. 285, 1st colm, 3. In one early study, want percentage of supervisors in settings serving people with developmental disabilities reported that they relied on punishment for managing staff performance problems?
13. 286, 2nd colm, 1. What types of programs have improved staff performance? Not for the exam, but note the next sentence – you can see a common theme throughout the article. First, supervisors don't have the skills to implement effective interventions and second, effective interventions take time and effort.
14. A. Based on the below, state the percentages that (1) developmentally disabled consumers and (2) staff spend in off-task activities in residential and group homes.

    Research has consistently shown that developmentally disabled consumers who live in residential facilities and group homes spend ~65% of their time off-task (that is, not engaged in any meaningful or leisure activities) and staff often spend ~45% of their time off-task. Multifaceted programs have improved this considerably.

    B. 290, 2nd colm, last sentence and first sentence on 291. What is the reasonable assumption of research that has shown the effectiveness of multifaceted programs with respect to increasing staff performance?

Back to ppt presentation: Green et al. study

15. What did Green et al. do as the first step and why did they do this? **Note carefully the emphasis on not interfering with the basic care of the consumers.**
16. A. How many different "facets" or components did Green et al.'s multifaceted program have?

    B. State any three of the facets/components.
17. State the percentage point decrease in nonwork from baseline to intervention for the two time periods.

THE END

Unit 8: Credentialing in Behavior Analysis and Professional Ethics

The following articles in U8 of the course pack:

1. Dickinson, A. M. (2015). Credentialing in behavior analysis.
2. Martin, G., & Pear, J. (2015). *Chapter 30, ethics*.
3. Van Houten, R., Axelrod, S., Bailey, J. S., Favell, J. E., Foxx, R. M., Iwata, B. A., & Lovaas, O. I. (1988). The right to effective behavior treatment.
4. Skinner, B. F. (1978). *Chapter 3: The ethics of helping people*.
5. Hanley, G. P., Piazza, C. C., Fisher, W. W., & Maglieri, K. A. (2005). On the effectiveness of and preference for punishment and extinction components of function-based interventions.
6. OPTIONAL: Wolf, M. M., Risely, T., & Mees, H. (1964). Application of operant conditioning procedures to the behavior problems of an autistic child.

Dickinson article

1. 1, 2. State two main differences between certification and licensing. In order to answer this correctly, you must refer to both certification and licensing for each difference.
2. 3, 1. State the four categories of requirements for BCaBAs and BCBAs.
3. 4, 2. State the degree requirements for (a) BCaBAs and (b) BCBAs. All you need to say here is (a) a "bachelor's degree" and (b) an MA degree: you do not have to go into detail.
4. 7, 0. State the name of and describe/define the two types of license laws.

Martin & Pear article

5. 307, 2. From a behavioral perspective, describe how constitutions, bills of rights, and related political documents are viewed.
6. 307, 2-3. Why, in its early years, did the term "behavior modification" evoke many negative reactions, ranging from suspicion to outright hostility? Note that part of this answer is at the end of paragraph 2 – the historical/cultural abuse of power by political regimes – and part is in paragraph 3 – people's personal experiences. They are different, and both are important. Also, see the ppt.
7. 308, 2. Define ethics from a behavioral point of view.
8. 309, 2. It is sometimes argued that all attempts to control behavior are unethical. Why, upon a little reflection, doesn't this argument make sense?
9. Now turn to 314, Note 1, the note that the authors refer to in the margin of 309,2.
   A. Why, according to Skinner, was the concept of freedom developed and why did Skinner believe that this concept was worthwhile at that time?
   B. Skinner asserted that the concept of freedom outlived its social usefulness. Why?
   C. Finally, why did Skinner believe that the concept of freedom is actual harmful? Give an example – it does not have to be original. Note: Do **not** answer in terms of the material that begins with "Moreover…." You may, of course, include that material in your answer, but I want you to learn the point that comes before that.

10. Turn back to 310, 1. Define countercontrol. From a behavioral perspective, this is critical to ensuring that interventions are ethical.
11. 314, 1. The most fundamental and effective safeguard to using behavior modification (behavior analysis) wisely and humanely is countercontrol. Why is it that the authors state that perhaps the best way to develop effective countercontrol throughout society is to spread their skills as widely as possible and to help educate the general public with respect to behavior modification?

Van Houten et al. article

12. 383, 2nd colm, 3. When is it **unacceptable** to expose an individual to a **nonrestrictive** intervention (or a series of such interventions)?
13. 383, 2nd colm, 4 – 384, 1st colm, 0. What determines a procedure's overall restrictiveness?
14. 382, 1st colm, 0. Not for the exam, but the Hanley et al. article will elucidate the following, "Furthermore, selection of a specific treatment is not based on personal conviction. Techniques are not considered either "good" or "bad" according to whether they involved the use of antecedent rather than consequent stimuli or reinforcement rather than punishment."

    To give you a preview or "whet your appetite", in the Hanley et al. study, two children with severe behavior disorders were exposed to treatment conditions that consisted of (a) reinforcement for appropriate behavior and extinction for inappropriate behavior and (b) reinforcement for appropriate behavior and punishment for inappropriate behavior. Not only was the latter condition more effective, but when the children were given a choice between the two, they chose the reinforcement plus **punishment** condition. Think about this: is it about us (our values) or is it about our clients/consumers? The Hanley et al. study is a **very important** study in our field.

Skinner article

15. 63, 1. According to Skinner, what is the problem of giving too much help?
16. 65, 2. We sometimes refer to people as lacking initiative, showing little strength of character, having weak wills, lacking spiritual strength, having underdeveloped egos and to be suffering from such things as apathy and boredom. What are such individuals actually suffering from?
17. 66, 3. State why we tend to give things/goods to others "gratis" rather than giving others the opportunity to work for things/goods. Don't just say, "reciprocal reinforcement" – make the points made in the sentence that begins "Given a choice between…"
18. 67, 0. How does behavior modification help people? Include both points about giving and getting.
19. 67, 3. The point made in this paragraph explains what Skinner said in 67,0 that "it was inevitable that there would be some conflict with traditional views of helping others – especially with principles of what was just or fair to be defended as the rights of the individual."

    For the exam: Why was it inevitable that there would be a conflict between behavior modification and the traditional views of helping others, particularly those in institutional care?

Let me help summarize this for you. In order to help individuals with complex behavioral problems (and provide a reinforcing environment), we need to implement effective contingencies of reinforcement. **The arrangement of effective contingencies of reinforcement involves depriving individuals, to some extent, of powerful reinforcers that traditionally have been viewed as guaranteed rights, and withholding them until the habilitative behavior occurs.**

Not for the exam: Needless to say, the above is very controversial and has caused serious public relations problems for behavior analysis. Before agreeing or disagreeing, please read 68, 2.

20. 69, 3. According to Skinner, The "good life" is not a world in which people *have* what they need – what is it? Note that the phrase "what they ***need***" is very important here. That is because things that people need are strong/potent reinforcers (food, shelter, comfort, etc.). Thus, the point Skinner is making here is that the "good life" is not one in which people have what they need (or, in other words, get what they need gratis/without working for it), but rather one in which strong/potent/important reinforcers result from effective/appropriate behaviors (what Skinner refers to as effective contingencies").

Not for the exam, but I find the material in 69, 3 intriguing, particularly as it relates to governments.

Hanley et al. article: this research study has multiple phases with interesting data. However, I am only going to focus on phase 3, in which two children with severe behavior disorders and impaired verbal behavior were able to select the treatment condition they preferred.

21. 52, 1st clm, 2. What is functional communication training? As the authors state, FCT is a type of DRA schedule but is a special type of DRA. See my explanation below.

The reinforcer for problem behavior is determined. Therapists then teach the individual to emit a socially acceptable **alternative** behavior – technically, a mand - such as a gesture, sign, word or other type of vocalization, handing the therapist a picture card, etc. – that they reinforce with the same reinforcer that was reinforcing the problem behavior. After training, the socially acceptable mand (the gesture, sign, word, vocalization, picture card), is reinforced while the problem behavior is extinguished or punished. In some cases, instead of extinguishing or punishing the problem behavior, therapists provide non-contingent reinforcement.

Let me try to explain this further using an example. Assume that a child's tantrum behavior was being reinforced/maintained by attention. Depending upon what the child is capable of doing, the therapist might teach the child to say "play", sign "play" or hand a green card to the therapist, which the therapist reinforces by attending to and playing with the child. The tantrum behavior is simultaneously extinguished or punished.

22. 52, 1st clm, 2-52, 2nd colm, 0. Not the for the exam but note the data reported by Hagopian et al. about the effectiveness of FCT when combined with reinforcement, extinction, or punishment for an alternative behavior.

23. 55, 2nd clm, 1. During phase three, which is the part of the study I am having you focus on, the children were exposed to three conditions: FCT with extinction, FCT with punishment, and punishment only, thus I am going to have you describe these three conditions.

Note that although the authors refer to FCT with extinction condition as just the FCT condition, I am going to require you to refer to it as the FCT with extinction procedure so that the contrast with the FCT with punishment condition is explicit.

24. 55, 2nd clm, 1. Describe the FCT with extinction procedure. Include in your answer (a) what the **specific** alternative responses were for each child (be specific and detailed – if in doubt, see the ppt for the answers I will accept) - and (b) what the **specific** reinforcer was (including the length of time it was provided).

    You do not have to include the information about the poster board for Jay.

25. 56, 1st clm, 1. Describe the FCT with punishment procedure. Include the reinforcement component even though the authors don't repeat it here. Also, include what the specific punisher was for each child, including the length of time they were administered.

    Again, you do not have to include the information about the poster board for Jay.

26. Turn to 57, 1st clm, 1. Describe the punishment only procedure (in detail). The procedure is described in the sentence starting, "During the punishment-only condition" about ½ way down the page.

27. 56, 2nd clm, 1-57, 1st clm, 1.

    A. How did the children choose the treatment condition? I am going to help summarize the procedure for you. See below.

    The children pressed one of three different-colored switches, each of which was paired with one of the three treatments.

    B. After the children pressed the switch, what happened?

    They were immediately praised by the therapist for pressing the switch and exposed to the corresponding treatment for 2 min. Note that I won't accept "they got access to the terminal link" – that is too vague.

28. 61, 1st clm, 2 and 61, 2nd clm, 0. Of the three treatment conditions, which one did the children prefer?

29. 61, 2nd clm, 2-62, 1st clm, 0. What would have been the problems if treatment options were restricted to those considered nonaversive or positive? The authors mention 2 problems; state both.

30. 62, 2nd clm, 1. Why might the children have chosen the treatment condition they did? Hint: the sentence starting, "Therefore, it seems plausible…."

    Not for the exam, but think back to Skinner's article, particularly the material in study objectives 20 and 22. Are these results related to what he said in that article?

THE END