

Biological Models of Anxiety

The biomedical model of human health primarily considers physiological factors when attempting to understand illness. When applied to mental disorders, this model assumes that such disorders can be conceptualized as diseases and typically treated by psychopharmacology. Alternatively, the biopsychosocial model considers environmental and psychological factors in addition to biological factors when determining mental health.

Presented with these two models, a group of researchers posited that the biopsychosocial model provides a better basis for the treatment of mental disorders. The researchers randomly assigned subjects diagnosed with Generalized Anxiety Disorder (GAD) into one of three treatment groups: Medication-only, Therapy-only, and Multimodal. Subjects in the Medication-only group received daily treatment with a benzodiazepine (i.e. clonazepam). Subjects in the Therapy-only group received weekly Cognitive Behavioral Therapy (CBT) sessions. Subjects in the Multimodal group received both treatment modalities. At three time periods during the study (pre-treatment, four weeks, eight weeks), subjects were asked to rate their average daily level of anxiety on a ten-point scale (1 = “no anxiety” to 10 = “paralyzing fear”). Figure 1 shows the results of this study.

At the end of eight weeks, researchers discontinued treatment for all study subjects. Subjects were then asked to return four weeks later for a follow-up meeting, at which time they repeated the subjective anxiety ratings shown in Figure 2.

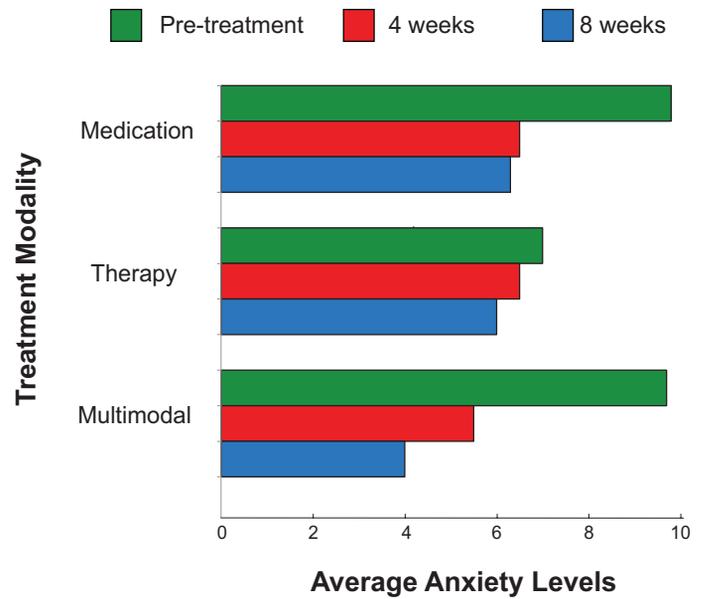


Figure 1. Self-reported levels of anxiety for subject groups at 0, 4, and 8 weeks.

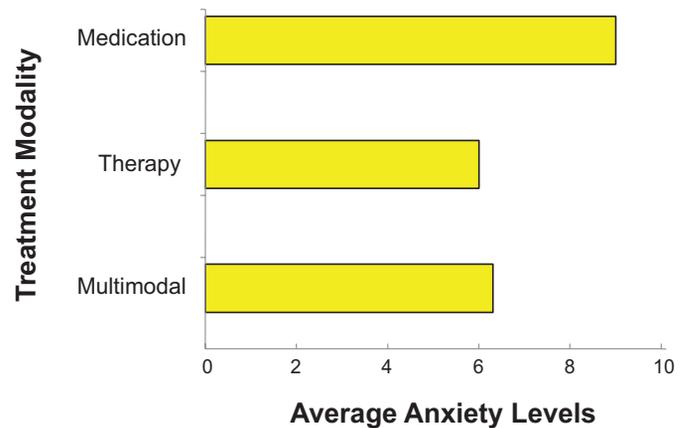


Figure 2. Self-reported levels of anxiety at follow-up.

- 1) Assume that, within each group, the differences between pre-treatment and 8-week anxiety levels are statistically significant for the Medication-only and the Multimodal groups. Which of the following conclusions is best supported?
- The biomedical model shows the most promise; subjects in the Therapy-only group did not experience significant symptom reduction.
 - The biopsychosocial model is supported; subjects in the Multimodal group experienced the greatest symptom reduction.
 - Results are inconclusive; the significance of the between-group differences at the 8-week period was not reported.
 - Any successful treatment modality must include medication; the Therapy-only group did not demonstrate significant symptom reduction.
- 2) Based on the results of this study, the researchers hypothesize that clonazepam is a uniquely effective medication for relieving symptoms of GAD. Which experiment best tests this hypothesis?
- Repeat the study with the addition of a placebo-control group, including clonazepam.
 - Repeat the study with the addition of a no-treatment control group and clonazepam.
 - Repeat the study using multiple Medication-only groups with different anti-anxiety medications, including clonazepam.
 - Repeat the study adding clonazepam to the other (non-medication) group in the original study.
- 3) Which of the following best explains changes in anxiety across the entire study, including follow-up?
- Clonazepam acutely reduced anxiety, whereas CBT promoted sustained improvement.
 - The Multimodal group experienced no benefits from medication.
 - The Therapy-only and Multimodal groups continued treatment after the study.
 - CBT was a more effective treatment than medication for reducing symptoms of anxiety.
- 4) What confounding element of this study prevents ruling out the possibility that symptoms simply change over time independent of treatment?
- Failure to account for personal differences between subjects.
 - Failure to include a no-treatment control group.
 - Failure to consider the possible genetic etiology of anxiety.
 - Only including one medication and one therapy model in the study.
- 5) “Avoidance” of a feared stimulus is a defining characteristic symptom of GAD. Avoidance behavior reduces anxiety symptoms in the short-term, but results in chronic anxiety symptoms. This is an example of what kind of sociopsychological process?
- Modeling.
 - Observational learning.
 - Classical conditioning.
 - Operant conditioning.

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Annotations.

1) **B** 2) **C** 3) **A** 4) **B** 5) **D**

	Foundation 6: Emotion/Stress-C			Foundation 7: Individual Diff.-A Learning-C		
	C			A	C	
Concepts					5	
Reasoning	3					
Research				2,4		
Data				1		

Big Picture. This passage describes a fairly standard mental health treatment experiment, in which multiple treatment methods are compared at different time points during treatment. While the data from this experiment are presented in two charts, the use of two charts is unnecessary. The data from Figure 2 could just as easily have been represented as a fourth time point in Figure 1. Splitting the data into two charts adds complexity to the passage, as it adds an extra step to the task of interpretation. You should recognize this as a common MCAT technique designed to slow you down, as it camouflages testable points that would be more obvious if they were presented as a single figure. This approach allows the MCAT to differentiate efficient from non-efficient test-taking methods. When you are presented with multiple charts, note how the charts overlap – in this case, entirely – and what obvious data trends exist, but don't get bogged down in possibly irrelevant details.

- 1) **B. The biopsychosocial model is supported; subjects in the Multimodal group experienced the greatest symptom reduction.** The key to this question is to know what can – and cannot – be inferred from statistically “significant” results. When a scientific article states that the results are statistically significant, it implies a given probability that the results were not due to chance. In the experiment described in this passage, the researcher applied three treatments – therapy, medication, and multi-modal – and tested the resulting changes in anxiety symptoms. Since the Medication-only and Multimodal groups experienced significant symptom reduction, those are the two treatment models that have statistical support for being effective. That does not mean that the Therapy-only treatment did not work, rather that the statistical test on that group's data did not indicate a significant outcome. In fact, we can see from Figure 1 that the Therapy-only group did experience symptom reduction, but the change was not as great and not statistically significant.

Question 1 requires you to determine the greatest change in anxiety levels from pre-treatment to week 8. To do this, you can calculate the approximate difference for each treatment: Medication = 4 (10-6); Therapy = 1 (7-6); and Multimodal = 6 (10-4). It follows that **choice B is correct** because the Multimodal treatment produced that greatest reduction in symptoms.

Choice A is tempting because the Medication-only group showed greater symptom reduction than the Therapy-only group. However **choice A is not correct** because we cannot say that it is the most promising, since the Multimodal shows an even greater change. **Choice D is incorrect** and attempts to confuse you by juxtaposing “significant” with “successful” (they are not synonymous). Note that there is no context to establish what “successful” means in the passage or question. Furthermore, there was a decrease in anxiety in every condition. **Choice C is incorrect** because it addresses the concept of between-group differences – a comparison of one group to another at each time point (e.g. the difference between each therapy group at week 8). However, the question stem focuses on within-group differences, or changes in data within a group over time.

2) **C. Repeat the study using multiple Medication-only groups with different anti-anxiety medications, including clonazepam.** In this question stem, the researchers think that clonazepam is a “uniquely effective medication” for treating anxiety. In order to demonstrate this, the researchers would need to compare the effects of clonazepam to those of other medications. **Choice C is correct**, as it describes an experiment testing the effectiveness of clonazepam versus other drugs. **Choices A and B are both incorrect** because they do not describe experiments that test clonazepam relative to other medications. In general, controls groups are important, but in this case it would not provide any information about relative differences among drugs. **Choice D is incorrect.** We cannot draw conclusions about clonazepam versus other drugs unless we directly compare it to other drugs. Since clonazepam was added to every condition, no comparison can be drawn regarding its effectiveness.

3) **A. Clonazepam acutely reduced anxiety, whereas CBT promoted sustained improvement.** First eliminate choice C; there is no information provided about treatment after week 8.

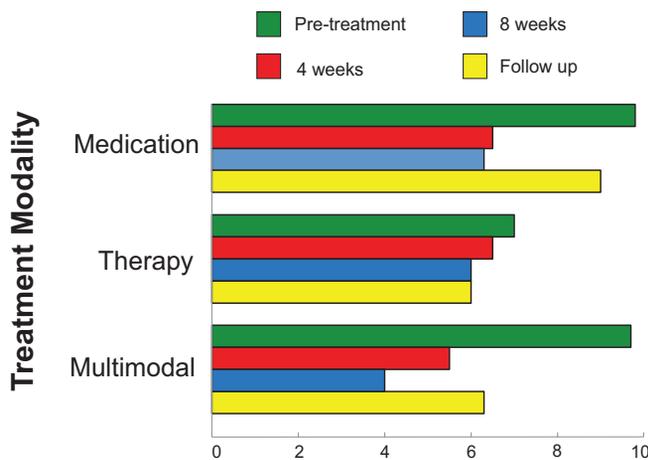


Figure 3. Changes in anxiety throughout the entire course of the experiment. X axis = average anxiety levels.

Figure 3 is a composite of Figures 1 and 2. It shows the following: 1) Anxiety levels in the Medication-only group first decreased from 10 to about 6 (at week 8), then increased to 9 at follow-up. Anxiety levels in the Therapy group decreased from about 7 to 6 (at week 8), and were sustained at 6

during follow-up. 3) Anxiety levels in the Multimodal group decreased from 10 to about 4 (at week 8), then rose back to 6 at follow-up. It is unclear why the anxiety levels rebounded for the Medication-only and Multimodal groups; however, the variable those two groups have in common is clonazepam, which was removed after week 8. Therefore, clonazepam acutely reduced anxiety in two groups. In the Therapy-only group, anxiety levels decreased, albeit it slightly, from 7 to 6 (in week 8), but remained nearly the same at follow-up. The small amount of improvement was sustainable as seen by anxiety levels at follow-up (**Fig. 3**). Therefore, **choice A is correct** because conditions that included clonazepam (Medication and Multimodal) produced decreases over the first eight weeks and increases at follow-up, while Therapy produced small changes that were sustained at follow-up. **Choice B is incorrect** because the phrase “no benefits from medication” is inaccurate – all groups had decreased levels of anxiety at some point in the study; they did receive some benefit. **Choice D is not credited** because the phrasing “more effective” is ambiguous; there is no clarity regarding acute (i.e. short-term) changes versus sustained improvement (i.e. follow-up). Therefore, “more effective” is ambiguous with regard to the question.

4) **B. Failure to include a no-treatment control group.** A study confound is a flaw in the experimental design. This study did not account for the possibility that patients’ anxiety symptoms may spontaneously get better over time – without any intervention. The only way to scientifically control for this possibility is to include a no-treatment control group. **Choice B is therefore the best answer.** The other three answer choices do not address experimental design with regard to change over time and are therefore not good answers.

5) **D. Operant conditioning.** This question does not require interpretation of the experiment described in the passage. Avoidance is when a person evades an unpleasant or feared situation because of the anxiety symptoms that the situation produces. Avoidance fits the definition of operant conditioning in the following way: a person is presented with a stimulus that produces anxiety, they respond with a volitional

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behavior (i.e. avoidance), the behavior is reinforced with symptom reduction (because the anxiety-producing stimulus is not present), and this increases the future occurrence of the avoiding behavior. The above situation is precisely what is described by operant conditioning, making **choice D correct**. “Modeling” and “observational learning” (choices A

and B, respectively) both refer to social learning theory, but they do not apply to avoidance. Therefore, **choices A and B are incorrect**. Classical conditioning (e.g. Pavlov’s dogs) is described in choice C. Classical conditioning encompasses reflexive (not volitional) responding to a stimulus, making **choice C incorrect**.