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GRADE  
100%

## Experimental design and special applications in neuroimaging

LATEST SUBMISSION GRADE

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1. What is a critical aspect of experimental design in a functional magnetic resonance imaging study?

1 / 1 point

- ☐ Measure brain activity associated in response to presented stimuli
- ☐ Determine how the stimuli will be organized within the experiment
- ☐ Using carefully selected stimuli to induce a psychological state of interest
- ☒ All of these options

✓ **Correct**

2. A number of technical limitations hinder the experimental design of an functional MRI study. What is not a technical limitation of fMRI?

1 / 1 point

- ☐ Limited visual field and response options
- ☐ Stimulus timing and length
- ☐ Subject motion
- ☒ Length of the MRI session

✓ **Correct**

3. What is an important psychological consideration in the experimental design of a functional MRI study?

1 / 1 point

- ☐ None of these options
- ☒ Does the stimulus induce the psychological state intended
- ☐ Will the subject be able to respond to all stimuli correctly
- ☐ Does the task make the subject move too much

✓ **Correct**

4. Which of the following statements about resting state functional connectivity studies (rsfMRI) is not true?

1 / 1 point

- ☐ Brain activity is observed in the absence of external task demands or stimuli
- ☒ The default mode network is the only functionally organized network that is observed during rsfMRI
- ☐ Studying brain activation during rest explores the functional organization of the brain
- ☐ Functional connectivity MRI is a variant of fMRI

✓ **Correct**

Several different independent networks of correlated activation can be observed in rsfMRI data.

5. The Default Mode Network (DMN) is thought to be involved in?

1 / 1 point

- ☐ Thought to support the neurological basis of self, including autobiographical information
- ☐ Thought to be involved in supporting cognitive function
- ☐ Thought to support social cognition and emotion
- ☒ All of these options

✓ **Correct**

6. Which of the following statements about the Default Mode Network is not true?

1 / 1 point

- ☐ Great overlap in the Default Mode Network between rodent and primate brains
- ☐ Changes in Default Mode Network activation have been observed in a number of diseases and conditions
- ☐ Tends to be less active when the subject is engaged in the performance of an external task
- ☒ Is completely independent from structural connectivity

✓ Correct

7. Why is hydrogen's the most commonly used gyromagnetic ratio in magnetic resonance imaging?

1 / 1 point

- ☐ Hydrogen has an unpaired proton and therefore a magnetic moment
- ☐ Hydrogen is abundant and distributed in form of water and fat
- ☒ Hydrogen has an unpaired proton and therefore a magnetic moment and hydrogen is abundant and distributed in form of water and fat
- ☐ Hydrogen has a low molecular weight and is therefore easy to excite

✓ Correct

8. Diffusion Tensor Imaging studies of fractional anisotropy provide a measure of

1 / 1 point

- ☐ Fiber density
- ☐ Brain connectivity
- ☐ White matter integrity
- ☒ All of these options

✓ Correct

9. Which of the following statements about Diffusion Tensor Imaging is not true?

1 / 1 point

- ☐ Diffusion Tensor Imaging provides a measure of structural connectivity
- ☒ White matter integrity obtained from Diffusion Tensor Imaging can provide a measure of functional ability
- ☐ White matter integrity obtained from Diffusion Tensor Imaging can be correlated with symptoms or cognitive performance
- ☐ Diffusion Tensor Imaging can provide measures of group differences in white matter integrity

✓ Correct

10. Magnetic Resonance Spectroscopy imaging measures?

1 / 1 point

- ☐ None of these options
- ☐ Structural integrity of local molecules
- ☐ Local water diffusion
- ☒ The local presence of certain chemical compounds

✓ Correct

11. Which of the following statements about Magnetic Resonance Spectroscopy is not true?

1 / 1 point

- ☐ Changes in brain metabolites often precede structural brain changes
- ☐ Higher magnetic field strength results in greater ability to detect metabolites of interest
- ☐ A number of brain metabolites can be quantified with magnetic resonance spectroscopy
- ☒ The spectroscopy signal from water signal is smaller than the common metabolites of interest

✓ Correct

The metabolites of interest in magnetic resonance spectroscopy have low concentrations in the brain

12. Brain metabolites commonly quantified with Magnetic Resonance Spectroscopy are

1 / 1 point

- ☐ N-acetylaspartate, Lactate, Creatine and Dopamine
- ☒ Lactate, Creatine, and Choline

- ☐ Lactate, Creatine, Choline and Dopamine
- ☐ N-acetylaspartate, Creatine, Serotonine and Choline



**Correct**

Dopamine and Serotonine are neurotransmitters