As many of you have figured out, ANOVA is essentially the same as a t-test, except we're dealing with 3 or more groups whereas a t-test deals with a max of 2 groups.

Here’s how you need to approach this discussion question.

**2 Ways of Structuring Your U09D1 Study**

Remember that with an ANOVA, you'd like to see one of 2 types of studies.  Here are your choices:

1. You start with 3 or more groups that are all different in some way, and then compare them for some characteristic or behavior. For example, we look at 3 different segments of corporations (aeronautics, cloud technology, and automotive), and compare them for their frequency of use of internal social media platforms. Here's there's no specific condition that's imposed: We're just looking at how much each of the groups uses an internal social media platform.
2. **You start with 3 or more groups of the same types of participants, and then give each group a different intervention**.  For example, we sort teenagers, all about equivalent in their age, schooling, and so on, into 3 groups.  We give one of the groups a new game app called "Best Fiends."  We give the second group a game app called "Piano Tiles."  We give the third group a game app called "Candy Crush." We then test each group after they've had a chance to play with the apps, to see and compare mean brain cell growth.

**Please pick ONE of these 2 options to help you structure your response to u09d1**.  Also, please remember to satisfy all the requirements of the discussion unit (make sure you address all the questions and explain everything!).  Finally, remember to develop YOUR OWN one-way ANOVA study design; this discussion is about you coming up with something meaningful to you, so it's got to be an original study you created.

How to Frame A Research Question:

You've got a few options here. The key is to come up with a research question that:

(1) Makes clear what you're trying to study

(2) Embraces the one-way ANOVA concept (i.e., you're testing 2 or more levels of an IV, preferably 3 or more, for whatever is measured on the DV)

(3) Does NOT suggest causation

Here are some examples. You may use any of these structures, but of course, modify them for your own topic.

--> Is there a significant difference in frequency of verbal demands among 3 groups of children with different types of autism diagnoses?

--> Is there a significant difference in frequency of verbal demands among children with PDD-NOS when given 3 different sets of verbal cues?

--> Which of 4 treatments for PTSD are associated with the highest reduction of symptoms?

--> Do the peoples of eastern Australia, western Australia, or southern Australia, have higher rates of literacy?

--> Does customer satisfaction differ significantly for different types of communication media (email, social media, and phone)?

Note that you may also come up with your own research question format as long as you're following the guidelines described above.

**Another Note on Variables and Scales of Measurement**

Many of you are struggling with this, so I wanted to add something to this announcement to try to help you.

Whether you select option #1 or option #2 above, your t-test will consist of 2 variables, no more, no less.  Not 3, not 4, not 1, not 16, just 2.

Huh?  But Dr. Reynolds, we're dealing with an ANOVA now.  Didn't you say that an ANOVA deals with 3 or more groups? Yes, I did.  GROUPS (or LEVELS), and NOT variables.  I'll explain.

One of the variables will always be the thing that makes the independent samples different from one another.  You're hypothesizing that this difference is what will result in different outcomes.  Hence, this variable is your PREDICTOR variable.  It is also called the INDEPENDENT VARIABLE. In the case of Option #1 above, the 'Type of Organization' variable is your PREDICTOR VARIABLE.  It has 3 levels: Aeronautics, Cloud Technology, and Automotive.

In Option #2, what's the thing that makes the groups different? The type of game app.  Hence, the 'Type of Game App' is your PREDICTOR VARIABLE.  It also has 3 levels.  You can guess what those are.

Your PREDICTOR VARIABLE for an ANOVA is going to be some sort of label.  "Aeronautics" is not a number.  It's a type of company, and it has a categorical, or more specifically, NOMINAL scale of measurement.

Now, what's your outcome variable in both cases?  Your OUTCOME or DEPENDENT variable, is the thing you're measuring.  You need to measure something to see if the variable that defines the difference between the groups, is really associated with an effect on whatever it is you're measuring.  In Option #1, you're measuring 'Frequency of Use Of Internal Social Media Platforms.'  That's got to be a quantitative variable, or more specifically, a ratio or interval variable depending on what you're measuring.

In Option #2, you're measuring 'Brain Cell Growth.'  Again, the scale of measurement has to be ratio or interval, depending on how you define it.

WHAT TO EXPECT WHEN YOU'RE EXPECTING

There's no way your expected findings could be anything along the lines of, "I expect this mean to be bigger than the other 2." Why am I saying that?

Let's think about it. If we were just comparing means, why would you need a one-way ANOVA?

Here, let's try it:

The mean of laughs by babies per day, where we are comparing the means of babies raised by detached parents, attached parents, and wolves.

Here are the numbers:

Mean # of laughs by babies raised by detached parents = 8

Mean # of laughs by babies raised by attached parents = 24

Mean # of laughs by babies raised by wolves = 32

So, what's the big deal? Clearly the mean is higher for wolves.

I did that without any ANOVA at all. Am I super-smart or am I missing something?

I'm missing something. Big-time!

Now, with an ANOVA, what are we evaluating?  Yes, we're comparing the mean of the dependent variable for group 1 vs. the mean of the dependent variable for group 2 vs. the mean of the dependent variable for group 3. But we are also calculating a p-value to determine whether the difference between the means is statistically significant.  If it is, we can say that one of the means is not only bigger than the other, but was bigger than the other for a reason that doesn't have to do with chance.  In that case, it's likely there's some relationship between the predictor and outcome variables.

One more important elements: Note that with an ANOVA, we wouldn't be able to determine which level(s) or group(s) are statistically significantly different from which others, not until we do what's called a POST HOC test.

So, what should we be talking about in our Expected Findings for u09d1?

(1) We should talk about our prediction -- i.e., that at least one of the means will be different from the others with statistical significance.

(2) We should talk about how in a one-way ANOVA, we can't tell which mean is different with statistical significance until we do a post hoc test.

(3) BUT, we should make a prediction about which mean(s) will be different from which other mean(s) and in what way, with statistical significance.

(4) We should talk about how we determine statistical significance (by comparing our p-value with our alpha level).

If we do all that, we should have a fairly good line on how to do u09d1 expected findings.