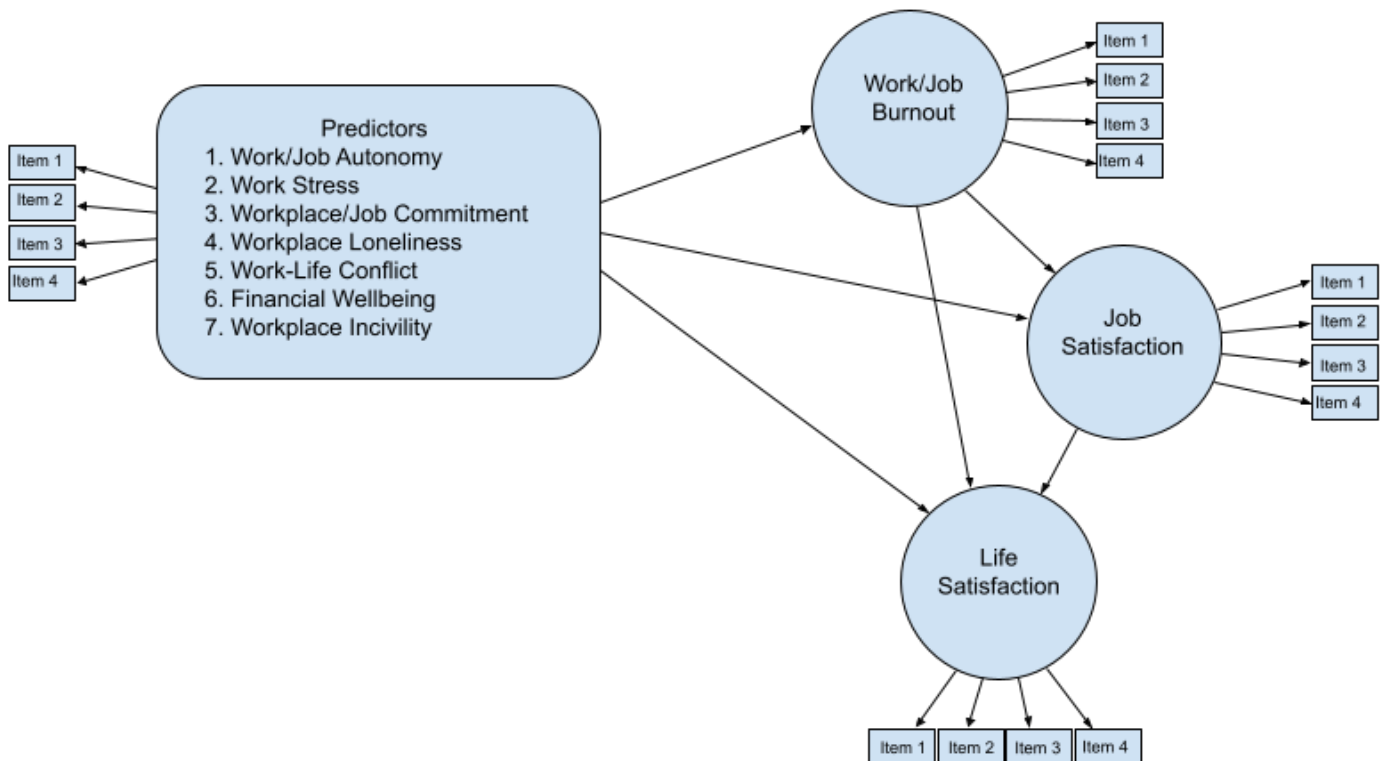


**EDUR 8331 Applied Measurement**  
**Activity 1: Scale Development**  
**Fall 2024**

**Purpose**

The purpose of this activity is to develop 10 scales to measure the latent variables shown in Figure 1. The goal is to obtain scores for each latent variable that demonstrate both reliability (internal consistency) and validity (empirical). The model shows seven predictors – Work/Job Autonomy, Work/Job Stress, Workplace/Job Commitment, Workplace Incivility, etc. – and three outcomes, Work/Job Burnout, Job Satisfaction, and Life Satisfaction. The model also specifies that Work/Job Burnout and Job Satisfaction are predictors of Life Satisfaction.

Figure 1: Predictors of Job Burnout, Job Satisfaction, and Life Satisfaction



**Part 1: Item Development**

This part of the activity will be divided into three phases. In the first phase you will work independently to develop six items to measure the latent variable to which you have been assigned. In the second phase you will work as a team to select and revise the six best items from among the items each of you developed for your latent variable. In the third phase each of you will help develop an electronic questionnaire by adding your group's items to the questionnaire. Details of these phases are provided below.

**1. Phase One: Develop Items Independently**

- On the course web page find the link "Activity 1: Latent Variable Assignments and Sample Scales" to learn which latent variable has been assigned to you and your group.
- Independently, without assistance from your groupmates, draft **5 items** for your latent variable, plus **1 summary item (the validity check item)**, for a total of **6 items**. Details for drafting items are explained immediately below.

Once developed, post your draft items, as a PDF, in the Folio dropbox for Activity 1. The PDF you submit should address each of the following.

- First, write the **latent variable name** to which you have been assigned and a **brief description** of the latent variable **plus any dimensions** that should be included in the measure. Provide citations as needed. For example, if the latent variable was test anxiety, the description and dimensions might appear as follows.

Test Anxiety is the fear one senses before or during important assessments and this usually occurs in two dimensions, physiological and psychological (Spielberger & Vagg, 1995). Physiological references physical reactions one may have when experiencing test anxiety such as sweating, upset stomach, headache, or nervousness, while psychological refers to cognition such as worry about failing, motivation, and concerns about being evaluated (Stöber, 2004).

- Below the latent variable description, post **item wording** and indicate the **response scale** that should be used for each item (e.g., 1 = Not at all like me, 5 = Very much like me; 1 = Very Dissatisfied, 5 = Very Satisfied, etc.). For this activity, use a 5-point Likert-type scale like the examples above, but use whichever scale description wording seems best for your items (e.g., Strongly Disagree, Very Infrequently, Not at all like me, etc.), and you may change response scale options for different item (i.e., not all items must use the same response scale descriptions). Also, all steps on the response scale (1, 2, 3, 4, 5) must have unique descriptions. For example:

1 = No or almost no anxiety  
 2 = Slight anxiety  
 3 = Some anxiety  
 4 = Moderate anxiety  
 5 = Major anxiety

You can find multiple examples of response scale wording in the links below.

- [List of Step Descriptions for Five-point Likert Responses](#)
  - Dr. Siegle offers these: [Likert Response Options](#)
  - Dr. Vagias provides these: [Likert Response Options](#)
- Do not plagiarize items** – borrowing words and ideas is acceptable but provide citations to sources used with your draft items. As a minimum, you must **develop at least three original items**; the remaining items can be reworded items found in the literature. Do not use exact wording of any items found. Identify which items you developed and which you reworded; below the reworded items include copies of the original wording (e.g., Reworded item: “I have an upset feeling when I face important tests.” Original item: “Sometimes I have an upset stomach when taking tests.”).
- One of the 5 items** developed for each latent variable must be **reverse worded**, i.e., **reversed polarity** or **reversed valence**. Reversing the meaning of items can be done by adding negatives, but this often leads to confusion with responses, so don’t use negatives (e.g., not, no), instead, use antonyms or phrasing to reverse the meaning. See examples below for test anxiety items.

Non-reversed:

I feel my heart beating faster during important tests.

Reversed:

My heart remains calm and steady during important tests.

Non-reversed:

When taking an important test, I worry about the consequences of failing.

Reversed:

When taking an important test, I am usually confident I will do well.

- **Validity check item** – Develop and present one item that clearly captures the latent variable succinctly; this is an overall summary item that can be used as a validity check to determine how well the other items correlate with responses to this one item. Below are several examples of summary items, and their response scales, for the measure of test anxiety.

Example 1:

I tend to have anxiety when taking important tests.

(1 = not true of me, to 5 = very true of me)

Example 2:

My level of anxiety before important tests is

(1 = very low, to 5 = very high)

Example 3:

When taking tests, I tend to experience

(1 = no, or very low, anxiety, to 5 = very high anxiety)

- **Diverse Content for the Latent Variable** – When writing items attempt to provide diverse content on the latent variable assigned to you, for example, these two items, while reversed, overlap and offer nothing new, so only one would be used.

My cat likes Friskies party mix snacks

vs.

My cat dislikes Friskies party mix snacks

Both items measure the same thing, thus the content is unchanged. In addition, critically evaluate wording of items and wording of response options to ensure they fit. For example, which response set fits better with this item?

My cat likes Friskies party mix snacks

1 = eats rarely

2 = eats occasionally

3 = eats frequently

vs.

My cat likes Friskies party mix snacks

1 = no, tends to dislike

2 = shows some interest

3 = shows much desire

- **Item justification** – Below each item provide a brief justification for why that item is included in the scale and which dimension it fits if multiple dimensions are modeled in your item development. Note

that item justification is one of the more important components of content validity. For example, if measuring test anxiety, the following item might be included “I have an upset feeling in my body when I face important tests.” Explain the theoretical rationale for including this item and dimension mapping. For example:

Spielberger & Vagg (1995) explain that those with high levels of test anxiety often report experiencing nervousness or an upset feeling. This item addresses that experience and fits with the physiological dimension of test anxiety.

- **Relationship Predictions** – Carefully consider your latent variable and the other latent variables in the Figure 1 model. Using logic, theory, or research, make a **prediction about which 3 latent variables** are likely to be most strongly related, either positively or negatively, with your latent variable. A brief literature review of variables related to your latent variable will be helpful here, although you do not have to report this review. It is likely the literature you review to find additional measures of your latent variable will include related variables. While a literature review is not required, do provide citations to support your predictions and include a brief – one sentence – explanation. Include these predictions in your item draft submission. Relationship predictions will be used to assess evidence for construct validity of your items. Below are examples of variables that are expected to relate to test anxiety.
  - a. Test Anxiety and Academic Self-efficacy – negatively related; logic suggest those with more academic confidence would have less anxiety, and prior research shows these two variables are negatively related (e.g., Roick, J., & Ringeisen, T. 2017. Self-efficacy, test anxiety, and academic success: A longitudinal validation. *International Journal of Educational Research*, 83, 84-93.).
  - b. Test Anxiety and Grades – negatively related; logically one would expect grades to be lower for those who suffer greater anxiety, especially if the anxiety debilitating (Rana, R., & Mahmood, N. (2010). The relationship between test anxiety and academic achievement. *Bulletin of Education and Research*, 32(2), 63-74.).
  - c. Test Anxiety and Distractibility – positively related; those who are more easily distracted during tests are more likely to have greater levels of test anxiety (Alting, T., & Markham, R. (1993). Text anxiety and distractibility. *Journal of Research in Personality*.).
- Lastly, include **references** of material used in development of your items (i.e., any scales or articles used from which item wording was selected). Include also links to those references; either links to the document or to the abstract. Google Scholar (<https://scholar.google.com>) is a good tool for finding published studies since it often provides a link to those studies with online documents.

The instructor will review draft items and provide feedback for revisions.

## 2. Phase Two: Select and Revise Items as a Group

Once you have item feedback from the instructor, make revisions then share your items with your group. As a group, review each member’s items and then select the five items that seem to best represent your group’s latent variable. Also select the one summary item (validity check item) that seems to best measure your latent variable. Once these six items are identified, select one group member to submit these six items to the instructor as a PDF using Folio mail (not the dropbox). Include each group member in the Folio mail so the instructor can easily reply to all with feedback. The instructor will review the new submission and provide suggested revisions if needed.

### 3. Phase Three: Electronic Questionnaire Construction

Once phase two is completed, an electronic questionnaire will be created. Google forms will be used to create the electronic questionnaire. All EDUR 8331 students will be given access to the questionnaire. All six items for your latent variable must be added. Determine who will add each item and each member of your group should add at least one item to the questionnaire so each of you have some experience working with the electronic questionnaire. Include both item and response scale in the questionnaire.

When entering response options in Google forms, provide coding number before response option, i.e.

- strongly disagree, disagree, etc. becomes 1 = strongly disagree, 2 = disagree
- adding these numbers makes it easier to convert text to numbers for data analysis after downloading data from Google forms.

Note that phases 2 and 3 above are the only parts of Activity 1 that should be completed as a group. The remaining parts of Activity 1, detailed in another document, should be completed individually.

### 4. Questionnaire Administration

Once the questionnaire is constructed it will be administered to students in the instructor's classes. Once data are collected, we will proceed to Activity 2 which will focus on item analysis, and reliability and validity assessment.

### References

Spielberger, C. D., & Vagg, P. R. (1995). Test anxiety: A transactional process model. Taylor & Francis.

Stöber, J. (2004). Dimensions of test anxiety: Relations to ways of coping with pre-exam anxiety and uncertainty. *Anxiety, Stress & Coping*, 17(3), 213-226.