

**EDUR 9131: Reliability and Reverse Coding**  
**18 February 2023**

**1. Menon's Questionnaire**

Collect data, unique numeric ID needed.

**2. Data Description**

- Data collected from 500+ undergraduate students at Georgia Southern
- Study focus was on cyber-harassment
- Analyses that follow will focus on the following variables: student sex, academic functioning, and life functioning
- Academic Functioning consists of
  - GPA
  - Graduation Confidence
  - University Connectedness
  - Academic Control
  - Intrinsic Motivation
  - Identified Regulation
- Life Functioning consists of
  - Toxic Disinhibition
  - Impulsivity
  - Empathy
  - Stress
  - Life Satisfaction
  - Socially Connected
- Counts of victimization and perpetration among respondents: VictimCount, BullyCount

**Student Sex**

<p>1. What is your biological sex?</p> <ol style="list-style-type: none"> <li>1. Female</li> <li>2. Male</li> <li>3. Other</li> </ol>
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**GPA**

<p>3. What is your university grade point average (GPA) – if you don't know precisely, please estimate your GPA:</p> <ol style="list-style-type: none"> <li>1. 0.00 to 0.50</li> <li>2. 0.51 to 1.00</li> <li>3. 1.01 to 1.50</li> <li>4. 1.51 to 2.00</li> <li>5. 2.01 to 2.50</li> <li>6. 2.51 to 3.00</li> <li>7. 3.01 to 3.50</li> <li>8. 3.51 to 4.00</li> </ol> <p style="color: red; margin-top: 10px;">Use just items 4, 5, and 6 and call it "College Graduation Doubt" - it will have higher alpha</p>
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## Graduation Confidence

	No or almost never	Rarely	Sometimes	Often	Almost Always
<b>4 5 6 7 = Leave College alpha = .64</b>					
4. Do you think about dropping out of university/college?	1	2	3	4	5
5. Do you think about transferring to another university/college?	1	2	3	4	5
6. Do you think about taking a break from university/college studies for a while and maybe returning later?	1	2	3	4	5
	Not at all Confident	Slightly Confident	Moderately Confident	Mostly Confident	Extremely Confident
7. How confident are you that you will graduate from a university/college?	1	2	3	4	5

## University Connectedness

	Strongly Disagree	Disagree	Mix of Disagree and Agree	Agree	Strongly Agree
<b>35 to 39 = University Connectedness alpha = .81</b>					
35. I feel close to people at this university.	1	2	3	4	5
36. I am happy to be at this university.	1	2	3	4	5
37. I feel like I am a part of this university.	1	2	3	4	5
38. The instructors at this university treat students fairly.	1	2	3	4	5
39. I feel safe in this university.	1	2	3	4	5

## Intrinsic Motivation and Identified Regulation

	Strongly Disagree	Disagree	Mix of Disagree and Agree	Agree	Strongly Agree
<b>48 49 50 = Intrinsic Motivation alpha = .87</b>					
The reason I go to a university is because:					
48. I really enjoy the experience.	1	2	3	4	5
49. it's so interesting.	1	2	3	4	5
50. there are a lot of interesting things to do.	1	2	3	4	5
<b>51 52 53 = Identified Regulation alpha = .83</b>					
51. I see the importance of learning.	1	2	3	4	5
52. I really appreciate and understand the usefulness of a university.	1	2	3	4	5
53. to me, education is just so important – so valuable.	1	2	3	4	5

Academic Control

40 to 47 = Academic Control alpha = .85	Strongly Disagree	Disagree	Mix of Disagree and Agree	Agree	Strongly Agree
40. My grades are basically determined by things beyond my control and there is little I can do to change.	1	2	3	4	5
41. I see myself as largely responsible for my performance throughout my college career.	1	2	3	4	5
42. No matter what I do, I can't seem to do well in my courses.	1	2	3	4	5
43. There is little I can do about my performance in college/university.	1	2	3	4	5
44. The more effort I put into my courses, the better I do in them.	1	2	3	4	5
45. How well I do in my courses is often the "luck of the draw."	1	2	3	4	5
46. I have a great deal of control over my academic performance in my courses.	1	2	3	4	5
47. When I do poorly in a course, it's usually because I haven't given it my best effort.	1	2	3	4	5

Empathy

30 to 34 Empathy alpha = .74	Strongly Disagree	Disagree	Mix of Disagree and Agree	Agree	Strongly Agree
30. If a classmate is teased, I feel bad thinking about what is happening to him/her.	1	2	3	4	5
31. I am patient with people who do things worse than I do.	1	2	3	4	5
32. I feel the misfortunes of others.	1	2	3	4	5
33. When I see that a friend is sad, I also become sad.	1	2	3	4	5
34. I am happy when something good happens to someone I know.	1	2	3	4	5

Stress

54 to 59 = Kessler Stress alpha = .84	None of the time	A little of the time	Some of the time	Most of the time	All of the time
Since you started college, how often did you feel ...					
54. So sad that nothing could cheer you up?	1	2	3	4	5
55. Nervous?	1	2	3	4	5
56. Restless or fidgety?	1	2	3	4	5
57. Hopeless?	1	2	3	4	5
58. That everything was an effort?	1	2	3	4	5
59. Worthless?	1	2	3	4	5

## Toxic Disinhibition

	Strongly Disagree	Disagree	Mix of Disagree and Agree	Agree	Strongly Agree
<b>16 17 18 19 = Toxic Disinhibition alpha = .68</b>					
16. I don't mind writing insulting things about others online, because it's anonymous.	1	2	3	4	5
17. It is easy to write insulting things online because there are no repercussions.	1	2	3	4	5
		16 to 19 Udris 2014 original items.			
18. There are no rules online therefore you can do whatever you want.	1	2	3	4	5
19. Writing insulting things online is not bullying.	1	2	3	4	5
<b>20 21 22 = Toxic Disinhibition alpha = .92</b>					
20. On the Internet it is easier to annoy or disturb someone I don't like.	1	2	3	4	5
		20 to 22 Revised scale Udris 2016			
21. On the Internet it is easier to blame or criticize someone without fear of revenge or repercussions.	1	2	3	4	5
22. On the Internet it is easier to ridicule or make fun of someone.	1	2	3	4	5
<b>16 through 22 = Toxic Disinhibition alpha = .85</b>					

## Impulsivity

	Strongly Disagree	Disagree	Mix of Disagree and Agree	Agree	Strongly Agree
<b>23 through 29 = Impulsivity alpha = .81</b>					
23. In class or when playing games, it is often difficult for me to wait my turn, so I jump in or interrupt.	1	2	3	4	5
24. I will do risky things without really worrying about what might happen later.	1	2	3	4	5
25. I often answer before the question has finished.	1	2	3	4	5
26. I often say what comes to mind without thinking first of the consequences or whether it is appropriate for the conversation.	1	2	3	4	5
27. I often do things without thinking of the consequences.	1	2	3	4	5
28. Usually, I find it difficult to wait my turn, so I jump in to speak when it is not my turn or I interrupt the person talking.	1	2	3	4	5
29. I think about things carefully before doing something.	1	2	3	4	5

Life Satisfaction and Socially Connected

8 9 10 11 12 = Life Satisfaction alpha = .85	Strongly Disagree	Disagree	Mix of Disagree and Agree	Agree	Strongly Agree
8. In most ways my life is close to ideal.	1	2	3	4	5
9. The conditions of my life are excellent.	1	2	3	4	5
10. I am satisfied with my life.	1	2	3	4	5
11. So far I have gotten the important things I want in life.	1	2	3	4	5
12. If I could live my life over, I would change almost nothing.	1	2	3	4	5
13 14 15 = Socially Connected alpha = .73 (.80 if 13 removed)					
13. Other people seem to have more friends than I do.	1	2	3	4	5
14. I often feel lonely because I have few close friends with whom to share my concerns.	1	2	3	4	5
15. I don't have many people who want to listen when I need to talk.	1	2	3	4	5

Victim Count and Bully Count (spoken harassment example, also includes written, visual, hacking/impersonating, and social harassment)

60 62 64 66 68 = Victim alpha = .77	61 63 65 67 69 = Bully alpha = .73
<b>Questions 60 to 61 – Spoken Harassment</b>	
<b>Spoken/Verbal Electronic Harassment</b> – to <b>speak</b> or leave a <b>spoken message</b> , anonymous or not, through electronic means (e.g., cell phone, video chat, video), with the intent to embarrass, threaten, intimidate, offend, anger, or manipulate someone, make someone fearful, or make them experience a similar negative reaction.	
<b>This happened to you</b>	<b>You did this to someone</b>
60. While in college, how many times has this <b>happened to you</b> ?	61. While in college, how many times have <b>you done this to someone else</b> ?
<ol style="list-style-type: none"> <li>1. Never</li> <li>2. 1 or 2 times</li> <li>3. 3 or 4 times</li> <li>4. 5 or 6 times</li> <li>5. 7 or more times</li> </ol>	<ol style="list-style-type: none"> <li>1. Never</li> <li>2. 1 or 2 times</li> <li>3. 3 or 4 times</li> <li>4. 5 or 6 times</li> <li>5. 7 or more times</li> </ol>

### 3. Reliability: Test-retest, Parallel Form, and Single-Item Reliability (test-retest)

- Consistency vs Agreement – Used to assess whether two or more ratings, or scores from raters, are similar.
- Consistency: sets of scores show similar rankings or relative positions, but the two sets may have large numeric differences.
- Agreement: sets of scores show both similar rankings/relative positions and have numeric similarities
- Used for test-retest and parallel forms reliability assessment. Used when one may collect scores on multiple occasions **from the same participants**.
- Pearson r can be used to assess consistency, but not agreement because it cannot assessment numeric equivalence.
- ICC = Intraclass correlation coefficient must be used for assessing agreement and can also be used to assess consistency
- Used for quantitative data (ordinal with multiple responses, interval, ratio data)

Example 3: Relative vs. Absolute Reliability

Student	Relative Reliability, Consistency				Absolute Reliability, Agreement		
	Test 1	Rank 1	Test 2	Rank 2	Test 1	Test 2	Difference
1	95	1	44	1	95	92	3
2	90	2	22	2	90	91	-1
3	85	3	20	3	85	83	2
4	80	4	19	4	80	79	1
5	75	5	10	5	75	78	-3
6	70	6	9	6	70	72	-2
7	65	7	8	7	65	64	1
8	60	8	1	8	60	61	-1
	Test 1 and 2 Pearson r = .91				Test 1 and 2 Pearson r = .98		

#### Analysis

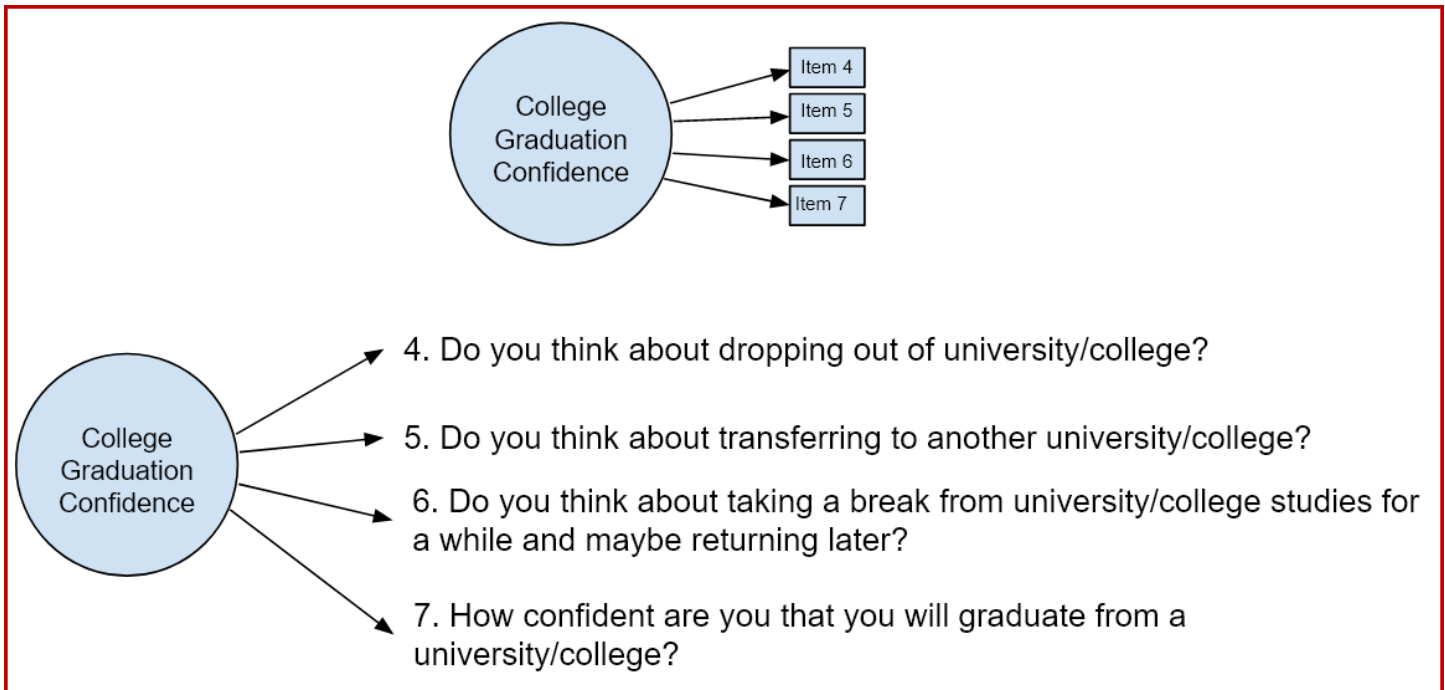
- Pearson r to confirm .91 level of consistency between tests 1 and 2 in the first example
- Use ICC
  - SPSS Scale,
  - Reliability analysis,
  - Statistics,
  - Intraclass correlation coefficient,
  - Two-way mixed
  - Absolute Agreement
  - Result – focus on Single Measures ICC

We will use ICC again for assessing rater agreement for ordinal, interval, and ratio data.

### 4. Menon's Questionnaire

Re-collect data; unique numeric ID needed. Single-item assessment.

## 5. Reliability: Internal Consistency



- Do items designed to measure a latent variable show consistency in responses? If yes, that means the scores are internally consistent.
- Cronbach's alpha most common measure of internal consistency
  - 0.90+ excellent consistency
  - 0.80 very good
  - 0.70 usable for research purposes, typically minimum level needed for research
  - 0.60 usable but may behave poorly, may reduce statistical power to detect differences or relationship.
- Alpha = proportion of shared variance among items, higher alpha higher variance shared, or higher common variance
- Item Analysis, part of Cronbach's alpha
  - Helps determine item fit among all items used to measure a construct
  - Examine
    - correlations among items
    - negative correlations signal possible reversed items
    - weak correlations indicate items that do not function well
    - corrected item-total correlation: item x with all other items combined
    - Alpha if item deleted: how alpha changes if an item is deleted
  - Don't let item decisions be mechanical, consider theoretical importance and contribution of item to construct before removing it should item fit be poor

University connectedness (items 35 36 37 38 39)

What is alpha?

Review item fit and contribution.

Toxic Disinhibition (items 16 17 18 19)

What is alpha?

Review item fit and contribution.

Graduation Confidence (items 4 5 6 7)

What is alpha?

Review item fit and contribution.

## 6. Reverse Scoring of Items

- Needed to reverse those item that have different polar or scale response orientations
- Use logic to identify reversed items: assume extreme position, answer all items, and it should be obvious which items cause responses to flip from high to low scores,
- and then items identified as reversed can be verify via correlations
- formula to reverse

$$\text{Reversed Score} = (\text{minimum score}) + (\text{maximum score}) - \text{actual score}$$

- Can check reversed scores by correlating reversed item with original item
- Also check frequencies for both original and reversed items

Graduation Confidence (items 4 5 6 7)

Identify and reverse items then recheck alpha using reversed items in place of original items

Review item fit and contribution.

Academic control (items 40 41 42 43 44 45 46 47)

Identify and reverse items then recheck alpha using reversed items in place of original items

Review item fit and contribution.

Socially connected (items 13 14 15)

Unique, odd situation with this construct: what do high scores mean?

Identify and reverse items then recheck alpha using reversed items in place of original items

Review item fit and contribution.



## 7. Composite Scores

- Composite scores are constructed scores
  - Summing responses across items or indicators (not a good option, explained below)
  - Mean of responses across items or indicators (good option)
  - Weighted composite from factor analysis or similar analysis (usually sample dependent) is sometimes used; weighted means some items account for more of the composite score than others; this requires more complex statistics or theoretical guidance; using equally weighted composite scores – like taking the sum of all items or the mean of all items – works well in many cases. Weights described below.
- Sometimes called scale scores, but this can be confusing since scale scores generally are understood to be scores with predefined mean and standard deviation (standard score, Z score)
- Sum scored can be misleading
  - Example from test anxiety, student has maximum anxiety
    - 1. Heart beats faster = 7 (on scale from 1 to 7)
    - 2. Upset stomach = 7 (on scale from 1 to 7)
    - 3. Feel dread = 7 (on scale from 1 to 7)
  - Minimum and maximum summed scores are
    - $1+1+1 = 3$
    - $7+7+7 = 21$
  - Respondent's sum =  $7+7+7 = 21$ , which is top score possible for sum of these three items
  - Item 2 has missing data
    - 1. Heart beats faster = 7 (on scale from 1 to 7)
    - 2. Upset stomach = missing (on scale from 1 to 7)
    - 3. Feel dread = 7 (on scale from 1 to 7)
  - Sum =  $7+\text{missing}+7 = 14$ , which is toward middle range of 3 to 21, so misleading level of anxiety presented
- Mean score can ignore missing responses so it reflects better level of anxiety, also mean lies within original scale units so easier to interpret
  - Example from test anxiety, student has maximum anxiety
    - 1. Heart beats faster = 7 (on scale from 1 to 7)
    - 2. Upset stomach = 7 (on scale from 1 to 7)
    - 3. Feel dread = 7 (on scale from 1 to 7)
  - Scale ranges from 1 to 7
  - Respondent's mean =  $7+7+7 = 21/3 = 7.0$  top score possible
  - Item 2 has missing data
    - 1. Heart beats faster = 7 (on scale from 1 to 7)
    - 2. Upset stomach = missing (on scale from 1 to 7)
    - 3. Feel dread = 7 (on scale from 1 to 7)
  - Mean of available data =  $7+7 = 14 / 2 = 7.0$ , top score possible
  - Mean of all items =  $7+7 = 14 / 3 = 4.66$ , misleading score

Be sure calculation of mean uses available data, not all possible scores

Form composite scores for each below and find the correlations among these constructs (use composite scores, not individual items, to assess correlations among constructs)

Be sure to use the appropriate items – reversed scored items where needed..

University connectedness (items 35 36 37 38 39)

Toxic Disinhibition (items 16 17 18 19)

Graduation Confidence (items 4 5 6 7)