The Effects of Staying Social:

The Interaction between Phone Use, Social Media, and Anxiety

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Abstract

This paper explores the relationship between growing Phone Use, Social Media, and the effects it may have on Generalized Anxiety. Participants (23 Male, 45 female, ranging from 14-53 years old. M_{age}=22.75) took an online survey that asked about their smart Phone Use, Social Media use, and their Generalized Anxiety. Researchers predicted first, that participants who reported more Phone Use would report higher levels of Generalized Anxiety. Secondly, they also predicted that this relationship would be moderated by Social Media use— those who spent more time using Social Media on their phone would experience higher anxiety. The first prediction was supported; Phone Use had a significant effect on Generalized Anxiety. However, there was no evidence to support the second hypothesis; there did not seem to be an interaction between Social Media use and Generalized Anxiety. These findings suggest that using a phone more (as is the habit for many) may lead to higher anxiety. Although the second hypothesis was not supported, further research would be needed to completely reject it, as there were not enough participants in the "high Phone Use/low Social Media use" moderation test to make reasonable statistical analysis; almost everyone who reported high levels of Phone Use also reported high use of Social Media. These results indicate that cell Phone Use could be integral in causing anxiety. Further research (possibly a more longitudinal study) could strengthen this suggestion.

The Effects of Staying Social: The Interaction Between Phone Use, Social Media, and Anxiety

In an age that is seemingly dominated by the smartphone, with almost 60% of the US population owning one and 30% claiming that it is 'something they cannot live without' (PEW, 2014), it is only logical that this will have some sort of impact on users. This fundamentally changes the way that humans interact with the world. Some studies have shown that conversations without the presence of a cell phone are rated as superior in content and quality, and that the presence of cellphones in a conversation will report significantly lower levels of understanding and empathetic concern (Misra, Cheng, Genevie, & Yuan, 2014).

Some Phone Users report spending up to 16 hours a day on their phone (Adler, 2014). In the presence of smartphones, users live in a divided-consciousness, they have the constant urge to seek out other information and attend to other possible conversations on their phone (Misra, Cheng, Genevie, & Yuan, 2014). A user who spends a very high amount of time on their phone will be taking that time away from his or her other obligations, which could lead to more stressed execution of those tasks, as multi-tasking leads to lower levels of accuracy and more stress (Foeher, 2006). This data looks to further this point, hypothesizing that persons who use their phone *more often will* have higher levels of Generalized Anxiety. These phones, though, are not just used for phone calls and text messaging. Those who have smartphones often engage with heavy amounts of Social Media. Business Insider reports that not only is Social the most common use of the internet, but also that roughly 60% of Social Media time is spent on phones (Adler, 2014). If millennials are racking up to 18 hours per day engaged with digital media (the most prevalent of which is Social Media) then negative impacts are of great concern. According to a study by Kross et. al, Facbook use is negatively correlated with life satisfaction (2013). As well, Social Media will have an impact on the emotional state. Media has been shown to have negative impact on emotional state of users, especially when levels of relatability are high (Milkie, 1999). Users present themselves in the best way, curating their online identity to present an idealized (or at least more specific) ideation of

themselves. When regarding these images and presentations for such an extended amount of time, a person on a smart phone will likely engage in social comparison (Bennet, 2014). Because the projected selves being viewed online are so idealized, a user will likely make exclusively upward comparisons, which lead to negative affect and likely Anxiety, especially because their online 'friends' are very similar and relatable. Also, because of extended exposure, a user will likely also feel pressure to continuously update their own media. This too could lead to more stress. Those who are using their phones for social more often are engaging in both large amounts of time on the phone and numerous, continuous social comparisons. This likely would reduce their cognitive ability to live life calmly and without Anxiety. There are also reports that extended Social Media Use can create a new disorder called Social Media Anxiety Disorder (Bennet, 2014). Including this information, then, this research further hypothesizes that the use of Social Media on their phone will act as a moderator between the Phone Use and Anxiety level means; students who are low in Social Media usage have a higher average means between Phone Use and Anxiety than will students who have high Social Media usage. This study serves to bridge the gap between the Phone Use/anxiety relationship and Social Media use/anxiety relationship, both of which are already suggested and supported.

Method

Participants

People of all age ranges were recruited via a convenience sample (23 Male, 45 female, ranging from 14-53 years old. M_{age}=22.75.) Besides the large range in age, there was also a large range in education level, ranging from some high school all the way to having achieved a doctorate degree. Questions about race and income were not asked. Only participants who had a smart phone were recruited for the study. Those who were under the age of 18 and participated without documented parental consent were dropped from the statistical analysis, but remained in this section to mark the fact that they had participated.

Procedure

In order to test this hypothesis, a survey was conducted. The survey was created by the researcher in order to test this hypothesis using a serviced called Qualtircs. The complete survey can be found in the Appendix. It was administered in a convenience sample; the researcher posted the link to her survey on her Facebook page, sent it out to friends via email, and asked friends and relatives via text message. The survey asked participants to answer questions about themselves from pertaining to the following subjects: Phone Use, Social Media Use, Generalized Anxiety, and demographic information. Then the Qualtrics service conglomerated the data and created an SPSS file of the information, removing participants' affiliation to the data, making it anonymous. There were 81 respondents, but as the analysis only concerns participants who had smartphones, only 69 respondents were used.

Materials

In order to address the hypotheses that increased Phone Use would lead to higher levels of Anxiety, and that Social Media Use would act as a moderator between these two, researchers analyzed the data from this survey. The independent variable (Phone Use) was operationalized using question 2, which had a fill in the blank option, making it open to any response, resulting in a continuous variable. The moderator (Social Media Use) was operationalized using an index created by adding up the responses to question 5 parts 1 through 11. These responses were numeric, making it also a continuous variable. Then, in order to facilitate the test of moderation via a t-test, it was recoded into a bivariate variable. In order to operationalize the dependent variable of 'Generalized Anxiety' an index was created using ten questions: which, when combining a total of 40 response options, made a continuous variable.

Variables. *Phone Use*. In order to operationalize the independent variable (Phone Use), researchers asked participants "About how much time do you spend using your phone per day (approximated in hours)?" This question offered a text box in which participants recoded their responses. The only issue may come from the fact that many respondents reported that they were not very sure with

their response, indicating that these responses were only estimates, and not exact numbers. This means that responses could be either too high or too low. Beyond that one limitation, 'Phone Use' is directly translatable to the concept being examined, this question is quite helpful. It has high face reliability and validity.

The survey service compiled the data provided in the survey into a SPSS data file. Researchers checked the data using a histogram (see Figure 1), to ensure that there were no erroneous data. As there were none, this then was solidified as the variable "phone time." Researchers were able to move on to dividing the data. Because some of the tests to be used required only two levels, rather than the original continuous data, it was divided into two groups. Low Phone Use was compiled from the responses ranging from 1-3 hours, which were recoded as '1.' High Phone Use was compiled from the responses of 3.0001-highest point, which were recoded as '2.' From here, this variable—"phonehilo"— was bi-variate, and ready to be used within the analysis.

Social Media Use. In order to operationalize the hypothetical moderating variable, researchers wanted to examine Social Media Use specifically on the smartphones. Researchers analyzed the responses from question five (parts 1-11) that reads "How much time do you spend on each of these applications (in hours) per day ONLY on your cell phone? This question had a slide bar next to the name of the top 11 Social Media applications. Respondents could slide the bar anywhere from 0-10 hours a day. Then, researchers added each participant's estimated time of Social Media Use together to create a total use variable. This variable was entitled "Soctime." This question likely has more issues in response bias. There is a negative stigma associated with Social Media Use (despite its ubiquity), so respondents may have been reluctant to report high use in a survey. As well, most people do not track their time per day exactly, so these responses were also estimates. However, assuming accurate responses by participants, this question also exactly addressed the researcher's need to operationalize Social Media usage. It has, therefore, high face reliability and validity.

Checking for cleanliness, researchers created a histogram. Noticing that there were some erroneous data points, researchers removed those values. They reconstructed another histogram to prove cleanliness. Just as the independent variable needed to be bi-variate for some tests, so did Social Media Use. This way, it could be used to split participants into high and low users in order test it as a moderator. Therefore SocTime was recoded into SocLoHi, so that it only had two levels. Low Social Media Use was compiled from those who responded 0-4, (recoded as 1) and High Social Media Use was compiled from those who responded higher than that (recoded as 2).

Generalized Anxiety. Unlike the other two variables, the bulk of this index comes from a scale created for previous research. In order to entirely capture the concept of Anxiety, researchers felt that exclusively looking at one area would not be sufficient. Using the seven questions from the Generalized Anxiety Disorder scale created by Robert L. Spitzer, MD; Kurt Kroenke, MD; Janet B. W. Williams, DSW; Bernd Löwe, MD, PhD, as the base, the researcher added in three more questions to flush out the entire realm of possible Anxiety symptoms. The full text of the questions can be found in Appendix A. Questions listed a symptom of Anxiety such as "feeling nervous, anxious, or on edge" and asked participants how often they experienced this in the last two weeks. Response options were recoded into numeric values so that it could become one score. Responses of Not at All were coded as 0, several days became 1, more than half the days became 2, and nearly every day became 3. These values were then added to each other for each participant and a final score of "Anxiety" was created. This response ranged from 0-40. A low score indicated little to no Generalized Anxiety, while a high score would indicate high Anxiety. This variable is continuous. This has high face validity.

Reliability. A formal test of reliability was conducted between the new scale and the scale on which it was based. The researchers calculated the GAD score with the original 7 questions and conducted a Pearson Correlation test using SPSS against the new Anxiety variable with a statistical significance level of .05. Reliability was supported when correlated: $r(66) = .973$, $p < .000$. This result shows that there is a relationship between the two, and it is strong (it is considered a strong relationship if

it is above .75). This result is also significant, at any significance level, as the p-value read .000. A test of Chronbach's alpha was also conducted. The results showed that it was significant ($\alpha = .954$). These results can be seen in Table 5.

Statistical Plan.

Once having compiled all of the data, the researchers were able to conduct these analyses in order to test the two hypotheses.

H1- Spending more time on a smartphone will lead to higher Generalized Anxiety Scores

H2- Social Media Use will act as a moderator to this interaction

Researchers tested these hypotheses with a series of correlations and t-tests. Because the independent (and moderator) variable are bi-variate and discrete, and the dependent variable was discrete, a t-test would allow researchers to examine if there is a significant difference between means of various groups. When the independent variable is coded as continuous, it can also be compared using a Pearsons Correlation to ascertain if there is a relationship.

Test 1. The first test was to establish if there was an original relationship between Phone Use and Anxiety. Using Phone Use in its continuous state, researchers conducted a Pearsons Correlation using SPSS. If the correlation was significant (p-value of less than .05) then they could ascertain that there is a relationship. If the correlation coefficient is higher than .25 you can ascertain that the relationship is significant, and if it is above the value of .75, then it is a strong relationship.

Test 2. The second test was to check if this same relationship between Phone Use and Anxiety is visible through a t-test. Using Phone Use and Anxiety in their bi-variate state, researchers were looking for an initial difference in means between Anxiety levels in participants with high versus low Phone Use. Using SPSS researchers conducted an independent samples t-test. If the high Phone Use did, on average, score higher on the Generalized Anxiety variable, than did the low Phone Use group, then the output

would indicate a confidence level of 95%. This, with the combination of affirmation from Test 1, would affirm Hypothesis 1.

Test 3. Test three was to establish the first part of the moderating variable: if there was a difference in means between low and high Phone Use group within ONLY the low social-media use group. Using SPSS, the researchers used select cases to analyze data only if "SocLoHi" was 1. Then they conducted the same t-test as in test two. The hypothesis would be that in people who were not engaging in Social Media maintenance, their Phone Use would be less Anxiety triggering, even if high. This, which would be displayed in a lower p-value, indicating a significant difference.

Test 4. Test four was to establish the second part of the moderation: if there was a difference in means between low and high Phone Use within ONLY the high Social Media group. Using SPSS, the researchers unselected the cases from the last test, and then selected cases to analyze data only if "SocLoHi" was 2. They then conducted the same t-test as two and three. The hypothesis posed that there would be a smaller, but still significant difference between means in high and low note taking groups, because these people are spending their phone time maintaining an online persona and making social comparisons which has been shown to lead to Anxiety.

Expectations. As has been previously discussed, there is expected to be a significant difference in average mean of Generalized Anxiety between low and high Phone Use groups. If the hypothesis is true, the correlation would be significant, and the t-test would show to show that this relationship is significant. However, when the moderator divides the students into two groups (high Social Media Use and low Social Media Use) this significant difference is expected to not exist in the high Social Media condition and be stronger in the low Social Media condition. This is because researchers predict that with high reported Social Media, participants will be stressed about being online and social comparisons, therefore making Anxiety more likely. Conversely, with little distraction from Social Media in the low Social Media category, these participants would be participating in less stressful activities (such as making phone calls) on their phones, and therefore higher time use would not be related to anxiety.

Results

Descriptive Statistics

Phone Use. The average time of Phone Use is 4.134 hours per day. There is a standard deviation of 2.976, indicating a wide range of variance.

Social Media Use. The average time of Social Media Use per day is 3.134 hours. There is a standard deviation of 3.395, which indicates an even wider range of variance.

Anxiety. The average level of Anxiety was 9.441. This was out of a possible 40. There was a standard deviation of 8.441. The full distribution can be seen in Figure 4 in the Appendix.

Analyses

The first test to establish a connection between Phone Use and Anxiety used a Pearson's Correlation. This showed a significant relationship $r(66) = .380$, $p < .001$. After conducting the first t-test, it was shown that there was also a significant effect for Phone Use on average anxiety level of participants $t(66) = -3.20$, $p = .000$. Because the difference in means was significant at the established significance level (it was well below the necessary .05), and it had a significant correlation, the first hypothesis can be supported. However, in an effort to prove the moderation effect of Social Media, the second and third t-test showed that there was also no significant interaction of Phone Use on Anxiety, for either low Social Media Users $t(63) = -.642$, $p = .535$, or high Social Media Users $t(27) = -.73$, $p = .008$. This shows that, when the amount of Social Media use does not factor into the amount of anxiety felt by users, and therefore cannot be established as having any significant effect on anxiety, because the p-value is well above the necessary .05 value in both tests. This difference in means cannot be supported as occurring not by chance. Therefore, the null hypothesis (no effect of Social Media) cannot be rejected. The second hypothesis, therefore cannot be supported.

Discussion

There were significant results to support some of the hypothesis. Since the p-value in the first test was well below the confidence interval, we cannot assume that the differences in means were due to chance. Therefore, the null hypothesis that Phone Use does not affect Anxiety could be rejected. It could be concluded then, that Phone Use does directly affect Generalized Anxiety. There were, however, not significant enough results to support the second hypothesis. Since the p-value in the second test was well above the desired score of .05, therefore the null hypothesis that high Social Media Use would not impact the relationship between Phone Use and Generalized Anxiety could not be rejected. The final test also had a p-value high above the desired score. The null hypothesis that low Social Media Use would not impact the relationship between note taking and academic achievement could not be rejected. Because the final two t-tests were also not significant, the second overall hypothesis could not be supported. Social Media Use did not have an evident moderating effect on the relationship between note taking and academic achievement. It could be concluded then, that it does not matter if you are or are not using Social Media on your phone, this does not impact your level of anxiety.

Limitations

Although the first part of the study concluded in alignment with prior research, the secondary report that did not support the moderation of Social Media are completely contradictory to what has been established in many different studies. This is likely due to the many limitations. Because this data was collected through a survey, it comes with both benefits and drawbacks regarding its applicability. It was able to gather a lot of information in a short amount of time. By nature, a survey comes with several stipulations as well. In any survey, there is the threat of pure error in data collection. Also, as this was a convenience sample from within a group of people who are friends with the researcher, so the results are not necessarily generalizable to all people. Another issue may come in the form of accuracy; because many of the questions touch on personal issues, respondents may not have recorded accurate responses. For instance, someone who has high anxiety may not have wanted to report that, and may have skewed

his response to be lower. Within the statistical analysis, there were also likely many issues. The data was highly manipulated.

Future research

In future studies, researchers could use similar survey techniques, because having such a large sample size, with so many questions, administered to a sample that is obligated to respond allows for the data to be gathered quickly, and inexpensively. However, researchers would want to execute a study that had even more participants in order to gain data about those with high phone usage, but low Social Media usage. That way, the data could either completely support or refute the hypotheses.

Conclusion

This study looks over the varying levels of interaction between the growing use of Phone Use, Social Media, and Generalized Anxiety. After taking an online survey that asked about their smartPhone Use, Social Media use, and their Generalized Anxiety, researchers searched for a positive relationship between Phone Use and Anxiety. They also predicted that this relationship would be moderated by Social Media use. The first prediction was supported but there was not significant evidence to support the second hypothesis. From this research, these findings suggest that using a phone more frequently (as is the habit for many) may lead to Anxiety. Although the second hypothesis was not supported, further research is needed to completely reject it, as there were not enough participants in the “High Phone Use/Low Social Media use” group to make reasonable statistical analysis. These results indicate that cell Phone Use could be integral in causing anxiety. Further research (possibly a more longitudinal study) could strengthen this suggestion.

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Appendix A

Social Media, Phones, and Anxiety Survey

THE STUDY
This study is being conducted as part of a class project for *Psychology 303: Research Methods* at the University of Michigan. The goal of this study is to learn more about the way our everyday technology use can impact us, especially focusing on our use of our phones and our levels of daily anxiety. This involves filling out a few questions about your personal opinions and experiences regarding these things. This study consists of only one session that will take less than ten minutes to complete.
RISKS/BENEFITS
There are no foreseeable risks or discomforts to this study outside of what you may encounter in everyday life. Although you may not receive direct benefit from your participation, others may ultimately benefit from the knowledge obtained in this study.
CONFIDENTIALITY
You will not be identified in any reports on this study. Records will be kept confidential. However, the teaching team responsible for monitoring this study may inspect these records.
PARTICIPATION & CONSENT
Your participation in this project is ***voluntary***. Even after you agree to consent, you may decide to ***leave the study at any time*** without any penalty or consequences. You ***may refuse to answer any questions*** for any reason without any negative consequences.
Questions or concerns about this research can be directed to Clara Jones at cchjones@umich.edu
CLICKING ON THE >> BUTTON WILL CONTINUE THIS SURVEY AND INDICATE THAT YOU HAVE READ AND UNDERSTOOD THE ABOVE INFORMATION AND THAT YOU AGREE TO PARTICIPATE IN THIS SURVEY.
If you do not wish to participate, click the "x" on the top corner of your browser to exit.

What kind of cell phone do you own?

- ○ I do not own a cell phone
- ○ Feature phone (phone that lacks the advanced functionalities of a smart phone)
- ○ Smart phone (a cellular phone that performs some computer functions, typically having a touchscreen interface, Internet access, and the capability of running applications)

About how much time do you spend using your phone per day (approximated in hours)

[ ]

For the purposes of this questionnaire, "Social Media Application" will be defined as:
An application that enable users to create and share content or to participate in social networking.

Do you have social media applications on your phone?

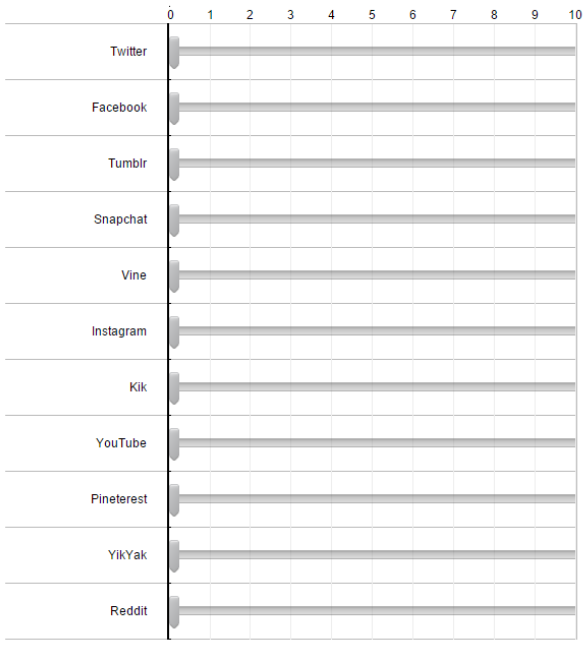
- Yes
- No

ber

If you indicated yes above, how many social media applications do you have?

- 1-3
- 4-6
- 7-9
- 10+

How much time do you spend on each of these applications (in hours) per day ONLY on your cell phone?



About how much time total do you estimate you spend on these applications per day (in hours)?

Over the last 2 weeks, how often have you been bothered by the following problems?

	⊗ Not at all	⊗ Several days	⊗ More than half the days	⊗ Nearly every day
Feeling nervous, anxious or on edge	☐	☐	☐	☐
Not being able to stop or control worrying	☐	☐	☐	☐
Worrying too much about different things	☐	☐	☐	☐
Trouble relaxing	☐	☐	☐	☐
Being so restless that it is hard to sit still	☐	☐	☐	☐
Becoming easily annoyed or irritable	☐	☐	☐	☐
Feeling afraid as if something awful might happen	☐	☐	☐	☐
Not wanting to participate in an activity you usually enjoy	☐	☐	☐	☐
Becoming stressed to the point of physical discomfort	☐	☐	☐	☐
Feeling overwhelmingly lethargic	☐	☐	☐	☐

With which gender do you identify?

- ☐ Male
- ☐ Female
- ☐ Transgender
- ☐ Other, Please Specify

How old are you?

What is your education level?

- ○ Some high school
- ○ Graduated High School
- ○ Some College
- ○ Technical/Vocational Training
- ○ Associate's Degree
- ○ Bachelors Degree
- ○ Masters/Doctorate Degree

Appendix B

Figure 1

Table depicitng the distribution of education level after cleaning

What is your education level?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Some high school	8	11.8	11.8	11.8
	Graduated High School	4	5.9	5.9	17.6
	Some College	40	58.8	58.8	76.5
	Bachelors Degree	8	11.8	11.8	88.2
	Masters/Doctorate Degree	8	11.8	11.8	100.0
	Total	68	100.0	100.0	

Figure 2

Table depicting the distribution of age after cleaning

How old are you?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	14	1	1.5	1.5	1.5
	15	1	1.5	1.5	2.9
	16	3	4.4	4.4	7.4
	17	5	7.4	7.4	14.7
	18	8	11.8	11.8	26.5
	19	5	7.4	7.4	33.8
	20	11	16.2	16.2	50.0
	21	14	20.6	20.6	70.6
	22	7	10.3	10.3	80.9
	23	5	7.4	7.4	88.2
	24	1	1.5	1.5	89.7
	30	1	1.5	1.5	91.2
	47	1	1.5	1.5	92.6
	49	1	1.5	1.5	94.1
	52	1	1.5	1.5	95.6
	53	3	4.4	4.4	100.0
	Total	68	100.0	100.0	

Figure 3

Table depicting the distribution of gender after cleaning

With which gender do you identify?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	23	33.8	100.0	100.0
Missing	System	45	66.2		
Total		68	100.0		

Figure 4

Histogram depicting the distribution of anxiety levels after cleaning.

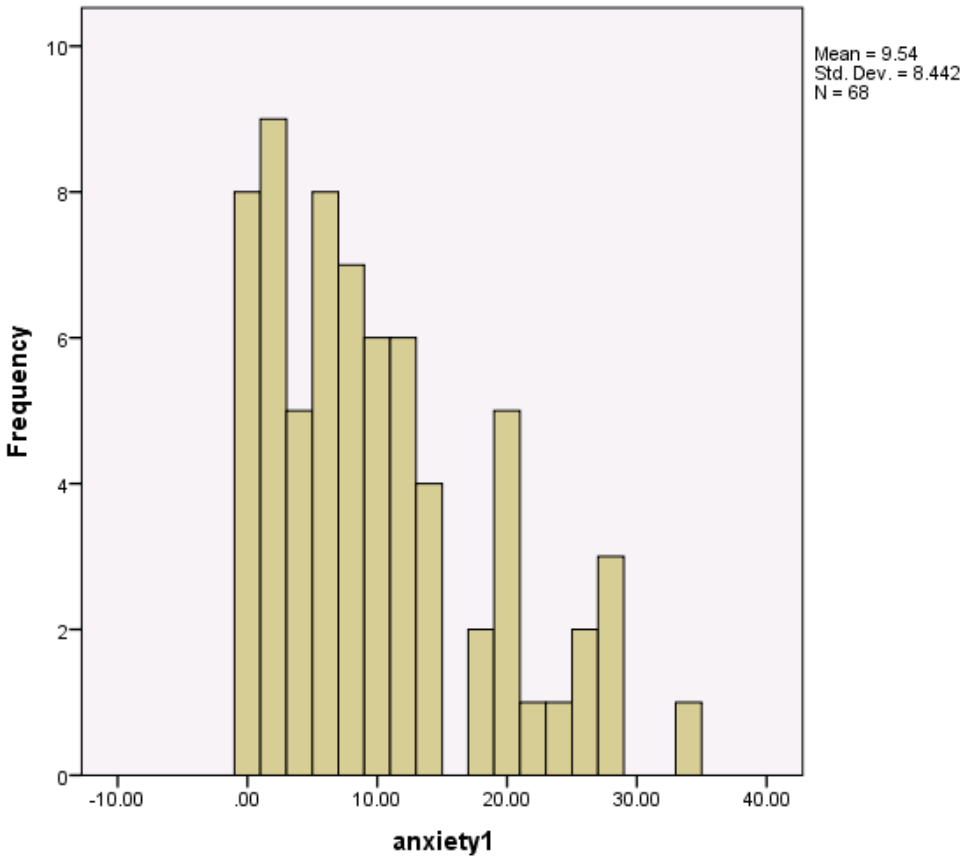


Figure 5.

Output depicting the results from the Chronbach's Alpha test.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.954	.986	2