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Validating the Collegiate Optimism Orientation Test and Exploring its Correlation to GPA and Mental Health Among College Students

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Honors Thesis

VALIDATING THE COLLEGIATE OPTIMISM ORIENTATION TEST AND EXPLORING ITS CORRELATION TO GPA AND MENTAL HEALTH AMONG COLLEGE STUDENTS

by
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ABSTRACT

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The Collegiate Optimism Orientation Test (COOT) was designed to provide a more specific and accurate understanding of an individual's optimism in a collegiate setting. The current study investigates the reliability and validity of the COOT in order to demonstrate its usefulness as a measure of optimism in college students and examines the relationship between optimism and both mental health and GPA. Participants were gathered using online survey websites, one of which was specific for students at Brigham Young University specifically and the other of which was open to any college student in the United States. Participants took a survey consisting of the COOT and various other optimism and mental health related measures. The COOT was found to be a valid and reliable measure of optimism among college students. Correlations found between the COOT and mental health were consistent with past research on optimism and mental health. Additionally, optimism, as measured by the COOT, was found to be significantly correlated to GPA.

ACKNOWLEDGMENTS

I wish to thank Conner Deichman, Libby Evans, and Rachel Hileman for their work on this project over the years. It has truly been a team effort, and I have learned so much from each one of you. I would also like to thank my thesis advisor and mentor, Dr. Scott Braithwaite, for his guidance and support. Thank you for taking a chance on a bunch of sophomores from you Psych 309 test.

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Introduction

College attendance increased by 87% between 1955 and 2015. Today, individuals currently enrolled in post-secondary education account for approximately 6% of the total population of the United States, whereas in 1955 it was roughly 1.4% (Schmidt, 2020; Census Bureau, 2020; National Center for Education Statistics, 2020; U.S. Department of Commerce, 1952). While the 5% increase in college attendance in the last 70 years is worth noting, 6% of the population is still not a particularly large amount. However, this 6% of the total United States population includes 69.1% of all high school graduates between the ages of 16-24, indicating that college students account for a significant portion of that age bracket (U.S. Bureau of Labor Statistics, 2019). As the number of individuals attending college has increased, the importance of obtaining a post-secondary degree has also increased, and a majority of well-paying jobs require a college degree. These factors have led to the need to study and understand the well-being of college students.

Mental health is a particularly concerning facet of well-being in college students. The American College Health Association has reported that 61.4% of undergraduates report having felt overwhelming anxiety within the last 12 months, and 40% have felt so depressed it was difficult to function within the same time period (2017). Poor mental health can have a detrimental effect on academic performance, enrollment retention, and graduation rates, and lead to problematic and disruptive behaviors, and even loss of life (Burris, et al., 2009; Harrar, et al., 2010). Additional studies have shown that approximately 30% of undergraduate students are experiencing psychological distress at any given time, however, many fewer than this report receiving any help for their

problems (Harrar, et.al., 2010, Zivin, et al., 2009). This indicates that mental health is a significant problem, but not being addressed in sufficient proportions among college students.

Studies have found a correlation between optimism and various coping skills, which in turn are tied to better mental health (Lei & Pellitteri, 2017; Scheier & Carver, 1992). This could suggest that when a person has an increased level of optimism, they will take more initiative in their own well-being by coping with stress in a healthy way. Optimism has been shown to be a good predictor for low psychological distress, and in general is correlated with lower levels of depression (Harrar, et.al., 2010; Bagroy et al., 2017; Burris et al., 2009; Wang, et al., 2017; Wong 2012). Specifically, for college students, negative correlations exist between positive thinking and anxiety, depression, and stress, and positive correlations between negative thinking and these things (Wang, et al., 2017).

The relationship between mental health and college attendance and performance is clear, as is the relationship between optimism and mental health (Burris et al., 2009; Scheier & Carver, 1992). Academic performance is another critical part of a student's life, but when looking at optimism as it relates to academic performance results have been less straightforward. One study found a positive correlation between pessimistic perspectives and higher likelihoods to drop classes (Londoño, 2009). More specifically, 65% of students who dropped classes considered themselves either "very pessimistic" or quite pessimistic". A study examining attributional retraining, however, found that students who were "very optimistic" had the lowest cumulative GPA of all groups being tested, unless they attended attributional retraining classes (Ruthig, et al., 2004). These

studies exemplify two extremes where pessimism and optimism are both portrayed as positively correlating with poor academic performance. Not all studies align with these extremes, in fact results concerning optimism and academic performance of college students falls at nearly all points between the extremes. For example, Feldman, and Kubota (2015), found that optimism had no significant correlation with a college student's GPA; Maleva et al. (2014) found that optimism was significantly, but weakly positively correlated with GPA, but encouraged further research; and Gibbons et al. (2000) found that while optimism did not specifically correlate with GPA, it did act as an important mediator between academic comparison levels and academic performance.

This lack of harmony within research points to a need for additional research and possibly a more valid measure of optimism for those in academic settings. There are various tests used to measure optimism, with the Revised Life Orientation Test (LOT-R), written by Scheier, M. F., Carver, C. S., & Bridges, M. W. in 1994 (B), being one that is commonly used. The LOT-R is the revised version of the Life Orientation Test, written by Scheier and Carver in 1985, which was needed to correct a third variable problem (Marshall & Lang, 1990). The LOT-R measures two factors, optimism and pessimism, and consists of 10 items (four of which are filler items) ranked on a 5 point Likert scale (Scheier, et al., 1994 B). When testing the LOT-R Scheier, Carver, and Bridges (1994 A) found that the test was reliable as it had a Cronbach's alpha of .78, item-scale correlations between .43-.63, and test-retest of .68 (four months), .60 (12 months), .56 (24 months), and .79 (28 months). Additional and more recent studies have tested the psychometrics of the LOT-R and have found that the test is psychometrically sound (Hinz, et. al., 2017; Gustems-Carnicer, Calderón, & Santacana, 2017). In spite of this, it is possible that, as

the LOT-R looks at optimism generally, which may not be enough to give a clear understanding of individuals who have so much of their outlook shaped by academic experiences (Ho, et al., 2010; Harrar, et.al., 2010; Bagroy et al., 2017).

After recognizing the discrepancies in the research of optimism and college students, as well as the potential impact that optimism could have on academic success, my colleagues and I determined to create a test that could be used for gauging optimism specifically for college students. The Collegiate Optimism Orientation Test (COOT) was created as a project for an undergraduate psychology class in the winter of 2018. A pool of 30 items were rated through a convenience sample of other students in the class according to how relevant the questions were to the construct in order to obtain content validity ratio (CVR) data. CVR ratings were computed, and the 14 questions with the highest CVRs were included in the final questionnaire. All selected questions had CVRs between .47 and .73 (M=.54 SD=.02). The selected items were rated on a 4-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree). A neutral middle option was not used in order to force participants to agree or disagree and get a more accurate reflection of their optimistic attitudes. The six negatively worded items were reverse scored, and all items were randomly distributed throughout the test to eliminate as much bias and error as possible. The COOT was originally tested on a convenience sample of 142 students from Brigham Young University and was found to have excellent reliability and validity statistics with a Cronbach's alpha of .85, two factors with Eigenvalues greater than 1, and a majority of items being significantly correlated to each other. While these were promising statistics, due to the nature of convenience samples little could

ultimately be concluded from this original test, leading to the need for further investigation.

The present study has three objectives, specifically: to demonstrate that the COOT is a reliable and valid measure of optimism among college students, to determine the usefulness of the COOT in predicting mental health outcomes in college students, and to determine the correlation between optimism and GPA. We hypothesize that the COOT will reliably and validly measure optimism of college students, and that it would break down into two factors, optimistic thought and optimistic behavior. Additionally, we hypothesize that the COOT will correlate positively with favorable mental health outcomes and GPA, and explain incremental validity above and beyond that of the LOT-R.

Methods

Participants

The study was comprised of two data sets. The first was gathered through the online survey websites MTurk and TurkPrime, and the second was through SONA. These two groups will be referred to as the MTurk group and SONA group, respectively.

The MTurk group consisted of university students throughout the United States and consisted of 292 useable responses. Any response that was incomplete was not used, as well as responses shorter than four minutes. Four minutes was a predetermined time for the shortest amount of time in which an average person could be expected to complete the survey accurately. This was deemed necessary due to potential problems with bots as well as individuals who may attempt to complete surveys as quickly as possible for money. Three control questions were also used for this purpose, and any individual who

incorrectly answered a control question was exited from the survey and considered an incomplete response. The survey was limited to college students, due to its objective of validating a test designed specifically for those seeking higher education. In order to limit our test data to college students, and thereby avoid confounding the data, we included a preliminary question asking if participants if they were currently enrolled as an undergraduate student in college or university. Anyone who answered "no" was exited from the survey and considered an incomplete response. Among the MTurk participants 166 were male, 124 were female, and 2 identified as other. Of the MTurk participants 77% were younger than 30 (See table 1). Participants who completed the survey then copy and pasted a code found at the end of the survey into TurkPrime to show they completed the survey. Those with the right code were paid $0.50 for taking the survey.

The SONA group consisted of students from BYU and included 150 usable responses. Responses were deemed usable through the same criteria used by the MTurk group. Out of the usable responses, 68 participants were male and 82 were female. All but three participants were ages 18-25, with the remaining three being older than 25 (See table 1). SONA participants received class credit for participating in the survey.

Table 1
Demographics

		MTurk		SONA	
		Frequency	Percent	Frequency	Percent
Gender	Male	166	56.85	68	45.33
	Female	124	42.47	82	54.67
	Other	2	.68	0	0
	Total	292	100	150	100
Race	White	147	50.34	131	87.33
	Black or African American	67	22.95	1	0.67
	American Indian of Alaska Native	4	1.37	2	1.33
	Asian	52	17.81	2	1.33
	Native Hawaiian or Pacific Islander	0	0	2	1.33
	Hispanic	19	6.51	9	6
	Other	3	1.03	3	2
	Total	292	100	150	100
Age	18-21	68	23.29	78	52
	22-25	96	32.88	69	46
	26-29	61	20.89	2	1.33
	30 or older	67	22.95	1	.67
	Total	292	100	150	100

Measures

In order to test all the hypotheses of the study a survey was created which included the COOT as well as various other measures. These measures were used to test optimism, as well as mental health and personality related constructs. In addition to the measures listed below, participants were asked to indicate the range in which their GPA fell using increments of 0.4. All surveys consisted of the same items from the following measures. The order of the measures in the survey is as follows.

COOT. The COOT consists of 14 items rated on a 4-point Likert scale ranging from *strongly disagree* to *strongly agree*. Statements were rated according an individual's feelings about them in general, without any specified time frame.

LOT-R. The Lot-R was used to provide convergent validity to the COOT. The LOT-R consists of 10 items rated on a 5-point Likert scale ranging from *strongly disagree* to *strongly agree*. Four of the 10 items were filler questions. Cronbach's alpha for the LOT-R is .78, and internal consistency for our sample was α= 0.72.

IDAS-II. The IDAS-II was used to measure participants' symptoms of depression and anxiety. Two subscales were used, specifically General Depression (α=.89) and Social Anxiety (α=.80). Internal consistency from our sample provided alphas of .94 for General Depression and .95 for Social Anxiety (Watson et al., 2007). The two subscales combined consisted of 27 items which participants were asked to rate according to how they had felt during the past two weeks. Participants rated their responses on a 5-point Likert scale ranging from *not at all* to *extremely*.

COPE Inventory. The COPE Inventory was used to examine the relationship between optimism and coping skills. Past research demonstrated that optimistic individuals may have healthier coping skills, which in turn lead to a greater sense of general well-being and fewer mental health problems (Harrar, et.al., 2010; Bagroy et al., 2017; Burris et al., 2009; Wang, Chen, Lin, & Hong, 2017; Wong 2012). The COPE Inventory has shown to be reliable through having a Cronbach's alpha of .71. Internal consistency with out study was α=86. The COPE consists of 28 items, with responses rated on a 4-point Likert scale including *I usually don't do this at all*, *I usually do this a little bit*, *I usually do this a medium amount*, and *I usually do this a lot*.

BFI-2. Two subscales of the Big Five Inventory 2 were used in the survey, specifically Negative Emotionality (α=.90) and Open-Mindedness (α=.84). We chose these subscales based on the personality traits we anticipated correlating the most with optimism. The internal consistency with out test provided alphas of .85 for Negative Emotionality and .82 for Open-Mindedness.

Procedure

The survey was administered through two platforms: the two survey taking sites associated with Amazon, MTurk (www.mturk.com) and TurkPrime (www.turkprime.com), and SONA (www.byu.sona-systems.com), a website used by Brigham Young University. Individuals on either platform received a link to a Qualtrics survey (www.qualtrics.com) which allowed them to participate in the study. Every participant took the same test and could access it on any device connected to the internet and associated with their MTurk, TurkPrime, or SONA account at any time that the survey batch was available--all information was kept anonymous. The study was preregistered with the Center for Open Science (osf.io/h4w7f).

Statistical Analysis. We used Cronbach's alpha to find the internal consistency of the COOT and the Pearson's bivariate to measure the correlation between the items, as well as their reliability within the COOT. Exploratory factor analysis and oblique factor rotation were used to determine how many factors the COOT has and how the items distributed between the factors, in order to determine the domains of the test. We used scree plot deflections as well as eigenvalues and parallel analysis to ascertain factor structures. Eigenvalues greater than one and above the deflection on the scree plot were used. Multiple regression was used to determine the incremental validity of the COOT

compared to the LOT-R in regard to GPA and all mental health subscales. All data was analyzed using Stata/SE 16.0.

Results

The results between the MTurk and SONA groups was consistent in nearly every area. The MTurk data set revealed a Cronbach's alpha of .82 and SONA gave a Cronbach's alpha of .84. In both cases the internal consistency of the test was good, with 74 our of 91 significant interitem correlations (Table 1 and 2). Furthermore, the COOT and LOT-R were significantly correlated in both samples, demonstrating likelihood that the constructs being measured area similar.

Both the MTurk and SONA data found two factors with eigenvalues greater than 1 (Factor one: MTurk = 3.7857, accounting for 68.35% of the variance, SONA = 4.2476, accounting for 76.88% of the variance; Factor two: MTurk = 1.78505, accounting for 31.74% of the variance, SONA = 1.1145, accounting for 20.18% of the variance). Parallel analyses revealed 3 factors with eigenvalues better than a null model for both MTurk and SONA data. Combining this evidence with our predetermined cut-off eigenvalue of one, we determined that our measure consisted of two factors (See figures 1 – 2). The items of the COOT loaded onto the same factors in both tests with the exception of item five (I believe, if I work hard, good things will happen) which did not load onto either factor in the SONA sample, and item 12 (I consider myself optimistic) which loaded onto both factors in the SONA sample (See tables 4 – 5). These findings, along with the above stated Cronbach's alpha and correlation coefficients provide support for the COOT being a reliable and valid measure of optimism for college students.

Table 2

MTurk Pearson Correlation Coefficients

	Item 01	Item 02	Item 03	Item 04	Item 05	Item 06	Item 07	Item 08	Item 09	Item 10	Item 11	Item 12	Item 13	Item 14
Item 01	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-
Item 02	.28*	1.00	-	-	-	-	-	-	-	-	-	-	-	-
Item 03	.18*	.58*	1.00	-	-	-	-	-	-	-	-	-	-	-
Item 04	.47*	.19*	.19*	1.00	-	-	-	-	-	-	-	-	-	-
Item 05	.18*	.44*	.48*	.17*	1.00	-	-	-	-	-	-	-	-	-
Item 06	.07	.38*	.40*	.06	.25*	1.00	-	-	-	-	-	-	-	-
Item 07	.45*	.17*	.14*	.52*	.11	.15*	1.00	-	-	-	-	-	-	-
Item 08	.51*	.20*	.19*	.54*	.21*	.06	.48*	1.00	-	-	-	-	-	-
Item 09	.24*	.34*	.38*	.15*	.45*	.25*	.19*	.29*	1.00	-	-	-	-	-
Item 10	.25*	-.04	.02	.32*	.09	-.1	.23*	.24*	.08	1.00	-	-	-	-
Item 11	.11	.24*	.33*	.14*	.28*	.25*	.12*	.13*	.27*	.11	1.00	-	-	-
Item 12	.06	.33*	.32*	.10	.34*	.30*	.17*	.01	.38*	.12*	.25*	1.00	-	-
Item 13	.28*	.40*	.40*	.14*	.55*	.23*	.17*	.21*	.60*	.14*	.37*	.47*	1.00	-
Item 14	.39*	.10	.06	.37*	.14*	-.00	.46*	.39*	.15*	.51*	.15*	.15*	.24	1.00

* Significant at 0.05 level (2-tailed).

Table 3
SONA Pearson Correlation Coefficients

	Item 01	Item 02	Item 03	Item 04	Item 05	Item 06	Item 07	Item 08	Item 09	Item 10	Item 11	Item 12	Item 13	Item 14
Item 01	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-
Item 02	.25*	1.00	-	-	-	-	-	-	-	-	-	-	-	-
Item 03	.13	.51*	1.00	-	-	-	-	-	-	-	-	-	-	-
Item 04	.35*	.26*	.24*	1.00	-	-	-	-	-	-	-	-	-	-
Item 05	.26*	.21*	.22*	.25*	1.00	-	-	-	-	-	-	-	-	-
Item 06	.17*	.46*	.52*	.17*	.23*	1.00	-	-	-	-	-	-	-	-
Item 07	.38*	.30*	.24*	.41*	.20*	.10	1.00	-	-	-	-	-	-	-
Item 08	.29*	.30*	.22*	.46*	.33*	.04	.36*	1.00	-	-	-	-	-	-
Item 09	.29*	.38*	.38*	.31*	.48*	.28*	.30*	.35*	1.00	-	-	-	-	-
Item 10	.21*	.05	-.09	.22*	.04	-.01	.19*	.10	.32*	1.00	-	-	-	-
Item 11	.11	.30*	.30*	.13	.15	.33*	.14	.09	.27*	.15	1.00	-	-	-
Item 12	.38*	.28*	.37*	.36*	.41*	.28*	.32*	.26*	.63*	.28*	.32*	1.00	-	-
Item 13	.29*	.36*	.44*	.40*	.42*	.36*	.26*	.32*	.69*	.26*	.33*	.63*	1.00	-
Item 14	.37*	.20*	.02	.43*	.12	.06	.35*	.28*	.24*	.33*	.22*	.27*	.26*	1.00

* Significant at 0.05 level (2-tailed).

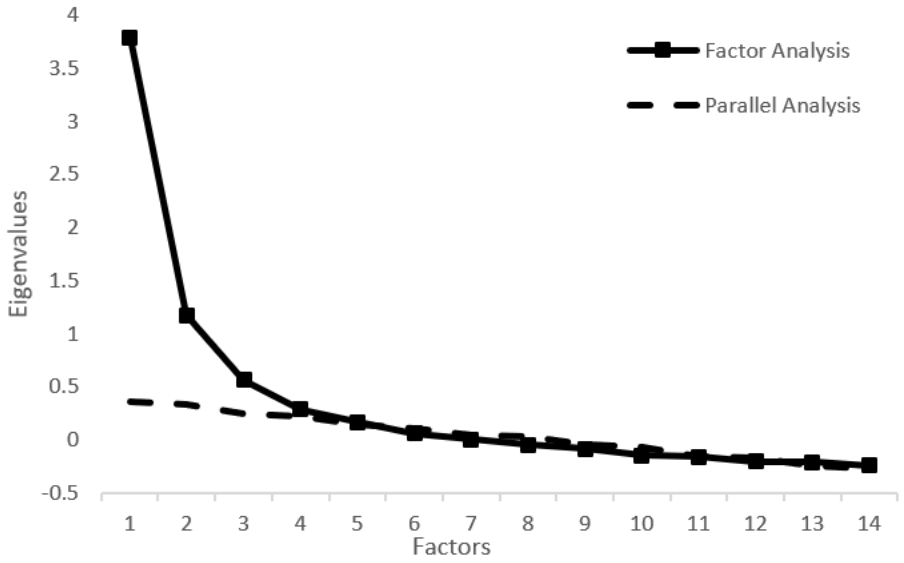

Figure 1

MTurk Factor Analysis and Parallel Analysis

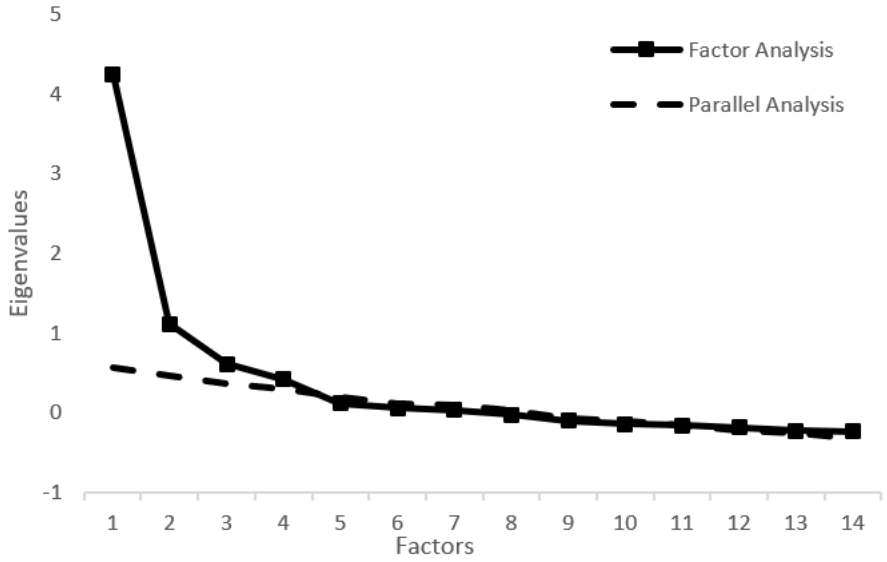

Figure 2

SONA Factor Analysis and Parallel Analysis

Table 4

MTurk Summary of Exploratory Factor Analysis for the COOT (N = 292)

	Factor Loadings	
Item	Optimistic Action	Optimistic Mindset
I go into a test assuming that I will fail		.62
I take the steps necessary to reach my academic goals	.66	
I take initiative in my learning process	.71	
I dread attending class in general		.69
I believe that if I work hard, good things will happen	.66	
When I don't understand a concept, I work until I do.	.52	
It is difficult for me to find motivation to complete my assignments		.66
I think I am wasting my time with my studies		.67
I think I will be successful in the future	.61	
I find it hard to forgive myself if I don't work hard on an exam		.53
I seek help if I'm struggling	.43	
I consider myself optimistic	.56	
I feel confident I will reach my goals	.70	
I feel hopeless when I start to struggle in class		.67
Eigenvalues	3.79	1.76
% of variance	68.35	31.74

Table 5

SONA Summary of Exploratory Factor Analysis for the COOT (N = 150)

	Factor Loadings	
Item	Optimistic Action	Optimistic Mindset
I go into a test assuming that I will fail		.53
I take the steps necessary to reach my academic goals	.60	
I take initiative in my learning process	.80	
I dread attending class in general		.61
I believe that if I work hard, good things will happen		
When I don't understand a concept, I work until I do.	.74	
It is difficult for me to find motivation to complete my assignments		.54
I think I am wasting my time with my studies		.53
I think I will be successful in the future	.48	
I find it hard to forgive myself if I don't work hard on an exam		.51
I seek help if I'm struggling	.43	
I consider myself optimistic	.42	.41
I feel confident I will reach my goals	.55	
I feel hopeless when I start to struggle in class		.65
Eigenvalues	4.25	1.11
% of variance	76.88	20.18

Multiple regression was used to determine the extent to which the COOT correlated with the various subscales of the IDAS-II and the BFI-2 as well as the extent to which the COOT explained incremental validity beyond the LOT-R. The LOT-R was used as the initial predictor and the COOT was added as an additional predictor variable. These same methods were used to determine the correlation and variance accounted for in GPA.

The COOT was found have a significant negative correlation with both the general depression and social anxiety for both the MTurk and SONA data sets, demonstrating the expected correlation between optimism and mental health. It did not provide additional incremental validity above that of the LOT-R, but both measures had relatively similar results regarding both social anxiety (COOT: MTurk $\beta = .34$, SONA $\beta = 0.19$; LOT-R: MTurk $\beta = 0.38$, SONA $\beta = 0.34$) and general depression (COOT: MTurk $\beta = 0.43$, SONA $\beta = 0.38$; LOT-R: MTurk $\beta = .32$, SONA $\beta = .37$) (See tables 6 – 9).

Table 6

MTurk Summary of Hierarchical Regression Analysis for Social Anxiety (N = 292)

	IDAS II Social Anxiety Subscale					
	Model 1			Model 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
LOT-R	.73	.06	.58*	.47	.07	.38*
COOT				.31	.05	.34*
R^2		.34			.41	
F for change in R^2		148.22*			35.90*	

*$p < .05$

Table 7

SONA Summary of Hierarchical Regression Analysis for Social Anxiety (N = 150)

	IDAS II Social Anxiety Subscale					
	Model 1			Model 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
LOT-R	.51	.08	.48*	.37	.10	.34*
COOT				.18	.09	.19*
R^2		.23			.25	
F for change in R^2		43.54*			3.94*	

*$p < .05$

Table 8

MTurk Summary of Hierarchical Regression Analysis for General Depression (N = 292)

	General Depression					
	Model 1			Model 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
LOT-R	2.07	.17	.59*	1.15	.19	.32*
COOT				1.12	.14	.43*
R^2		.34			.46	
F for change in R^2		151.24*			63.04*	

*$p < .05$

Table 9

SONA Summary of Hierarchical Regression Analysis for General Depression (N = 150)

	General Depression					
	Model 1			Model 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
LOT-R	1.6	.16	.63*	.91	.20	.37*
COOT				.84	.18	.38*
R^2		.40			.47	
F for change in R^2		98.11*			21.86*	

*$p < .05$

The COOT was significantly correlated to Negative Emotionality in the SONA sample (β = 0.37, p = 0.00), and in MTurk sample (β = 0.22, p = 0.00), indicating a potential relationship between negative-emotionality and optimism, however yielded mixed results, being significantly correlated in the MTurk sample (β = 0.52, p = 0.00) but not in the SONA sample (β = 0.15, p = .18). The LOT-R had similar results for each subscale, being significantly correlated to NE in both samples, both by individually and after the COOT had been added, but only to OM in the MTurk sample prior to adding the COOT, and not at all in the SONA sample (See tables 10-11).

Table 10

MTurk Summary of Hierarchical Regression Analysis for Negative Emotionality (N = 292)

	BFI-2 Negative Emotionality Subscale					
	Model 1			Model 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
LOT-R	1.29	.07	.70*	1.04	.09	.57*
COOT				.30	.07	.22*
R^2	.50			.53		
F for change in R^2	285.58*			19.38*		

*$p < .05$

Table 11

SONA Summary of Hierarchical Regression Analysis for Negative Emotionality (N = 150)

	BFI-2 Negative Emotionality Subscale					
	Model 1			Model 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
LOT-R	1.02	.12	.55*	.54	.16	.29*
COOT				.62	.15	.37*
R^2	.30			.38		
F for change in R^2	63.53*			17.61*		

*$p < .05$

Table 12

MTurk Summary of Hierarchical Regression Analysis for Open-Mindedness (N = 292)

	BFI-2 Open-Mindedness Subscale					
	Model 1			Model 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
LOT-R	.44	.09	.27*	-.06	.10	-.04
COOT				0.62	0.07	.51*
R^2		.07			.24	
F for change in R^2		23.41*			64.66*	

*$p < .05$

Table 13

SONA Summary of Hierarchical Regression Analysis for Open-Mindedness (N = 150)

	BFI-2 Open-Mindedness Subscale					
	Model 1			Model 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
LOT-R	.09	.07	.11	.01	.09	.01
COOT				.11	.08	.15
R^2		.01			.02	
F for change in R^2		1.84			1.78	

*$p < .05$

The LOT-R was found to initially have a significant correlation to GPA (MTurk β = 0.15, p = 0.09; SONA β = 0.19, p = 0.02), upon adding the COOT the LOT-R dropped out of significance (MTurk β = -0.04, p = .56; SONA β = 0.04, p = 0.71) while the COOT was significant (MTurk β = .32, p = 0.00; SONA β = 0.23, p = 0.03), demonstrating that the COOT added substantial incremental validity to the correlation of optimism and GPA. The COOT was shown to account for between 7% and 9% of the variance in GPA (MTurk R-squared = 0.0882; SONA R-squared = 0.0688) (See tables 12-13)

Table 14

MTurk Summary of Hierarchical Regression Analysis for GPA (N = 292)

	GPA					
	Model 1			Model 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
LOT-R	.04	.02	.15*	-.01	.02	-.04
COOT				.06	.01	.32*
R^2		.02			.09	
F for change in R^2		6.89*			20.61*	

*$p < .05$

Table 15

SONA Summary of Hierarchical Regression Analysis for GPA (N = 150)

	GPA					
	Model 1			Model 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
LOT-R	.03	.01	.20*	.01	.02	.04
COOT				.03	.15	.23*
R^2		.04			.07	
F for change in R^2		6.11*			4.61*	

*$p < .05$

The COOT had significant correlations to the COPE in both data sets (MTurk β=.50*; SONA β=.46*; $p<.05$) demonstrating that, consistent with past tests, optimism is correlated to good coping skills, which may account for some of why optimism negatively correlates with poor mental health.

Discussion

Optimism has shown to be negatively correlated with depressive symptoms, and positively correlated with general well-being, however, results have been mixed when trying to establish a relationship between optimism and GPA. The present study aimed to discover if the COOT could be a viable measure to accurately predict mental health but also have greater reliability in its correlation to GPA than other common measures. Our findings conclude that the COOT is a valid and reliable measure for optimism among college students, that it is correlated in the hypothesized directions to both mental health and GPA. In both the MTurk and SONA groups the COOT showed to have an alpha of >.8 and the number of interitem correlations was also high in both groups. It was also highly correlated with the LOT-R, demonstrating that it is measuring the construct of optimism.

Further validity of the COOT was shown through the two factors found in both data sets. Most of the items loaded onto the same factors in both groups, with the exceptions being item 5, which did not load onto either factor in the SONA group, and item 12, which loaded onto both factors in the SONA group. We hypothesized that the items would load onto factors according to the domains of optimistic belief and optimistic behavior, however the items did not follow the expected pattern, and after examining the way they loaded onto the factors we labeled factor one optimistic action

and factor two optimistic mindset. These factors still include both an element of behavior and belief but seemed to more specifically fit the items in each factor. We noted that optimistic action included all the positively worded items whereas factor two included all of those that were negatively worded, and further tests may be needed to determine to what degree the wording of the questions impacted the factors.

The most significant finding, which sets the COOT apart from other measures of optimism is its significant correlation to GPA. When examining GPA the LOT-R initially had a significant correlation to GPA, but once the COOT was added the LOT-R fell out of significance, indicating that the COOT accounts for a significant amount of variance beyond what the LOT-R is able to. This may mean the COOT can better discriminate between individuals who are "optimistic in unproductive ways," such as individuals who believe they will do well on a test without putting in any effort, and those who genuinely have a positive outlook on life and work to maintain that (Scheier & Carver, 1992). With the various and contradictory results regarding optimism as a predictor for GPA in the past, this offers support to the idea that optimism is an indicator of academic performance but that past studies have lacked a measure suited for measuring optimism in an academic setting. The correlation of the COOT and GPA was found to have an r-squared of .088, indicating that nearly 10% of the variance in GPA may be able to be explained through optimism as measured by the COOT. It is possible that understanding how optimistic an individual is can provide insight to their potential for future academic achievement, but it is also possible that students with higher GPA feel optimistic as a result of having seen good academic outcomes in the past, making the need to establish the temporal precedence of this relationship apparent. Further research is needed to determine the

temporal precedence of the optimism GPA relationship, which will give a greater understanding of potential circumstances in which the COOT may be useful.

In addition to a significant positive correlation to GPA, the COOT had significant negative correlations to general depression and social anxiety. This indicates that for the demographic of college students the COOT can provide an optimism score, which in turn could be used to make inferences regarding both GPA and mental health. The COOT did not provide incremental validity beyond the variance already explained by the LOT-R, however, the relatively equal levels of variance explained by both the COOT and the LOT-R, in conjunction with the incremental validity that the COOT adds to GPA it is worth considering that the COOT may be the measure better suited for use when looking at college students.

As anticipated, the COOT was highly correlated with the COPE, demonstrating, consistent with past research, that optimism is significantly connected to coping skills (Lei & Pellitteri, 2017; Scheier & Carver, 1992). This may be because optimism helps facilitate coping skills, causing optimistic individuals to have better coping skills than their less optimistic peers. Further research is needed to determine the precise relationship between optimism and coping skills. For the purpose of this study, however, it is beneficial to see the strong correlation due to the implication that optimistic college students may also be more likely to have the coping skills needed to excel in stressful environments.

Limitations and Future Directions

The current study builds upon past research by providing a measure of optimism that may have greater accuracy in predicting the potential for academic achievement. The

COOT was found to have good psychometrics, indicating that it is both valid and reliable, and it had significant positive correlations to GPA and significant negative correlations to general depression and social anxiety. Despite these strengths, we acknowledge the limitations of the present study. The survey only included two subscales of the BFI-2, which makes it difficult to draw any personality related conclusions from the survey. This demonstrates a lack of understanding of personality when the survey was constructed and administered, and future research should examine the connection to optimism and personality by including all the big five personality traits. Furthermore, we are not able to conclude, from the current study, that having optimism leads to a good GPA, and in the future research should be done to establish the temporal precedence of this relationship.

This study provides a good foundation for future research regarding optimism and college students by providing a valid and reliable measure for the optimism of college students. It builds upon past research by offering a population specific measure of optimism to demonstrate not only the relationship between optimism and mental health but also optimism and GPA. This measure can help to bring clarity to the relationship between optimism and GPA, thus helping us to better understand this demographic.

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