The Use of Humor to Alleviate Acute Stress in Undergraduate Adults

by
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Abstract

Stress is a familiar feeling for college students, and an unresolved build-up of acute stress events can lead to chronic stress and disease development. This informs the importance of intervention and the researcher's goal was to focus on performing arts intervention to stress, specifically with comedy. Although current research displays a need for development and further study regarding comedy as a form of stress relief, the incorporation of comedy has demonstrated significance in decreasing negative feelings of stress. In this study, researchers conducted an experiment with 79 undergraduate students, measuring self-reported levels of positive and negative affectivity (PA and NA) at baseline, after completing a stress task, and after viewing either a comedy or control video. The findings demonstrated significance in the area of PA and that students' overall positive feelings increased within the time of the experiment after watching a recording of a comedy performance following a stress task.

Keywords: stress, positive affectivity, PA, negative affectivity, NA, comedy, college students

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Stress is a feeling of tension, irritability, and being overwhelmed that often leads to mental worry and generalized anxiety. The term "stress" is an umbrella term holding the terms "acute stress" and "chronic stress." Acute stress is defined as a moment or short time in which stress occurs in an individual. While being uncomfortable but manageable, many people choose to cope with their feelings of stress by procrastinating, overeating, smoking, drinking, and in major scenarios, developing eating disorders and mental health issues. Chronic stress refers to a build-up of stress or feelings of pressure and being overwhelmed over a long time. This form of stress, if not treated, can cause a variety of health concerns (e.g., insomnia, high blood pressure, and a weakened immune system) and disease development, and can affect one's emotional and social states of being. Throughout this thesis, we will explore what stress is and how it manifests, why we find stress to be an issue in our lives, how it can develop from acute to chronic (i.e., causing the development of disease risk), why intervention is necessary, and how the performing arts, like standup comedy, could be a source of healthy coping or alleviation to stressors in undergraduate adults.

Stress

Feeling stress is an inevitable aspect of human experience. Whether large or small, immensely impactful, or slightly annoying, stress has an impact. There are different types of acute stress, some being productive to our behavior while others cause us to seek out ways to eliminate the stress in the short term. Acute stress can be linked to what we call negative affectivity (NA), which causes us to feel bad (Russell & Carroll, 1999). When we feel negatively about the things in our life, we can make decisions and

form ways of coping that are counterproductive to our overall success in life. It is common that when we feel elevated levels of NA, we find ways to cope with these feelings that can be either productive or counterproductive to our efficiency as humans to either eliminate our NA or increase our positive affectivity (PA) (Russell & Carroll, 1999). Productive coping can invoke seeking social support, being optimistic, or taking breaks from tasks (Schneiderman et al., 2004, p. 4). Counterproductive coping can be quite the opposite and while temporarily relieving, can lead to long-term health consequences if continued use occurs. This form of coping can look like drinking more frequently on days with higher levels of stress (Russell, Almeida, and Maggs, 2017, p. 684), increased levels of tobacco/e-cigarette use (Meléndez et al. 2022, p. 679), and even excessive procrastination. While stress in the short term can cause us to feel bad and make us want to drink or smoke, the problem lies when these behaviors become habitual and more problematic. Increased levels of NA can cause us to seek out more counterproductive forms of coping, which if used for longer periods, can contribute to the development of chronic stress and negative health outcomes.

Acute stress is often known as short-term stress that can be characterized by brief feelings of anxiety or worry. This form of stress can serve as a source of motivation for some individuals and be more productive (e.g., worrying about an exam or having an adrenaline rush while giving a presentation) or more problematic and less productive (e.g., getting in a traffic jam, failing a test, cramming for an important exam, etc.). Often, in both cases of acute stress, it is left untreated or acknowledged. Acute stress, when manifesting physiologically, can cause a slight increase in blood pressure, perspiration, and heavier breathing patterns, and this is not often an issue alone. However,

Schneiderman et al. (2004) explain acute stress left untreated or multiple occurrences of acute stress as a cause for smoking, sleep problems, eating disorders, and excessive drinking. In an article which surveyed 744 university students, Russell, Almeida, and Maggs (2017) found that of students who drank alcohol, many drank due to school or personal-related stressors, and often drank heavier on days with greater number of stressors (p. 683). The study went on to test students' drinking patterns via a digital diary in the first three years of college and found that those who drank heavier on days with a greater number of stressors accurately predicted their likelihood to continue drinking due to stress in their fourth year of college (Russell, Almeida, and Maggs, 2017, p. 684). In addition to alcohol use, untreated acute stress can lead to general anxiety, increased tobacco/e-cigarette use, and overall increased NA.

While stress is an inevitable aspect of life that can cause us to formulate poor coping strategies, it is important to discuss what specifically causes us to feel stress. In a study conducted with 535 post-secondary students in Canada, researchers sought to find some of the most common sources of stress. After asking specific survey questions, it is notable that the researchers found overall, more women than men reported severe feelings of stress in their lives. Some of the most common stressors across all genders were managing multiple exams and one's academic workload, completing assignments within an abbreviated time limit, and thinking of diving into the workforce and finding a job post-graduation (Linden et al., 2022, pp. 474-475). In a research study of this scale, these specific issues, which were heavily reported, can be generalized to a general population of post-secondary students. According to another article on stress and its impact on college students, stress is a common feeling, and excessive stress can lead to

burnout and “interference with academic performance” (Linden et al., 2022, p. 469). It is also important to note that not all sources of stress that post-secondary students feel come from the academic realm.

Many college students find managing multiple roles and relationships as a student stressful and struggle to find a healthy balance of focus during the undergraduate college experience. This goes into stress-related issues that are not academic. Most, if not all college students experience many changes including but not limited to relocation, change in lifestyle, their friendships/personal relationships, and handling all of these with academic and work-related tasks as well (Franzoi et al., 2020, pp. 1-2). Overall, when jumping into college, life can be stressful.

Stress not only has an impact on mental health and emotions, but it also influences human physiology. Stress is a threat to the human body’s homeostasis and the term “stressor” is defined as anything that tries to move our body out of homeostasis (Schneiderman et al., 2004). During any stress, various hormones (i.e., epinephrine, norepinephrine, and cortisol) are released to help us maneuver our thoughts, emotions, and behaviors. They produce what is often referred to as adrenaline, which can be beneficial in certain situations (i.e., giving a presentation, responding to a crisis, or bungee jumping) and detrimental or negatively impactful in others (i.e., raising one’s blood pressure over time and increasing feelings of anxiety). These hormones can affect the nervous system, increase cognition, awareness, and arousal, and decrease immune function. The effects of these hormones can last even after the passing of a stressor, which is the body’s way of staying in the “fight or flight” mindset until safety is ensured. During moments of stress, there are physiological reactions that can impact our health if

exposure to stress happens frequently. The body naturally perspires more, heart rate and blood pressure increase, and cortisol also acts to mitigate pain. During short-term stress (e.g., giving a presentation or slamming on your brakes in traffic) the human body often works through the event and moves on. This form of stress can act as a challenge to push past fear and even motivate some humans (Straub, 2022). However, long-term (chronic) stress exposure (e.g., exposure to stress frequently over a long time) or other factors such as Adverse Childhood Experiences (ACEs) and Post Traumatic Stress Disorder (PTSD) can affect the body's ability to create wear and tear because the body's system for managing stress is not always meant to be activated. Long-term exposure to stress, then, can serve as a pathway to more concerning medical issues (i.e., high cholesterol, the probability of developing type II diabetes, hypertension, obesity, etc.) (Straub, 2022). For this thesis, most focus will be on the short-term (acute) stress response, but long-term (chronic) stress exposure will also be addressed.

The unfortunate reality of stress is that it can have an immense impact on the emotional, mental, and physical states of humans. Schneiderman et al. (2004) explain that majorly stressful events or long-term stress (e.g., a death in the family, parental issues during childhood, and abuse) can often lead to longer-lasting effects in a person such as generalized anxiety and depression. Other stress-related issues or scenarios can lead to academic burnout, feelings of being overwhelmed, and lack of motivation. These issues often subside but without proper care can cause further development of health concerns, and excessive exposure to acute stress over a long time can lead to chronic stress and health concerns in an individual.

Intervening on Stress

Given the prevalence and commonness of feelings of stress in college students discussed above, it can be understood that feelings of stress are common and letting them sit without intervening can cause negative health outcomes and disease development. An article analyzing stress overload in college students refers to the body's relationship to stress by saying that "it is only when demands overwhelm resources [our ability to reduce/alleviate the stress] that bodily damage occurs" (Amirkhan, Manalo, & Velasco, 2023, p. 637). This shows the importance of early intervention to prevent bodily damage. Since chronic stress can be developed by long-term exposure to stress without intervention, the researcher aims to touch on the importance of intervention by way of expressive or performing arts, like comedy, also discussing current methods, and the potential benefits of expressive arts intervention.

Many college students, especially first-generation college students (FGCS) experience feelings of anxiety and stress when entering college. Due to a lack of resources and social support, and often experiencing financial issues at home, many FGCS must support themselves (Amirkhan, Manalo, & Velasco, 2023). This can lead to working more hours than students from wealthier families and having less time to study and prepare for tests/exams, which can increase feelings of stress and NA. Many schools do what they can to offer mental health resources to students, but many do not take the time to utilize them, leaving them feeling stressed and overwhelmed with their workload, balance of social relationships, and causing them to resort to coping poorly with these feelings of stress and anxiety. However, if one were to introduce nontraditional

intervention, like the performing/expressive arts or comedy, students may feel more motivated to take advantage of it as a way of alleviating stress.

Although many treatments such as traditional talk therapy, cognitive behavioral therapy, and medication have served as evidence-based approaches to resolving issues related to stress, the researcher is interested in the application and effectiveness of humor as an intervention to alleviate acute stress symptoms. Many tested empirical research studies imply that positive emotions elicited from health and well-being exercises can decrease negative emotions, and other studies demonstrate the importance of participation in performing/expressive arts as a way of building community, increasing self-esteem and sense of belonging, and managing stress levels in oneself.

Many expressive or performing arts find themselves in communities, supported by those who enjoy the arts. While single-use expressive/performing arts intervention strategies can display effectiveness in the short term, most benefits come from joining creative communities where individuals can express themselves through art, writing, drama, or dance throughout their moments of hardship and trouble. In an article discussing the heavy prevalence of people with childhood trauma and high levels of adverse childhood experiences (ACEs), Pliske et al. (2021) allow many adults the platform to share their stories and experiences, both positive and negative, and the impact that the expressive/performing arts had on them as they persevered through their ACEs. In one of the interviews conducted with participants, Pliske et al. (2021) dove deeper into participants' narratives to learn more about their relationship with the arts and how they helped with managing several aspects of life and "used play and art as techniques for decreasing the [...] pain associated with [...] stress" (p. 251). In one specific interview, a

participant named Jane talked about her experiences playing the flute, expressing that it often detached her from the chaos that went on in life for her. Pliske et al. (2021) go on to say that this ability to pair an "auditory sensation with controlled breathing" allowed her to settle her stress response system. (p. 251). Another participant talked about their relationship with music, specifically a record player, and how dancing and listening to music allowed them to escape and cope with the overwhelming bouts of stress they faced in childhood. The impact of these artistic experiences allowed several participants to break free from lives where they felt powerless and developed chronic stress, and this study gave immense detail into the personal lives of many who used the arts to heal from their stressful hardships in childhood.

In another study, healthcare workers actively took part in art therapy workshops to reduce symptoms of burnout syndrome, "defined as a feeling of exhaustion, being present, especially among people that work in risky and physically challenging environments" (Buluga, 2022, p. 195). In an always-growing field of physical demand and constant work, healthcare workers often face bad cases of burnout when they are overworked and refuse to take time to work through their feelings and stress. Although in this article the focal point is on healthcare workers, most aspects of burnout can be generalized to those in college, especially students in their later years who manage heavy courses and workloads. Buluga (2022) describes the performing arts as an activity or therapy that "contributes to better stress management and self-awareness" (p. 196). In the study, researchers collaborated with two companies to bring workshops to healthcare workers in Romania, which included various forms of intervention and performance/creative art to contribute to feelings of well-being and relieve stress. The

impact of these workshops and interventions was significant and showed a great ability to decrease feelings of stress and burnout and increase overall feelings of well-being in many healthcare workers (Buluga, 2022). Since the research on comedy as a form of performance art in the alleviation of stress relief is not as prevalent, these findings can provide a solid foundation for comedy performance to build upon.

Given that research on the field of comedy as a form of stress relief is limited, another article (a systematic review) exhibits how the performing arts, when used to help prevent suicidal behavior, can have a “positive effect on mental and physical well-being by promoting self-understanding" (Davico et al., 2022, p. 3). In this review, the researchers found that studies using role-playing techniques showed the most success in taking part in realistic stressful situations, and helped developed a sense of learning and understanding of their behaviors. Comedy often mirrors or mocks real, situational hardships, bringing light to the darkness that can be the chaos of our lives, so they can relate in this way. Also, another technique reviewed involved a narrative form of theatrical intervention where actors interacted with audiences and brought harsh realities to life, which is like that of comedy, which serves as a platform for comedians to talk about more sensitive topics in a lighthearted way (Davico et al., 2022). Overall, while research on comedy-specific interventions and comedic art forms for relieving stress is limited, one can make associations with theatrical performance and expressive art forms to bridge the gap between art and comedy, and their impact on overall stress relief in individuals.

When the average person finds daily life stressful, they often take comfort in laughing with colleagues or turning on a sitcom TV show after work. The innate human

desire to laugh and experience joyful emotions over negative ones is not an uncommon experience, but not many evidence-based approaches are in place to unveil that idea. The most beneficial aspect of consuming comedy is often the joy we feel from laughing, and the distracting effect it can have from experiencing our negative emotions. In an article discussing this idea, being distracted from negative emotions is addressed and coined as "cognitive distraction." (Strick et al., 2009, p. 574). In this study, researchers aimed to discover whether humorous stimuli shown after viewing neutral and negative pictures would have a greater impact on alleviating negative emotions than regular, nonhumorous positive stimuli. The findings were significant and concluded that humor did a more effective job of alleviating or distracting from negative emotions in participants, leading the humorous stimuli to be more effective than the nonhumorous stimuli (Strick et al., 2009). Many conclusions can be drawn from this study. First, the findings demonstrate that there are stress-relieving aspects of comedy, and this can set a solid foundation for research in the realm of comedy as a form of stress relief. Second, the researchers expressed the importance of understanding that humor cannot be an end-all, be-all solution to problems, and that it serves a certain purpose: that it is "useful when a stressor is relatively low on personal relevance and imposed on a person for a limited duration" (Strick et al., 2009, 577). This finding signifies the importance of not using humor as a long-term form of stress relief. While it has shown effectiveness for the short term, other areas of intervention and evidence-based approaches to healing from stressful situations should be sought out regarding chronic stress events.

Although research in the realm of comedy as an intervention on feelings of stress is limited, the research on the performing and expressive arts have shown to be valuable

in working to relieving stress, increasing feelings of well-being and belonging, and providing a platform for which complicated topics can be brought to light. Comedy, specifically standup comedy, can be seen as an artform where a(n) individual(s) stands on a stage and brings smiles to faces by constructing and expressing jokes, often relative or in mockery of everyday life. In the present research study, the researcher aimed to discover whether there would be an increase in positive affect (PA) and decrease in negative affect (NA) for those who watched a comedy performance after completing a stress task compared to those who watched grass grow (control group).

With stress levels and increased levels of NA during moments of stress being prevalent among college students, the need for intervention is inevitable. While traditional talk therapy and medication management have been evidence-based approaches to relieving stress, the researcher for this thesis aimed to analyze the possible effects of the performing arts, such as comedy, as an intervention for relieving stress. Humor is an everyday part of life that often leaves people feeling happy (i.e., increased levels of PA) and undisturbed in troublesome moments; the phrase “laughter is the best medicine” has not been spoken without reason. The present study aims to answer the question of whether performing arts, like comedy, can serve as a suitable, tested form of stress relief displaying a decrease in NA and an increase in PA in adult undergraduates.

Methods

Participants

A total of 79 undergraduate students (M_{age} = 19, SD_{age} = 2.13, *Min* = 18, *Max* = 31), participated in this study. A priori power analyses were conducted prior to data collection to estimate the minimum required sample size needed to observe medium effects given the study's design. With alpha set to .05 and beta set to .20, these analyses revealed that a sample size of 86 participants would be sufficient to observe medium sized between groups effect, whereas a sample size of 28 would be sufficient to observe medium sized within-subjects and between-groups/within-subjects interaction effects. The present sample is sufficiently powered to observe medium to large within-subjects and between-groups/within-subjects interaction effects; however, it is slightly underpowered with respect to detecting medium between-groups effects as a posteriori power analysis revealed that the sample's achieved power for such is .76. All participants were recruited through the Middle Tennessee State University, Department of Psychology participant pool, and all received course credit for their participation. The demographic breakdown of the sample can be found in Table 1.

Table 1

Demographics (n = 79)

	Comedy Condition (n = 39)	Control Condition (n = 40)	Total
Sex at Birth			
Female	26	25	51 (65%)
Male	13	15	28 (35%)
Gender Identity			
Female	26	23	49 (62%)
Male	13	14	27 (34%)
Non-binary	0	2	2 (3%)
Other	0	1	1 (1%)
Race			
Black/African American	6	6	12 (15%)
Asian/Asian American	2	0	2 (3%)
Middle Eastern	0	2	2 (3%)
Native American	1	0	1 (1%)
White/Caucasian	22	23	45 (57%)
Multiracial	3	3	6 (8%)
Other	1	3	4 (4%)
Prefer not to say/Missing	4	3	7 (9%)
Hispanic Ethnicity			
Yes	8	7	15 (19%)
No	30	33	63 (80%)
Prefer not to say/Missing	1	0	1 (1%)
Year in School			
Freshman	29	27	56 (71%)
Sophomore	5	12	17 (22%)
Junior	5	0	5 (6%)
Senior	0	1	1 (1%)

Materials

PANAS-SF

The PANAS-SF questionnaire (Watson et al., 1988) is a self-report measure of positive and negative affect. This form helped the researcher collect quantitative data to be analyzed and interpreted. (See Appendix A).

Demographics Questionnaire

The Demographics Questionnaire is a six-question self-report questionnaire that was given to participants following the intervention stage of the study who were asked to

indicate their age, race, ethnicity, gender identity, assigned sex at birth, and year in school. (See Appendix B).

Serial 7s Test (S7)

The Serial 7s Test (S7) is an arithmetic test given to participants as a form of inducing stress, in which participants are asked to mentally subtract the number seven from a much larger number repeatedly for 5 minutes, and if they get it wrong, are instructed to start again. Bostan (2021) explains that there can be many forms of this test (e.g., testing with verbal feedback, and verbal or written), but every version of the S7 remains similar in that participants are asked to subtract from a large number, "1009" in Bostan's study, under a given time restraint of five minutes, and all were valid forms of the S7 (p. 9). For this study, the researcher used an assigned random number (i.e., 1000) to allow more room for mistakes in participants, and did not give verbal feedback (e.g., "go faster" or "you can be quicker than that") to the participant, and had a printed document with all answers to catch participant error. (S7 Script – see Appendix C; S7 answers – see Appendix D)

Procedures

At initial recruitment, participants were given an overview of the study and reasons for such research and were be asked for their consent in the participation of the study through Qualtrics. There was a random assignment into two groups: the *comedic performance observation* group and the *control* group.

For each group, participants signed an informed consent form and completed the *PANAS-SF* questionnaire to create a baseline of overall acute feelings of stress. Next, the researcher conducted the *S7* Task for both groups. Then, participants once again

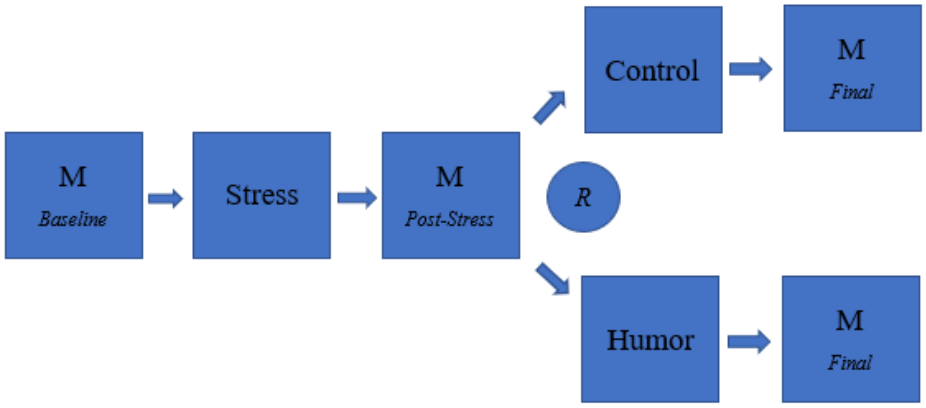
completed the *PANAS-SF* to measure acute stress levels after inducing psychological stress in participants.

Participants in the *comedic performance observation* group watched a brief comedy performance, and afterward, completed the *PANAS-SF* one last time. Participants in the *control* group watched a simple, monotonous video of grass growing, and then completed the *PANAS-SF* one last time.

Following the study, participants were asked to fill out a *Demographics Questionnaire* and were debriefed on reasoning behind the research conducted. Some participants were also told which group they were in (comedic performance observation or control group) depending on their curiosity.

Figure 1

Procedure



Note: M = PANAS-SF Measurement; *R* = Randomization

Statistical Analysis

All statistical procedures were conducted using Jamovi Desktop (2.3.21; The Jamovi Project, 2023). Univariate procedures were used to describe the data. Due to a significant degree of positive skew that resisted correction, the negative affectivity (NA) data were examined using a mixture of parametric and non-parametric procedures, whereas the positive affectivity (PA) data were analyzed with parametric procedures. Regarding the NA data, a Mann-Whittney *U*-test was used to determine equivalency of baseline measures of NA across the two conditions, and then two Bonferroni corrected Wilcoxon signed rank tests were used to determine if the arithmetic task successfully stressed participants in each condition via showing significant increases in such between the first and second measures. Next, as no non-parametric equivalent of a mixed factorial analysis of variance exists, the interaction between time and condition was probed using a linear regression. Specifically, condition assignment was used to predict difference scores in NA between time 2 and time 3. From there, Friedman tests with post hoc Bonferroni corrected Durbin-Conover comparisons were used to explore differences in the changes in negative affectivity across time for the two conditions. Regarding the PA data, an independent samples *t*-test was used to determine equivalency of baseline measures of PA across the two conditions, and two Bonferroni corrected correlated samples *t*-tests were used to were used to determine if the arithmetic task successfully stressed participants in each condition via showing significant decreases in such between the first and second measures. Next, a 2x3 mixed factorial analysis of variance was performed to determine if changes in PA across time differed by condition. The significant between-groups/within-subjects interaction was probed using two 1x3 repeated measures analyses

of variance with Tukey's honest significant differences tests used for post hoc comparisons in each.

Results

Descriptive Statistics

Cronbach's alpha values for each of the PANAS subscales can be found in Table 2. The PANAS subscales demonstrated good to excellent internal consistency in the present sample. Descriptive statistics for the positive affectivity (PA) and negative affectivity (NA) data across the two conditions as well as three time points are found in Table 3. Of note, all the NA data as well as the PA data for the comedy condition during the recovery timepoint were positively skewed beyond acceptable levels of such for parametric analysis. Natural log transformations were applied to the data to reduce skew to acceptable levels. This was successfull for the PA data but unsuccessful for the NA data.

Table 2

PANAS Internal Consistency

	PA_{T1}	PA_{T2}	PA_{T3}	NA_{T1}	NA_{T2}	NA_{T3}
Cronbach's α	0.86	0.91	0.92	0.88	0.89	0.90

Table 3

Descriptive Statistics

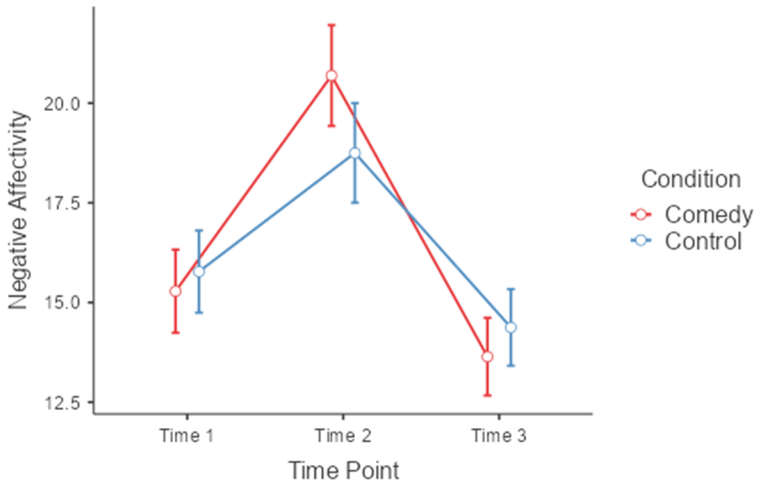
	PA_{T1}	PA_{T2}	PA_{T3}	NA_{T1}	NA_{T2}	NA_{T3}
Overall Sample (n = 79)						
Mean	26.20	22.20	20.40	15.50	19.70	14.00
SD	7.50	8.22	8.16	6.48	7.90	6.05
Skew	0.15	0.53	0.81	2.82	1.26	2.84
Nlog Transformed Skew	-0.51	-0.15	0.21	1.44	0.48	1.77
Comedy Condition (n = 39)						
Mean	26.30	22.20	22.60	15.30	20.70	13.60
SD	6.94	7.00	7.70	5.63	8.53	6.82
Skew	0.17	0.22	0.37	1.70	1.29	3.34
Nlog Transformed Skew	-0.55	-0.35	-0.08	0.94	0.40	2.34
Control Condition (n = 40)						
Mean	26.20	22.30	18.20	15.80	18.80	14.40
SD	8.10	9.35	8.09	7.27	7.22	5.25
Skew	0.15	0.63	1.49	3.28	1.16	1.92
Nlog Transformed Skew	-0.47	-0.01	0.67	1.93	0.60	1.27

Negative Affectivity

A baseline comparison using a Mann-Whittney *U*-test revealed that Time 1 measures of NA did not significantly differ between those assigned to the experiment's two conditions (z = .57, p = .72), thus indicating that the two groups had equivalent levels of NA at the start of the experiment. Next, two Bonferroni corrected Wilcoxon signed ranks tests revealed that NA levels for those in comedy condition (W = 81.5, p < .001, r_{rb} = -.77) as well as for those in control condition (W = 124, p = .002, r_{rb} = -.61) significantly increased following the arithmetic stressor task, thus providing evidence that the task did evoke stress for participants in both groups. Figure 1 demonstrates the changes in NA scores for participants in both conditions across time.

Figure 1.

Changes in NA Scores Between Conditions and Across Time



Note. The Y axis reflects untransformed values.

The linear regression wherein condition assignment was used to predict change scores in NA between Time 2 and Time 3 was significant, F (1, 77) = 5.17, p = .03, R^2 = .06; thus, providing evidence that changes in NA across those two time points differed as a function of group assignment. The first follow-up Friedman test was conducted on the NA data from those in the comedy condition. It revealed a significant effect of time on NA scores; X^2 (2) = 42.7, p < .001. Post hoc Bonferroni corrected Durbin-Conover comparisons revealed that: NA scores significantly increased from Time 1 to Time 2 (p < .001); NA scores significantly decreased from Time 2 to Time 3 (p < .001); and NA scores were significantly lower at Time 3 relative to those at Time 1 (p < .001). The next follow-up Freidman test was conducted on the NA data from those in the control condition. It also revealed a significant effect of time on NA scores, X^2 (2) = 22.9, p < .001; however, while NA scores significantly increased from Time 1 to Time 2 (p < .001) and decreased from Time 2 to Time 3 (p < .001), the difference between NA scores were not significantly different at Time 3 than they were at Time 1 (p = .06). Taken together,

these analyses demonstrate that comedy exposure following a period of acute stress led to greater reductions in NA relative to baseline NA levels than those who were not exposed to comedy.

Positive Affectivity

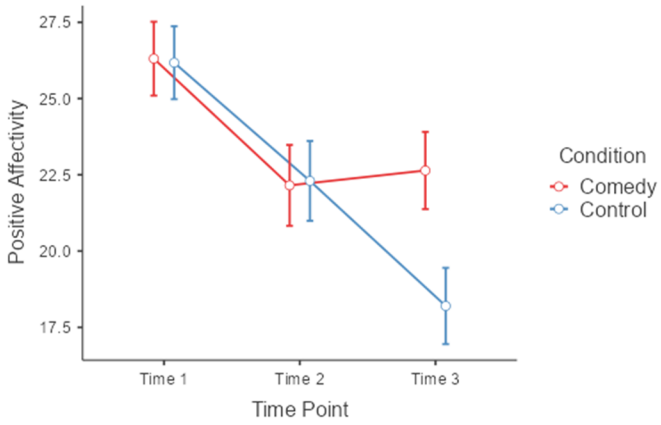
A baseline comparison using an independent samples *t*-test revealed that Time 1 measures of PA did not significantly differ between those assigned to the experiment's two conditions, thus indicating that the two groups had equivalent levels of PA at the start of the experiment, t (77) = .08, p = .94. Next, two Bonferroni corrected correlated samples *t*-tests revealed that PA levels for those in comedy condition, t (38) = 4.95, p < .001, d = .79, 95% CI [.43, 1.15], as well as for those in control condition, t (38) = 4.11, p < .001, d = .65, 95% CI [.31, .99], significantly decreased following the arithmetic stressor task, thus providing further evidence that the task did evoke stress for participants in both groups. Figure 2 demonstrates the changes in PA scores for participants in both conditions across time.

The 2x3 mixed factorial analysis of variance yielded a significant main effect of time on PA scores, F (2, 154) = 49.14, p < .001, η^2_p = .39, indicating that PA scores differed significantly across time; however, there was no significant main effect of condition, F (1, 77) = 1.75, p = .19. There was a significant interaction effect of time and condition, indicating that changes in PA across time differed as a function of condition, F (2, 154) = 9.31, p < .001, η^2_p = .11. The first follow-up repeated measures analysis of variance was performed with the PA data from the comedy condition. It demonstrated a significant effect of time on PA scores, F (2, 76) = 15.4, p < .001, η^2 = .07, with post hoc Tukey's honest significance tests revealing: a significant decrease in PA scores from

Time 1 to Time 2, t (38) = 4.08, p < .001; a non-significant change in PA scores from Time 2 to Time 3, t (38) = -.04, p = .91; and a significant decrease in PA scores from Time 1 to Time 3, t (38) = 5.10, p < .001. The second follow-up repeated measures analysis of variance was performed with the PA data from the control condition. It demonstrated a significant effect of time on PA scores, F (2, 78) = 15.4, p < .001, η^2 = .15, with post hoc Tukey's honest significance tests revealing: a significant decrease in PA scores from Time 1 to Time 2, t (39) = 4.81, p < .001; a significant decrease in PA scores from Time 2 to Time 3, t (39) = 4.10, p < .001; and a significant decrease in PA scores from Time 1 to Time 3, t (39) = 8.94, p < .001. Taken together, these analyses demonstrate that comedy exposure following a period of acute stress led to the attenuation of further PA reductions as compared to those who were not exposed to comedy.

Figure 2.

Changes in PA Scores Between Conditions and Across Time



Note. The Y axis reflects untransformed values.

Discussion

In the study above, I, with the help of a research partner, conducted an experiment with 79 current undergraduate students enrolled at Middle Tennessee State University (MTSU) to test whether students' acute stress levels would be alleviated by watching a six-minute comedy performance following a stress task. My hypothesis was that students' positive feelings would increase and their negative feelings would decrease, and our research mostly supported this idea. Students' stress levels were measured by using a Positive and Negative Affect Schedule (PANAS-SF; Watson et al., 1988), which consisted of students self-reporting their positive and negative feelings to gather data on positive (PA) and negative affectivity (NA) levels (Russell & Carroll, 1999). The results of the experiment were analyzed by separating participants' self-reported NA and PA levels. In the area of NA levels, those in both the comedy and control groups had lower NA than their respective baseline, indicating that all students (in both comedy and control groups) felt less bad or negative feelings than when the experiment began. However, the significant findings were that the overall levels of PA in the comedy group after the stress task were much greater than the PA of the control group, meaning that viewers in the control group decreased positive feelings consistently throughout the experiment, whereas in the comedy group their positive feelings decreased after the stress task and increased slightly after the comedy performance. This demonstrates that the incorporation of the comedy performance did have an impact on participants' overall positive feelings, not bringing them back to the high positive feelings they had at baseline but showing a vast difference from the control group and an increase in positive feelings.

The experiment's findings somewhat conflict with the present research. Although comedy has shown to be effective in alleviating negative emotions (Strick et al., 2009), our findings were not significant in that area. While participants' NA was lower than their respective baseline, this was similar across the board (comedy or control group), so it cannot be associated with comedy being the cause. However, the comedy in the study could be coined as a "cognitive distraction" for the participants, since they increased PA levels after intervention as opposed to the control group (Strick et al., 2009, p. 574). There have been, though, increased positive emotions in participants who used other various forms of artistic techniques, such as art therapy workshops or playing instruments and connecting with music for peace (Buluga, 2022; Pliske et al., 2021).

Some possible reasons for the results not lining up with the present literature could have been due to many different factors. First, humor can vary vastly, and we as humans find different things humorous, so finding a comedy performance to appeal to every audience is virtually impossible. Second, while there was a script for the researchers to follow to begin the stress task, the researchers' moods and intensity of delivery for the stress task could have varied for many reasons, leaving some students to feel more stress or less stress based on the researchers' delivery of the stress task. Since this was an interactive task, though, the researchers were needed to run the task each time, and could not have used a recorded video to run through the task. Third, similar to the last statement, participants also came in after dealing with various tasks and life responsibilities, some feeling more positive or negative feelings than others at baseline. This could have been controlled by having all participants complete a grounding/meditiative exercise at the start of the experiment.

This experiment contributes well to the research regarding comedy as a form of stress relief. College students often experience high levels of stress in waves (i.e., midterms/finals) and overall throughout their academic careers, so finding easy, short-term solutions like comedy can provide insight for further research in knowing that it did show significance in increasing students' PA. As stated above in the literature review, comedy has shown to be most impactful in the short-term, and that other, more long-term focused tactics should be used when alleviating feelings of stress and preventing chronic stress and disease development (Strick et al., 2009). Since our research did demonstrate significance for the comedy group and PA levels, it would be interesting to develop further research in this area and examine different levels of humor or different stress tasks to find possible discrepancies/commonalities in research. Since only measured self-reported PA and NA levels with the PANAS-SF scale, it may also be beneficial to incorporate either physiological research practices (i.e., measuring blood pressure or perspiration levels) or by conducting qualitative interviews which would gather first-hand self-reported data on participants' thoughts and feelings.

Our findings' implications for applied work could contribute to intervention/stress relief programs that different universities present to their students, and could provide insight for educators when speaking with distressed students. While it is important still to encourage evidence-based practices for relieving stress, it could be helpful to share with students experiencing short-term feelings of stress that taking time to watch their favorite comedian might increase their positive feelings. Also, creative workshops in place that utilize different forms of performing arts could work to incorporate comedy into their work.

There are multiple limitations to this study. Some were notable observations were that not all participants found the comedy video to be humorous, and not all participants appeared to be challenged or stressed by the Serial 7s stress task (Bostan, 2021). This could be because of varying comedy interests/preferences, and the intensity of the S7 task. It is important to understand that comedy is within a spectrum and not all forms of comedy were tested/presented in our study. We did try to find the most commonly appropriate form of comedy performance and did anticipate this to some degree in the initial creation of the experiment. Another limitation of the study could be that all three administrations of the PANAS-SF in the experiment had all of the questions in the same order each time. By not randomizing the list each time and moving questions around, it could have been simple for participants to develop a familiar pattern of answers, so controlling for practice effects could be beneficial to a later replication of this study. Some limitations to the study regarding the S7s task could be that the researchers administering the task may have felt more positively or negatively one day more than another, so this could be controlled in future replications by having participants complete grounding techniques before each administration of the S7 task in the future. Also, in a few experiment sessions, the researchers reacted to participants' facial expressions and comments throughout the S7 task (e.g., a participant would laugh nervously or make a funny nervous face, causing the researcher to laugh), and this could have skewed a few of the participants' feelings either negatively or positively as opposed to being from the experiment itself. Regarding the control video (i.e., a six-minute video of grass growing with little to no audio), many participants appeared to become more stressed or experienced greater negative feelings due to growing impatient. The video, since it was

of grass growing, appeared to be mostly still, so many participants thought they were staring at a picture for six minutes in silence. This could potentially be controlled in further studies by having a video with moving parts or audio.

While there were many limitations, it was overall an interesting and highly fascinating study to conduct. If replicated or used as a framework for future developments, it would be interesting to test for different styles of humor (i.e., physical or slapstick, dark, surreal, self-deprecating humor, etc.). Also, incorporating ways of testing for blood pressure or perspiration levels could provide a different, more physiological outlook to the field of research. Finally, controlling any confounding variables (i.e., practice effects, researcher reactions, and varying levels of intensity when administering the stress task) could produce more concise research results.

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Appendix A. PANAS-SF Questionnaire

Positive and Negative Affect Schedule (PANAS-SF)

Indicate the extent you have felt this way over the past week.		Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
PANAS 1	Interested	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PANAS 2	Distressed	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PANAS 3	Excited	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PANAS 4	Upset	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PANAS 5	Strong	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PANAS 6	Guilty	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PANAS 7	Scared	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PANAS 8	Hostile	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PANAS 9	Enthusiastic	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PANAS 10	Proud	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PANAS 11	Irritable	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PANAS 12	Alert	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PANAS 13	Ashamed	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PANAS 14	Inspired	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PANAS 15	Nervous	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PANAS 16	Determined	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PANAS 17	Attentive	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PANAS 18	Jittery	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PANAS 19	Active	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PANAS 20	Afraid	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

Scoring:

***Positive Affect Score*:** Add the scores on items 1, 3, 5, 9, 10, 12, 14, 16, 17, and 19. Scores can range from 10 – 50, with higher scores representing higher levels of positive affect.
Mean Scores: 33.3 (SD±*7.2)*

***Negative Affect Score*:** Add the scores on items 2, 4, 6, 7, 8, 11, 13, 15, 18, and 20. Scores can range from 10 – 50, with lower scores representing lower levels of negative affect.
Mean Score: 17.4 (SD ± 6.2)

Your scores on the PANAS: Positive: ____ Negative: ____

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: the PANAS scales. *Journal of personality and social psychology*, *54*(6), 1063.

Appendix B. Demographics Questionnaire

1. “Please type your age in years?” [For example, “22”]
2. “What was your assigned sex at birth?” [Select from Male, Female, Intersex, or Prefer not to say]
3. “Which of the following best matches your gender identity?” [Select from Male, Female, Non-binary/third gender, Other (please specify), or Prefer not to say]
4. “Are you of Spanish descent?” [Select from No, Yes, or Prefer not to say]
5. “Which of the following best matches your racial identity?” [Select from African American/Black, Asian-American/Asian, Caucasian/White, Native-American/American Indian, Pacific Islander/Hawaiian, Middle Eastern, South Asian/Indian, Multiracial, Other (please specify), or Prefer not to say]
6. “Which describes your class rank?” [Select from Freshman, Sophomore, Junior, Senior, or Non-degree seeking student]

Appendix C. Serial 7s Task Script

Connor: Now, we will move on to the Serial Sevens Task. In just a moment, I will ask you to begin subtracting the number "7" from a larger number. You will need to complete the math in your head and say the answer aloud. Continue subtracting the number "7" from each number that follows, until the five-minute timer goes off. If you make a mistake, I will say, "Stop" and instruct you to start over from the beginning. This will continue until the timer goes off. Do you have any questions?

Connor sets the timer

Connor: You will begin by subtracting the number "7" from "1000." You may begin.

Appendix D. Serial 7s Task Answer Sheet

1000	790	580	370	160
993	783	573	363	153
986	776	566	356	146
979	769	559	349	139
972	762	552	342	132
965	755	545	335	125
958	748	538	328	118
951	741	531	321	111
944	734	524	314	104
937	727	517	307	97
930	720	510	300	90
923	713	503	293	83
916	706	496	286	76
909	699	489	279	69
902	692	482	272	62
895	685	475	265	55
888	678	468	258	48
881	671	461	251	41
874	664	454	244	34
867	657	447	237	27
860	650	440	230	20
853	643	433	223	13
846	636	426	216	6
839	629	419	209	
832	622	412	202	
825	615	405	195	
818	608	398	188	
811	601	391	181	
804	594	384	174	
797	587	377	167	

IRB Approval

Office of Research Compliance
2269 Middle Tennessee Blvd.
Sam H. Ingram Bldg (ING) Room 010A
Box 124
Murfreesboro, TN 37132
www.mtsu.edu/irb

Date: May 1, 2023
PI: Connor Mosburg
Department: Middle Tennessee State University, Psychology
Re: Initial - IRB-FY2023-155
Comedy & Affect Study

The Middle Tennessee State University Institutional Review Board has rendered the decision below for Comedy & Affect Study. The approval is effective starting April 28, 2023.

Decision: Approved
Category: 7. Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Findings:
Research Notes:

Please note:

Any **modifications to the approved study must be submitted for review through Cayuse IRB**. Please note, as well, that according to MTSU Policy, a researcher is defined as anyone who works with data or has contact with participants. Anyone meeting this definition needs to be listed on the protocol and needs to complete the required training. If you add researchers to an approved project, please add them to the project within Cayuse IRB for approval **before** they begin to work on the project.

Any unanticipated harm to participants or adverse events must be reported to the Office of Compliance, and any subsequent changes to the protocol must be submitted to the IRB for review before implementing this change.

You must submit an end-of-project form to the Office of Compliance upon completion of your research. Completed research means that you have finished collecting data.

All research materials must be retained by the PI or faculty advisor (if the PI is a student) for at least three (3) years after study completion and then destroyed in a manner that maintains confidentiality and anonymity.

All approval letters and study documents are located within the Study Details in Cayuse IRB.

We wish you a successful research project,

Middle Tennessee State University Institutional Review Board