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Masked Emotions: Studying the Impact of the COVID-19 Pandemic On the Emotional Regulation in College Students and Beyond

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**Masked Emotions: Studying the Impact of the COVID-19 Pandemic
on Emotional Regulation in College Students and Beyond**

A Thesis

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College of Liberal Arts and Sciences

Of

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Sara Katherine Taft

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Abstract

Studies regarding the socioemotional selectivity theory have found that upcoming endings lead to a positivity bias in individuals' executive functioning. The current study seeks to expand upon this theory by studying the impacts of the COVID-19 pandemic on college students and graduates. It was predicted that a) current students would demonstrate more negative emotionality than pre-COVID students, b) that current students would demonstrate a greater positivity bias than pre-COVID students, and c) that this bias would be more pronounced in current seniors and weaker in current freshmen and college graduates. Participants responded to several scales regarding personality (neuroticism, shyness) and emotional factors (depression, anxiety, optimism/pessimism, loneliness, general affect, and completed working memory tasks for happy, neutral, and sad human faces. Results revealed that current students performed significantly worse on all conditions of the working memory task; additionally, current students scored significantly lower on optimism, and higher on shyness, anxiety, depression, general affect, and neuroticism. Among current students, only loneliness differed significantly, with first year students being the most lonely. While findings were inconsistent with the socioemotional selectivity theory, they suggest that overall emotionality can have detrimental effects on executive functioning. Findings that first year students are significantly more lonely than pre-COVID students and other current students suggests that social distancing practices are having a particularly negative effect on connectedness for these students.

Keywords: COVID-19, college students, emotion regulation, executive functioning, socioemotional selectivity theory

**Masked Emotions: Studying the Impact of the COVID-19 Pandemic
on Emotional Regulation in College Students and Beyond**

Since the first outbreak of the coronavirus disease 2019 (COVID-19) in the Chinese city of Wuhan, there have been nearly 29 million confirmed cases and approximately 524,000 deaths in the United States alone as of March 11, 2020 (World Health Organization, 2020).

Unprecedented attempts to control the disease via physical or “social” distancing have shut down normal life. This has included forced school closures, cancelled graduations, and uncertain futures for both college and high school graduates, and current college students as they move into their next stage of life. By mid-March of 2020, more than 1,100 colleges and universities throughout the nation had cancelled in-person classes in addition to multiple cancellations or postponements of spring graduation ceremonies (Smalley, 2020). Though a new school year is officially underway, many questions remain unanswered for college students in regards to what the “new normal” will be under COVID-19 conditions.

The threats to physical health are well documented (Couzin-Frankel, 2020), yet just as important, but perhaps less studied, are the psychological impacts of the virus. A study by Cao and colleagues (2020) conducted on college students in China found a positive association between anxiety symptoms and economic effects, impact on daily life, and delays in academics. Furthermore, anxiety for individuals could be heightened by the reminder of their own mortality as a result of the current pandemic (Usher & Durkin, 2020). Additionally, it has been demonstrated that COVID has had a negative effect on cognition. In research conducted on more than 60,000 Chinese residents during the pandemic, Jiang and colleagues found that individuals tended to show negative cognitive processing bias as demonstrated by a negative attention bias—paying greater attention to negative information relative to neutral or positive

information—as well as a negative memory bias—demonstrating a better memory of negative information compared to neutral or positive information—and rumination—repeated thinking and reflection over negative feelings; it was found that such measures were related to increased levels of anxiety and depressive symptoms (Jiang, Liu, Zhang, & Feng, 2020). More specifically, research has connected impairments in emotional and cognitive functioning in individuals with greater social disconnection due to the social isolation procedures implemented during the pandemic (Bland, Roiser, Mehta, Sahakian, & Robbins *et al.*, 2021).

The socioemotional selectivity theory posits that as an individual approaches some sort of life event that marks an ending to a particular life phase, emotions become progressively salient (Mather & Carstensen, 2003). More specifically, older adults have been found to demonstrate a positivity bias, meaning that such individuals attend more to positive emotional information in comparison to neutral or negative emotional information (Charles, Mather & Carstensen, 2003; Mather & Carstensen, 2003; Cypriańska *et al.* 2014). It has been suggested that this pattern can be explained by a change in motivational focus that affects cognitive processing. For example, older individuals may become more aware of impending endings and adjust their focus to more positive information in order to maintain greater emotional well-being (Carstensen, Fung & Charles 2003). Significantly, research by Pruzan and Isaacowitz (2006) has uncovered the same positivity bias in graduating college seniors relative to first-year students, demonstrating that cognitive aging does not play a role in the motivation behind emotion regulation.

Though the Cao and colleagues' (2010) study found a negative relationship between social support and level of anxiety in college students, college students have been largely removed from their social support groups due to the social distancing orders and cancellation of in-person classes (Smalley, 2020). In fact, a survey conducted by YoungMinds found that 83%

of respondents under 25 reported that their mental health had worsened during the pandemic due to school closings, restrictions on social connection, and loss of routine (YoungMinds, 2020).

The loss of expected endings—for example, graduation ceremonies and celebrations for high school and college seniors, referred to herein as closure activities—has left individuals with anxiety over what is to come next (Cao *et al.* 2020). In turn, this may prompt the motivation to maintain emotional wellbeing through emotional selectivity as seen in the study by Pruzan and Isaacowitz (2006).

To date, research related to the socioemotional selectivity theory has only considered typical life events that mark an ending, such as death or college graduation (Charles, Mather & Carstensen, 2003; Mather & Carstensen, 2003; Pruzan & Isaacowitz, 2006). The current research is significant because it is investigating the role of socioemotional regulation when individuals are denied their closure activities (e.g., end of school activities and graduation). Essentially, this research will seek to answer the question of what impact missed opportunities have on emotion regulation; as research regarding the socioemotional selectivity has found that life events marking an ending alter emotion regulation, this research will seek to uncover what effect the cancellation of such events has on emotion regulation. Additionally, this research is significant because it is taking into account an atypical life event happening on a national scale. COVID-19 has disrupted normal life for every individual, and particularly for students (Smalley, 2020). This research will be able to exemplify some of the ways in which national events can impact the psychological processes of individuals.

The current study will seek to investigate what impact the COVID-19 pandemic has had on college students' and 2020 college graduates' cognitive processing of emotional stimuli. Firstly, it is predicted that all current students, regardless of class year, will demonstrate a more

negative emotionality than students prior to the pandemic. It is also predicted that all current students, regardless of class year, will demonstrate a positivity bias given that there is likely a heightened awareness of their own mortality in comparison to students prior to the pandemic, as well as lost closure activities (Usher & Jackson, 2020; Smalley, 2020). However, it is expected that this bias will be more pronounced in current seniors given that a) they are approaching graduation, and b) what is coming next for these individuals, especially in light of the current pandemic, is more likely to be unknown. In contrast, the bias will be weaker in 2020 college graduates and incoming college freshmen; though both groups lost their closure activities, college graduates have moved on to their next phase of life and have likely obtained jobs while college freshmen are getting ready to begin their college years, meaning that the need to maintain positive emotionality in light of a significant ending in life has passed for these individuals .

Method

Participants

In total, there were 118 current Butler University students and graduates who consented to take part in this study. 106 of these students were current students, with 18 being first years, 24 second years, 35 third years, and 29 fourth years; 11 were 2020 psychology college graduates. Overall, 16 identified as males and 102 as females. 104 identified as white, and 28 identified as non-white. Students' ages ranged from 16 to 23, with the average age being 20.38 (SD=1.37).

Materials

The following scales were used to measure a variety of personality and emotion variables:

Affect. Participants responded to the Positive and Negative Affect Scale (PANAS), constructed by Watson and colleagues (1988). Participants responded to 20 different emotion words, and stated the extent to which they had experienced that emotion in the past few weeks prior to their participation in the study. Responses were given on a scale of 1 (very slightly or none at all) to 5 (extremely). Cronbach's alpha for negative affect was .85, and .89 for positive affect. Data on this measure was compared to a sample from research conducted by Watson, Clark, and Tellegen (1988).

Anxiety. The Anxiety subscale of the HEXACO Personality Inventory as established by Lee and Ashton (2004). Participants responded to 20 statements on a scale of 1 (rarely or none of the time) to 4 (most or all of the time). Cronbach's alpha was .86. Data on this measure were compared to data from research by Lee and Ashton (2006).

Depression. Participants also completed the Center for Epidemiologic Studies Depression Scale (CES-D), a 20-item scale detailing their depressive symptomatology, as established by Radloff (1977). Participants stated the degree to which they felt they had experienced each statement on a scale of 1 (rarely or none of the time) to 4 (most or all of the time). Cronbach's alpha was .93. Data on this measure was compared to data from work by Simon, DiPlacido, and Conway (2019).

Loneliness. The Revised UCLA Loneliness Scale was used to assess participants' experiences of loneliness (Russell *et al.*, 1980). Participants responded via a scale of 1 (never) to 4 (often) to 20 items to indicate how often the participant felt that the statement applied to them. Cronbach's alpha was .93. Results were compared to a sample from research conducted by Rotenberg and Korol (1995).

Neuroticism. The Revised NEO Personality Inventory was used to evaluate the extent of participants' neuroticism (Costa & McCrae, 1992). Participants responded to 20 statements, and indicated the extent to which they felt the statements were very inaccurate (1) to very accurate (5) for them. Cronbach's alpha was .89. Data from the current sample were compared with a sample from research conducted by Donnellan and colleagues (2006).

Optimism and Pessimism. The Life Orientation Test (LOT) was established by Scheiver and Carver (1985) to measure the extent to which individuals tend to be optimistic or pessimistic in their outlook on life. Participants responded to 12 statements on a scale of 0 (strongly disagree) to 4 (strongly agree). Cronbach's alpha was .80. Data on this measure were compared to data from research conducted by Scheier, Carver, and Bridges (1994).

Shyness. Participants' degree of shyness was assessed using the Revised Buss Shyness Scale (Cheek, 1983). Participants read and responded to 13 statements on a scale of 0 (strongly disagree) to 4 (strongly agree). Cronbach's alpha was .91. Data on this measure were compared to data from research conducted by Koydemir and Demir (2008).

An *n*-back working memory task involving human faces created by Taylor, Hernandez, and Lineweaver (2010) was used to assess participants' memory for emotions of positive and negative valences. The task included 3 sections of 90 items each, and a final memory recall task of 12 items. The first section involved human faces portraying neutral emotions. In the second section, human faces were portraying happiness (a positively-valenced emotion), and in the third section, human faces were portraying sadness (a negatively-valenced emotion). Participants were tasked with saying whether or not the person in the current trial was the same person depicted two trials prior. In the final task, participants viewed twelve pictures one at a time, and had to indicate whether or not they had seen the emotion portrayed in any of the first three tasks.

Individuals received scores for each emotion task (sad, neutral, and happy), as well as a final combined n -back score.

Procedure

Undergraduate students at Butler University were recruited via Sona, and had the opportunity to earn extra credit in a psychology course. After completion of the first session, current students received the link to the second session of the study, and were given three weeks to complete the second session before their data became void. Butler '20 graduates of the psychology department were recruited via direct email from the researcher. In return for their participation, these individuals received a gift card worth twenty dollars. Links to both portions of the study were included in the email for graduates for these individuals to complete at their discretion.

In the first session of the study, participants read and gave informed consent; if they denied consent, the window to the study closed. Once consent was given, participants answered several demographical questions, which included: age, year in school (first year/freshman to graduate student, or college graduate), race, and sex. In addition, graduates were asked to provide an email so that they would receive the gift card. Following the questions on demographics, participants completed seven self-report surveys on the various emotion and personality variables. This portion of the study took place on Qualtrics.

In the second session of the study, participants completed the n -back working memory task, as well as the memory recall task. Once the final session was completed, current students were granted credit, and graduate students received their gift cards via email.

Results

Using a one-sample t-test to compare *n*-back and memory data to that of students prior to the pandemic, it was found that current students fared significantly worse on working memory tasks in comparison to pre-COVID students for both neutral faces ($M=68.22$, $SD=16.172$; $t[86]=-4.056$, $p<.000$), happy faces ($M=69.70$, $SD=17.569$; $t[86]=-3.726$, $p<.000$), and sad faces ($M=68.82$, $SD=20.052$; $t[86]=-3.156$, $p=.002$). However, current students performed significantly better than pre-COVID students on the memory task ($M=11.10$, $SD=1.423$; $t[86]=8.546$, $p<.000$).

In regards to the measures on affect, anxiety, depression, loneliness, neuroticism, optimism and pessimism, and shyness, current students were significantly different from pre-COVID students on: optimism and pessimism ($M=19.653$, $SD=4.978$; $t[117]=11.572$, $p<.000$), shyness ($M=22.578$, $SD=10.532$; $t[117]=-8.225$, $p<.000$), affect (*negative*: $M=24.449$, $SD=7.428$; $t[117]=9.285$, $p<.000$; *positive*: $M=33.712$, $SD=7.438$; $t[117]=-2.027$, $p=.045$), neuroticism ($M=56.119$, $SD=13.115$; $t[117]=4.405$, $p<.000$), depression ($M=22$, $SD=11.467$; $t[117]=6.489$, $p<.000$), and anxiety ($M=33.017$, $SD=7.795$; $t[116]=-2.058$, $p=.042$). Differences on the loneliness measure were insignificant between current students and pre-pandemic students. These differences are presented in Table 1.

To compare participants across class years (first years, Sophomores, Juniors, Seniors and Graduates), a One-Way Multivariate Analysis of Variance (MANOVA) was performed. That analysis revealed a significant cohort effect (Wilk's $\lambda=0.007$., $F([8,104]=1767$, $p=.001$). This test was followed by a set of One-Way ANOVAs for each of the measures of emotionality which revealed significant cohort differences on loneliness ($F[4,111]=3.27$, $p=.014$) and negative affect ($F[4,111]=3.07$, $p=.019$) For loneliness, post-hoc analysis revealed that first years differed significantly from all other years, with first years being significantly more lonely than other class

years. For negative affect, significant differences occurred between second years and graduates, and third years and fourth years. There were no significant cohort differences on any of the *n*-back working memory measures.

Though failing to reach a level of significance, some factors demonstrated possible trends.. Levels of optimism related to life outlook ($F[1,111]=2.02, p=.09$) increased by year, with first years ($M=17.154, SD=1.264$) demonstrating a more negative outlook relative to college graduates ($M=20.125, SD=1.612$). Within each year, positive affect was consistently greater than negative affect (*first years*: positive affect $M=33.077, SD=2.049$, and negative affect $M=23.385, SD=2.044$; *second years*: positive affect $M=34.632, SD=1.695$, and negative affect $M=25.842, SD=1.691$; *third years*: positive affect $M=34.043, SD=1.540$ and negative affect $M=24.217, SD=1.537$; *fourth years*: positive affect $M=33.524, SD=1.612$, and negative affect $M=26.952, SD=1.608$; *graduates*: positive affect $M=33.750, SD=2.612$, and negative affect $M=19.875, SD=2.606$).

Regression analysis revealed that measures of personality and emotion variables predicted overall *n*-back scores ($R^2 = .187$; $F[8,75] = 2.15, p = .041$). However, only scores on positivity, as measured by the PANAS scale, were significant in predicting *n*-back scores ($\beta=-.300$, zero-order correlation $=-.281, p = .014$). These results are summarized in Table 2, and depicted in Figure 1.

Discussion

The current study sought to investigate what impact the COVID-19 pandemic has had on the cognitive processing of emotional stimuli by current college students and 2020 college graduates. The study used *n*-back and memory tasks to assess college students' and graduates' memory for neutral, positive (i.e. happy), and negative (i.e. sad) human faces. It was predicted

that all current students would demonstrate a more negative emotionality than pre-COVID students. Additionally, it was predicted that all current students, regardless of class year, would demonstrate a positivity bias when compared to students prior to the pandemic, but this bias would be more pronounced in current seniors, and weaker in 2020 college graduates and incoming college freshmen. However, results regarding these predictions were mixed.

Compared to pre-COVID students, current students demonstrated significantly different scores for all three emotion conditions. However, it was predicted that current students would have a greater memory for positive relative to neutral or negative emotions, and this was not the case; current students performed worse on all conditions relative to students before the pandemic. These results were in spite of the fact that, though insignificant, each class of current students consistently demonstrated higher positive affect scores than negative affect scores. While this doesn't support the findings of the socioemotional selectivity theory as predicted based on previous research (Charles, Mather & Carstensen, 2003; Mather & Carstensen, 2003; Cypryńska *et al.* 2014), it does suggest that various emotional factors may affect executive functions. Research has found connections between executive dysfunction and 1) depression and anxiety (Warren, Heller, & Miller, 2020), 2) neuroticism (Sutin, Stephan, Luchetti, 2019), and 3) negative affect (Shields, Moons, Tewell, & Yonelinas, 2017). Indeed, within this study, current students demonstrated higher levels of shyness, negative affect, neuroticism, anxiety, and depression relative to pre-COVID students. Additionally, current students demonstrated decreased levels of positive affect. This is consistent with research linking negative cognitive processing and memory biases to increased levels of anxiety and depressive symptoms during the pandemic (Jiang, *et al.*, 2020). Interestingly, current students did not differ significantly in loneliness compared to pre-COVID students, which may have been predicted given the current

social isolation procedures in place to control the spread of the virus. The lack of this significant difference may indicate that current students have adjusted to these procedures.

The predictions that bias would be more pronounced in current seniors, and weaker in 2020 college graduates and incoming college freshmen were not supported. Socioemotional selectivity theory would predict that because current seniors are approaching graduation and college freshmen and college graduates have just graduated and are entering a new phase of life, current seniors would demonstrate the positivity bias and current freshmen and college graduates would not; the absence of this finding is inconsistent with previous research (Pruzan & Isaacowitz, 2006). It may be that the current environment created by the pandemic has given students something beyond impending endings to worry about, therefore overshadowing any need to maintain positivity. Indeed, it was found that scores on the positive affect scale were the only significant indicator of total scores on the *n*-back task reflecting all three types of emotions; with every increase in positive emotionality, there was a corresponding decrease in total *n*-back scores, which is inconsistent with previous research into the socioemotional selectivity theory (Charles, Mather & Carstensen, 2003; Mather & Carstensen, 2003; Cypryańska *et al.* 2014). Though it was predicted that the loss of closure activities (i.e. graduation) and other activities (i.e. school events) would induce a positivity bias as students attempted to maintain a happy disposition, students may be less focused on lost opportunities and more concerned with the negative effect these losses have on their mental health overall (Bland, *et al.*, 2021; Cao, *et al.*, 2020; Jiang, Liu, Zhang, & Feng, 2020).

Within current students specifically, a significant difference occurred in experiences of loneliness between first years and all other years, with first years demonstrating the highest levels of loneliness overall. It is not uncommon for college freshmen to feel lonely after their

transition to college; however, finding that current freshmen during the pandemic are feeling more lonely than pre-pandemic freshmen suggests that current social distancing procedures have impeded these students' formation of a connection with other students on campus, and suggests that more steps may need to be taken to help these students acclimate to college life, regardless of how much longer the pandemic lasts. This is consistent with other findings regarding college freshmen during the pandemic (Arslan, 2020; Williams, 2020).

Limitations of the current study could point to further research in testing the effects of the pandemic on socioemotional functioning. Firstly, because this study was conducted nearly one year into the pandemic, this population of individuals may have grown accustomed to the "new normal" of the pandemic, therefore blurring any differences in socioemotional functioning among students of different years. Indeed 2020 college graduates have likely adjusted one year after their graduation, and have moved on to their next phase of life; current seniors, now only a few months away from graduation, have likely determined what they will do following their graduation; and other undergraduate students have likely grown accustomed to the new social distancing practices required of them. Secondly, this study lacked racial diversity, with only 23.0% identifying as non-white, and because COVID has been shown to disproportionately affect people of color (Karaca-Mandic, Georgiou, & Soumya, 2020), it may be important to conduct a similar study on students of color. Lastly, this study was conducted on a small private university campus in the Northwest, therefore limiting its generalizability. Further research may consider performing a national study on the socioemotional well-being of college students.

Even so, the current research indicates current college students are functioning at a lower emotional well-being, leading to decreased executive functioning. As the country is far from returning to the normal it used to know, it is likely that the effects of social distancing practices

implemented during the pandemic will continue to have negative effects on college students for the foreseeable future, and steps must be taken for improvements in mental health to occur.

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Table 1
 Emotionality and Memory Measures Compared to Known Pre-COVID Values in College Students

Measure	Mean (St. Dev)	One-Sample t (df)
Outlook on Life	19.65(5.0)	11.6(117)***
Shyness	22.58(10.5)	-8.2(117)***
PANAS Negativity	24.45(7.4)	9.3(117)***
PANAS Positivity	33.71(7.4)	-2.0(117)*
Loneliness	35.30(10.9)	-0.9(117)
Neuroticism	56.12(13.1)	4.4(117)***
Depression	22.00(11.5)	6.5(117)***
Anxiety	33.02(7.8)	-2.1(117)*
Faces: Person Neutral	68.22(16.2)	-4.1(86)***
Faces: Person Happy	69.70(17.6)	-3.7(86)***
Faces: Person Sad	68.82(20.0)	-3.2(86)**
Faces: Person Memory	11.10(1.4)	8.5(86)***

Notes: Positive t values indicate post-COVID values higher than pre-COVID values
 Negative t values indicate post-COVID values lower than pre-COVID values
 * = p<.05, ** = p<.01, *** = p < .001

Table 2

Multiple Regression Analysis of Emotionality and Memory Measures on Overall Executive Functioning (Total *n*-Back Score)

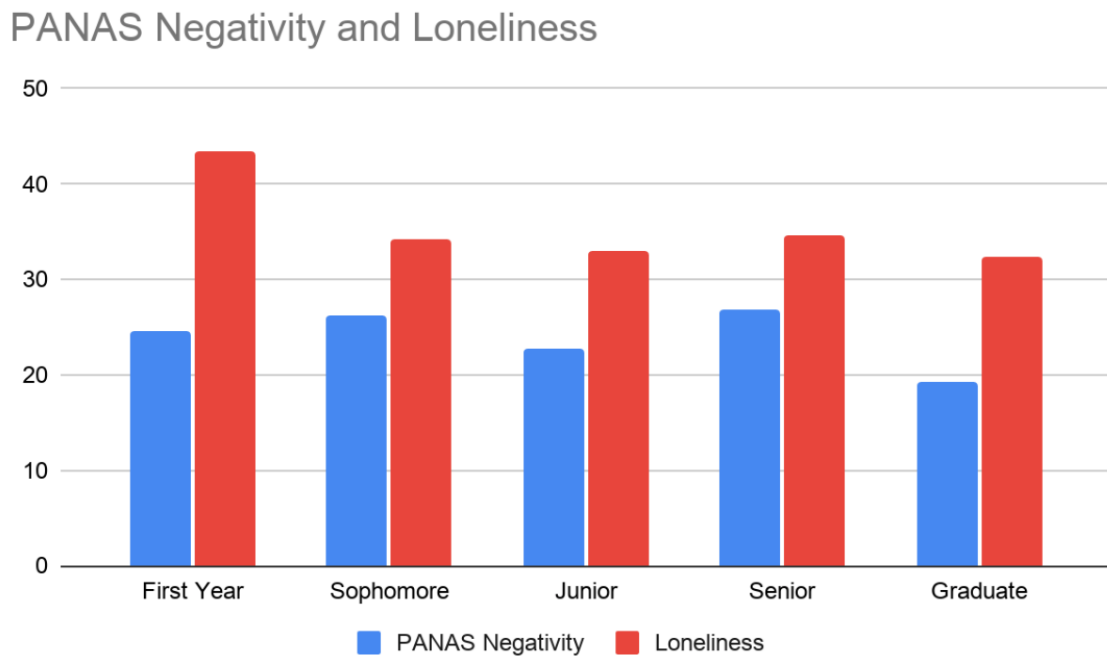
Model	Beta	Zero-Order Corr.
Outlook on Life	-.009	-.140
Shyness	.132	.136
PANAS Negativity	-.281	-.128
PANAS Positivity	-.300*	-.281**
Loneliness	.057	.027
Neuroticism	.247	.136
Depression	-.290	-.018
Anxiety	.091	-.075

Notes: $R^2 = .187$ $F(8,83) = 2.15$, $p = .041$

* = $p < .05$, ** = $p < .01$

Figure 1

Mean Level of Reported Feelings of Loneliness and Negativity as a Function of Year in School.



Note: Protected post-hoc tests show that First Year students report feeling more loneliness than other groups, which do not differ from each other. Seniors report higher levels of negative affect than college graduates.