Heterogeneous Patterns of Stress Over the Four Years of College: Associations With Anxious Attachment and Ego-Resiliency

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Abstract

Objective: A growing body of literature suggests that college students display alarming rates of psychological distress. However, studies of responses to significant life stressors in other contexts have found that people respond in heterogeneous ways and that attachment style and ego-resiliency mitigate the effects of stressors on mental health.
Method: Individual differences in distress among a cohort of students ($N = 157$; Mean age = 18.8 years, 62.6% female) across the four years of college were analyzed using latent class growth analysis. Trajectories were then regressed on levels of anxious and avoidant attachment and ego-resiliency.
Results: Four discrete patterns emerged characterized by healthy and maladaptive patterns of stress response, indicating that students respond to college in heterogeneous ways. Several patterns showed significant variability in distress by semester. Low levels of anxious but not avoidant attachment predicted membership in the stable-low distress or resilient class while ego-resiliency predicted membership in both the resilient and moderate distress classes.
Conclusions: Findings indicate that low levels of anxious attachment and the ability to flexibly cope with adversity may be associated with better mental health throughout college. Implications from stress response and developmental perspectives are discussed.

Keywords: College, Distress, Latent Class Growth Analysis, Attachment, Flexible Coping

There is increasing focus in the mental health literature on the deleterious effects of stress on college students. College life was once considered a respite from real life concerns. This rosy view of college life has been challenged by systematic studies of college stress. A number of commonplace stressors ubiquitous in the undergraduate experience have been highlighted, including change in environment, loss or diminishment of previous social support networks, new and increased academic demands, needs to create new peer relationships, and an increase in personal responsibility in housing and money management (Vaez & LaFlamme, 2008; Voelker, 2003).

These increased demands and responsibilities lead to an increase in opportunities for both success and failure, which in turn can affect mood, self-worth, and potential levels of psychopathology symptoms (Sargent, Crocker, & Luhtanen, 2006). A number of studies suggest that these increased demands have resulted in deleterious consequences for the mental health of the student body with reports that college students are increasingly presenting with severe psychopathology (Kadison & DiGeronimo, 2004). For example, recent data from directors of counseling centers at 274 institutions found that 85% claimed to have observed an increase in severe

pathology over the past five years (Gallagher, Gill, & Sysko, 2000). In 2000, the American College Health Association surveyed 16,000 college students at 20 public universities and reported that symptoms of depression were common among college students, including feelings of hopelessness (61%), depressed mood (45%) and suicidal ideation (9%) (Voelker, 2003). Based on these observations, many have concluded that severe psychopathology is at near epidemic proportions on college campuses (Kadison & DiGeronimo, 2004).

These observations may have limited utility for a number of reasons. First, the above estimates by mental health professionals of rising rates of treatment in clinics may not reflect increases in the need for services secondary to increases in college related stress, but rather may reflect increased attention to and/or acceptance of mental health services among college students over the past ten years. Secondly, though estimates of reported symptoms are alarming, they may only be indicative

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of the presence of transient symptoms rather than diagnostically or clinically relevant levels of pathology. Finally, concerns about the effects of exposure to stressors and the subsequent deleterious effects on mental health do not seem to be well reconciled with newer findings based on longitudinal studies which indicate that despite significant adversity, most cope well both with discrete stressors such as the death of a spouse (Bonanno et al., 2002; Galatzer-Levy & Bonanno, 2012), traumatic injury (DeRoon-Cassini, Mancini, Rusch, & Bonanno, 2010), life-threatening medical procedures (Lam et al., 2010), job loss (Galatzer-Levy, Bonanno, & Mancini, 2010), and with chronic stressors such as military deployment (Bonanno et al., 2012), police service (Galatzer-Levy, Madan, Neylan, Henn-Haase, & Marmar, 2011), and parenthood (Galatzer-Levy, Mazursky, Mancini, & Bonanno, 2011). These studies all demonstrate that individuals cluster into patterns of response that are diagnostically meaningful, with the majority demonstrating consistently low levels of symptoms despite adversity, while smaller groups demonstrate significant increases in indicators of stress and symptomatology. This former group has been characterized as resilient due to their ability to adapt well despite adversity (Bonanno, 2004).

The types of trajectory analyses that characterized these studies have not yet been reported in a college student sample. Accordingly, it remains unclear whether college students will also demonstrate discrete longitudinal patterns of stress, what the nature of these patterns of response to stress will look like, and whether the majority will demonstrate resilience in this context as well.

In the current investigation, we attempted to identify longitudinal patterns of adjustment and their predictors in a representative cohort of college students. The students were recruited as part of a larger longitudinal project and assessed for general levels of distress at the beginning and end of each of the four years of college. As we describe in greater detail below, we identified the best-fitting trajectories of adjustment using Latent Class Growth Analysis (LCGA).

The systematic exploration of different patterns of adjustment raises the crucial question of why some students may cope well while others do not. There are a number of potential factors that might be associated with longitudinal patterns of adjustment during the transitions of college life. Variations in adjustment following significant life stressors have, for example, been associated with demographic variables, social and economic resources, levels of stress, personality, and coping habits (for a review, see Bonanno, Westphal, & Mancini, 2011). In the current study, we examined two potential predictors of clear relevance to the shifting demands of college life: adult attachment and ego-resiliency.

LONGITUDINAL TRAJECTORIES OF ADJUSTMENT

A challenge to previous studies of college student distress is the relative lack of longitudinal data. While numerous studies have examined stress among college students cross-sectionally (i.e., Bell & D'Zurilla, 2009; McCarthy, Lambert, & Moller, 2006) or longitudinally across brief transitional periods (i.e., Aspinwall & Taylor, 1992; Bernier, Larose, & Whipple, 2005; Priester & Clum, 1993; Sasaki & Yamasaki, 2007), to our knowledge, no studies have examined mental health by exploring the longitudinal course of stress and psychopathology over the entire 4 years of college. By doing so we can examine changes over time rather than examining brief intervals and assuming that they are representative.

Still another important limitation is that most previous studies of college student adjustment have emphasized mean-level analyses and ignored individual differences (e.g., Cornish, Kominars, Rivba, McIntosh, & Henderson, 2000). Typically, these analyses treat individual cases as instances of a single mean and variations from the mean as anomalies. However, there is strong evidence that distress in college students is not normally distributed (Todd, Deane, & McKenna, 1997). While nonnormality can be accommodated through statistical procedures, there is consistent evidence that nonnormality in scores of psychiatric symptoms and stress may indicate latent populations characterized by mixtures of finite distributions with these distributions conforming to clinically meaningful subpopulations (Bonanno, Westphal et al., 2011). Thus the mean may offer a misleading picture of distress among college students, because studies that examine averages collapse these clinically distinct groups.

A number of data analytic approaches have been developed to model patterns with high levels of variability. For example, both hierarchical linear modeling (Bryk & Raudenbush, 1987) and growth curve modeling (McArdle & Epstein, 1987) represent advances over traditional linear models because they allow for the exploration and prediction of individual-level variability in patterns over time. However, these modeling techniques assume a common pattern that individuals fit better or worse. In situations such as stress responses—for which we find true heterogeneity—such models may be inadequate (Galatzer-Levy et al., 2010; Galatzer-Levy & Bonanno, 2012; Nagin, 1999).

In the current investigation we capitalized on recent statistical advances in structural equation modeling that allow for the empirical exploration of the underlying heterogeneity of the data, which would otherwise be treated as error (Del Boca, Darkes, Greenbaum, & Goldman, 2004; Muthén & Shedden, 1999). LCGA has emerged as a particularly strong methodology for the study of heterogeneity by allowing for the exploration of finite mixture distributions in a larger population. LCGA allows for the modeling of longitudinal data with consideration for empirical observation as well as parsimony and interpretability (Jung & Wickrama, 2008). These techniques are uniquely suited to identifying multiple unobserved trajectories in the data because they extend conventional approaches to longitudinal data (Curran & Hussong, 2003) by estimating growth parameters within latent mixtures of individuals that represent distinct multivariate distributions. These modeling

techniques not only allow for the exploration of heterogeneous patterns of response, but also allow for predictors of those patterns.

In the current study we sought to examine patterns of stress response among college students while testing if the population under study is best understood in terms of multiple clinically relevant discrete distributions. To minimize sampling bias we recruited a representative sample of undergraduates at the beginning of their college career. We followed these students over the entire 4-year course of their college career. Finally, to assess individual differences we identified the most common patterns or trajectories of adjustment using data analytic techniques suited for the elucidation of distinct latent, or not directly observable, heterogeneous subgroups.

Extending the findings from the stress literature, we hypothesized that the modal response would be a stable trajectory characterized by little or no distress throughout the four years of college (resilience). We further hypothesized that a relatively less frequent trajectory characterized by clinically significant distress would emerge. Because stress responses to college have not been explored in relation to heterogeneous patterns, we did not make a priori predictions about the number or nature of classes beyond the hypotheses regarding these two patterns. Further, we explored whether distress levels would evidence a semester effect; that is whether distress would increase over the course of each academic year and thus be higher at the end of the second of each year (Rohan & Sigmon, 1997). We anticipated that we would uncover meaningful differences in levels of distress by semester in relation to trajectories of distress.

PREDICTING LONGITUDINAL TRAJECTORIES OF ADJUSTMENT

Adult Attachment Style

Despite the relative newness of observations that college life may be a significant stressor leading to heightened pathology, researchers have been interested for some time in predictors of adjustment during college. This literature focuses less on the current university climate and instead on college as a unique developmental period marked by an adolescent's first substantive independence. In particular, this period has been noted for its jarring shift in routines, daily environment, and social support, as well as a marked reduction in direct parental guidance and monitoring (Bernier et al., 2005; Fisher & Hood, 1987). A key variable that may inform a student's ability to both move forward toward independence and develop new peer relationships is anxious attachment style.

Bowlby (1979) theorized that working models of attachment, developed in infancy, continue to hold sway throughout adulthood, continue to influence perceptions and behaviors, and help to guide an individual's predictions and management of interactions with the outside world. As such, attachment patterns in adulthood have been characterized as inner

resources that guide coping behavior (Mikulincer & Florian, 1998) and exert a strong effect on responses to life stressors both in adolescence and adulthood (Ainsworth, 1989). Individuals with an anxious attachment pattern have been shown to be less likely to seek out support and are less likely to trust it when it is made available. In contrast, securely attached individuals perceive significant others as responsive, available, and supportive. As a result, they are more likely to utilize social resources at their disposal (Fraley & Shaver, 1998; Mikulincer & Florian, 1995).

Coping with the stress of college specifically has been shown to be influenced by attachment pattern (Bradford & Lyddon, 1993; Larose & Boivin, 1998), with coping in this context being particularly difficult for individuals with an anxious attachment pattern (Bernier et al., 2005). This is consistent with the overarching theory of attachment, as one of the theory's core assumptions is that attachment-related behaviors are activated during times of personal distress (Bowlby, 1982). If the large number of emergent stressors paints the picture of the student's current college life, then attachment patterns may be the canvas on which they are painted. As attachment patterns are established in early childhood and continue to hold considerable sway though out the lifespan, individuals with poor attachment patterns appear to have a concerning prognosis for coping with the unique demands of college life. The literature associating maladaptive attachment with poor outcomes in longitudinal studies is clearest for anxious attachment. By contrast, avoidant attachment may not always be maladaptive and some circumstances may even promote adjustment to certain types of stressors (Fraley, Davis, & Shaver, 1998). Consistent with this presupposition, avoidant attachment has been associated with a minimal stress response or distress response to specific types of stressor events (e.g., Fraley & Bonanno, 2004).

Ego-Resiliency

A separate body of literature indicates that the flexible use of coping behaviors may also have a significant impact on outcomes in response to life stressors (Bonanno, Papa, Lalande, Westphal, & Coifman, 2004; Cheng, 2001). In the context of college, there is evidence that students who utilize active coping techniques fare better in terms of motivation and grades (Aspinwall & Taylor, 1992), as well as levels of depression (Priester & Clum, 1993), symptoms of distress (Bell & D'Zurilla, 2009), and positive adaptation and health outcomes (Sasaki & Yamasaki, 2007).

Coping theorists have long emphasized the advantages of being able to deploy diverse types of coping behaviors in accord with the varying demands of different situations (Block & Block, 1980; Haan, 1977; Lazarus & Folkman, 1984; Mischel, 1973). Coping researchers have consistently reported cross-situational variability both in perceptions of coping efficacy (Folkman, Lazarus, Gruen, & DeLongis, 1986) and in the flexible use of coping behaviors measured in self-reports

(Bonanno, Pat-Horenczyk, & Noll, 2011; Cheng, 2001) and laboratory settings (Bonanno et al., 2004; Westphal, Seivert, & Bonanno, 2010). When considered in this context, flexibility in attitudes and use of coping behaviors is likely to predict optimal adjustment in the face of highly salient life transitions, such as adjusting to college (Bonanno, 2005).

In the current investigation, we focused on the concept of ego-resiliency as a trait measure associated with flexibility and resilience. Ego-resiliency is the ability to adapt one's level of control temporarily up or down as circumstances dictate (Block, 2002). Individuals with a high level of ego-resiliency are more likely to be interested, assertive, highly aspirational, and expressive. Individuals low in ego-resiliency tend to be self-defeating, and give up easily when frustrated (Block & Kremen, 1996). When confronted by stressful circumstances, individuals with a low level of ego-resiliency may act either in a stiff and preservative manner or chaotically and diffusely. The resulting behavior is likely to be maladaptive (Block & Kremen, 1996). As such, ego-resiliency has been shown to be important in coping with commonplace environmental stressors, conflicts, and uncertainty, as well as with extreme adversity (Klohnen, 1996). Thus, ego-resiliency may play a key role in adjusting to stress related to college, as it represents an overall ability to modify behavior through flexible coping.

Of significance, because its basic features suggest parallels with the concept of psychological resilience, ego-resiliency broadly defined has been assumed to represent a trait dimension of resilience, and has been used as a proxy for resilient outcomes (e.g., Fredrickson, Tugade, Waugh, & Larkin, 2003). To the best of our knowledge, however, there is no direct evidence to support this presumed association (Bonanno, Westphal et al., 2011). The current investigation therefore provides an opportunity to directly test for a unique associative relationship between ego-resiliency and a resilient outcome pattern.

Though the constructs of attachment style and ego-resiliency may be distinct, because the former is characterized as an internal working model while the latter is characterized by trait flexibility and resilience, it is easy to see that they would likely be related, as our internal working models hold influence over our behavioral repertoire in response to stress. There is some evidence to this effect showing that late adolescents with a secure attachment style demonstrate higher levels of ego-resiliency (Kobak & Sceery, 1988). In the current investigation, we hypothesized that individuals exhibiting a resilient trajectory would demonstrate lower levels of anxious attachment compared to those who exhibited high levels of distress. Owing to the mixed findings on avoidant attachment discussed above, we did not make specific predictions for this dimension. We further hypothesized that both the resilient trajectory and other emergent patterns not characterized by clinically significant levels of distress would be characterized by higher levels of ego-resiliency, consistent with the assumption that ego-resiliency aids in coping even among those with higher levels of anxious attachment.

METHODS

Participants and Procedure

Letters were mailed to all first-year undergraduates at a large campus in New York City inviting students to participate in a longitudinal cohort study sponsored by the university. The mailing explained that students would be asked to participate in a range of experimental, interview, and questionnaire procedures over the 4 years of their college careers and that they would be paid $250 for full participation in all four years of the study. Recruitment continued until a sample size of 180 was reached. For more detail on the larger cohort study, see Bonanno et al. (2004). The study was approved by the Teachers College, Columbia University IRB and all participants received written informed consent upon enrollment. Data for the current investigation involved 157 undergraduates who participated in the cohort project. These participants completed self-report measures of distress each semester for four years and completed measures of attachment and ego-resiliency at the beginning of their third year of college. The mean age at the beginning of the study was 18.08 years ($SD = .55$). Among the participants, 50% identified themselves as Caucasian, 26.39% as Asian or Asian American, 6.94% as African American, 4.17% as Hispanic or Hispanic American, 1.39% as Native American, and 11.11% identified themselves as being of "other" racial/ethnic background. The majority of students were female (62.6%). Data from 155 students were used in the current investigation due to missing data on two participants.

Self-Report Measures

Distress. Self-reported distress was measured each semester of the study using a brief version (29 items) of the Symptom Checklist-90-R (SCL-90-R; Derogatis & Melisaratos, 1983). The SCL-90-R is considered a transdiagnostic measure of psychiatric distress. The items from these scales were summed and averaged to form a Global Severity Index (GSI). Items are rated on a 5-point Likert scale ranging from 0 (*not at all*) to 4 (*extremely*). The GSI has shown adequate internal consistency (.78 to .86) and good 1-week test-retest reliability ($\alpha = .78$ to .90; Derogatis & Melisaratos, 1983). In the current study, the coefficient alpha for this measure was .93. Typically, a cutoff score of 1 indicates distress in the pathological range (Derogatis & Melisaratos, 1983).

Relationship Scale Questionnaire (RSQ). The RSQ is a 30-item questionnaire designed to assess individual differences in adult attachment. Individual items are rated on a Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*). Individual participants are placed on a scale on two dimensions: attachment-related anxiety and avoidance. This scale has demonstrated good 1-week test-retest reliability ($\alpha = .75$–.79; Scharfe & Bartholomew, 1994). The RSQ was administered at the beginning of participants' third year (5th semester) of college in the study.

Ego-Resiliency Questionnaire (ERQ). We measured ego-resiliency as an indicator of flexible coping and trait resilience. The ERQ is a 14-item questionnaire, in which each item is measured on a 3-point Likert-type scale (Block & Kremen, 1996; Block, 2002). This scale was positively correlated with several other favorable characteristics, such as having a wide range of interests and a high aspiration level, being interested, cheerful, expressive, and assertive, and valuing intellectual and cognitive matters. ERQ was negatively related to items that are definitive of a low level of ego-resiliency, such as being self-defeating, emotionally bland, and giving up when frustrated. ERQ was also positively related to several measures of well-being and negatively related to several indicators of psychopathology (from the MMPI-2); these findings were particularly strong among females (Letzring, Block, & Funder, 2005). This measure has demonstrated adequate internal consistency (α = .76; Block & Kremen, 1996). The ERQ was administered at the beginning of participant's third year (5th semester) of college in the study.

Analytic Strategy

First we examined correlations between time points on the SCL to establish an overall significant relationship over time. Next, we examined the correlation between anxious attachment, avoidant attachment, and ego-resiliency. Our expectation was that each would be moderately correlated, indicating that they are related but distinct. Our analysis consisted of the following steps. First we estimated a progressive number of mixture models to examine the appropriate number of discrete latent mixture distributions using MPlus 6.0 (Muthén & Muthén, 1998–2010). Owing to previous results that have demonstrated both linear and quadratic growth trends, we tested models with linear only as well as linear and quadratic trends.

We assessed the best-fitting model both in terms of the number of latent classes and linear vs. linear and quadratic trends by assessing relative fit with the information criteria and fit indices, including the Bayesian (BIC), sample-size adjusted Bayesian (SSBIC), Aikaike (AIC) (Akaike, 1987; Schwartz, 1978; Sclove, 1987), the Lo-Mendell-Rubin likelihood test (LRT) (Lo, Mendell, & Rubin, 2001), and the Bootstrap Like-lihood Ratio Test (BLRT). We also attended to entropy values which range from 0 to 1 and indicate the degree of separation among the classes where scores closer to 1 indicate better fit of the data into the prescribed class structure (Duncan, Duncan, & Strycker, 2006).

Based on recommendations from the literature, we primarily focused on the BLRT and the BIC method for assessing relative model fit (Nylund, Asparouhov, & Muthén, 2007) while being accountable to both parsimony and interpretability (Curran & Hussong, 2003; Nylund et al., 2007). After finding the best-fitting model free from covariates (Unconditional Model), we tested the effects of the growth parameter (defined below) and covariates including the Anxious and Avoidant subscales on the RSQ and scores on the ERQ (Conditional Model).

RESULTS

First, correlations between the SCL-90 GSI across time points were shown to be significant, with the strongest association occurring with the adjoining time point (Table 1). Next, the examination of the correlations between anxious and avoidant attachment (r = .30, p < .001), anxious attachment and ego-resiliency (r = .39, p < .001), and avoidant attachment and ego-resiliency (r = .29, p < .01) were all revealed to be significant but modest indicating that they are related but unique constructs.

Unconditional Model

The fit statistics for one-to five-class solutions for distress are summarized in Table 2. The two- through four-class solution exhibited improvements in the information criteria. Though the LRT demonstrated inconsistent results, the BLRT, the BIC, and the SSBIC privileged a four-class solution. Entropy, a posterior probability of overall membership, remained within a high range. The addition of a fifth class produced a less inter-pretable solution, as it served to split the smallest class in half, resulting in two smaller classes that were not substantively distinct. Based on inconsistencies in the strength of four versus five classes in the information criteria, a nonsignificant LRT

Table 1 Descriptive Statistics and Zero-Order Correlations for GSI Scores

Variable	M	SD	1	2	3	4	5	6	7	8
1. GSI t1	0.74	0.52	—							
2. GSI t2	0.73	0.57	.56**	—						
3. GSI t3	0.57	0.48	.47**	.54**	—					
4. GSI t4	0.69	0.56	.47**	.57**	.53**	—				
5. GSI t5	0.50	0.47	.38**	.58**	.50**	.62**	—			
6. GSI t6	0.65	0.60	.49**	.62**	.46**	.67**	.69**	—		
7. GSI t7	0.51	0.48	.35**	.42**	.43**	.60**	.58**	.60**	—	
8. GSI t8	0.53	0.51	.43**	.49**	.41**	.60**	.60**	.45**	.68**	—

Note. *p < .05. **p < .01. GSI = Symptom Check-List-90 General Severity Index.

Table 2 Fit Indices for 1- to 5-Class Growth Mixture Models of Distress (Unconditional; $n = 155$)

	Growth Mixture Model									
	Linear Weights Only					Indicates Linear + Quadratic Weights				
Fit Indices	1 Class	2 Classes	3 Classes	4 Classes	5 Classes	1 Class	2 Classes	3 Classes	4 Classes	5 Classes
AIC	1608.89	1216.01	1146.45	1111.91	1102.14	1609.77	1216.62	1146.87	1101.98	1093.24
BIC	1618.02	1234.27	1173.84	1148.43	1147.79	1621.94	1241.00	1183.40	1150.68	1154.11
SSBIC	1608.53	1215.27	1145.35	1110.44	1100.34	1609.28	1215.65	1145.41	1100.04	1090.81
Entropy	—	.93	.84	.85	.87	—	.93	.83	.87	.89
LRT	—	$p < .01$	$p = .41$	$p < .05$	$p = .60$	—	$p < .05$	$p = .12$	$p < .05$	$p = .62$
BLRT	—	$p < .001$	$p < .001$	$p < .001$	$p < .001$	—	$p < .001$	$p < .001$	$p < .001$	$p = .19$

Note. AIC = Akaike information criterion; BIC = Bayesian information criterion; SSBIC = sample size adjusted Bayesian information criterion; LRT = Lo-Mendell-Rubin test; BLRT = bootstrap likelihood ratio test.

Table 3 Growth Factor Parameter Estimates for 4-Class Unconditional Model ($n = 155$)

	Intercept			Slope			Quadratic			Semester		
Class	Est	SE	p	Est	SE	p	Est	SE	p	Est	SE	p
Resilience	0.48	0.05	<.001	−0.07	0.02	<.001	0.01	0.002	<.05	0.07	0.02	<.05
Stable Moderate Distress	0.87	0.09	<.001	0.02	0.09	.81	−0.01	0.01	.45	0.03	0.07	.67
High Distress	1.04	0.10	<.001	0.12	0.06	<.05	−0.01	0.01	.12	0.45	0.08	<.001
Distressed Recovered	2.16	0.21	<.001	−0.54	0.14	<.001	0.05	0.02	<.01	0.27	0.16	.08

Note. Est = estimate; SE = standard error of the estimate.

when comparing a four-to-five class solution ($p = .65$), and the negative effect on interpretability, we proceeded to the conditional model with a four-class solution (Table 3). Results between the linear only and the linear + quadratic models demonstrated trivial differences. However, as two of the classes demonstrated significant quadratic patterns, we maintained the linear + quadratic model to increase interpretability. A polynomial (i.e., linear + quadratic) growth curve model was posited with fixed effects. Fixed effects were utilized to aid in model convergence because of an observed nonpositive definite covariance matrix when random effects were utilized consistent with recommendations (Jung & Wickrama, 2008).

Stress Response Trajectories

The model suggests the following four discrete trajectories: *Stable Low Distress* (62.9%) is characterized by a consistently low level of distress on the SCL-90 over all four years of college. *Stable Moderate Distress* (22.3%) is characterized by elevated but consistently sub-threshold levels of distress over all four years of college; *Stable High Distress* (9.9%) is characterized by consistently high levels of distress above the GSI cut-off for pathological levels of distress over all four years of college. Finally, *Distressed-Recovered* (4.9%), the smallest class, is characterized by high initial distress during the first year of college, with a steady decline in GSI scores over the subsequent year to elevated but sub-threshold levels of distress by fall of third year. Linear and quadratic parameter estimates are summarized in Table 3.

Conditional Model With Semester Parameter

After establishing the unconditional model that best fit the data, we introduced a semester growth parameter that would allow for the exploration of semester effects within each class. Based on prior theory (Rohan & Sigmon, 1997) and observed variability in the sample means by semester in our measure of stress, with stress consistently elevated in the spring semester in the single class model (Figure 1), we concluded that the exploration of variability in stress level as it covaries with semester was an important aspect of the growth model. The addition of a separate growth parameter, when parsimonious, has been utilized in previous studies. For example, Del Boca et al. (2004) utilized a separate growth parameter when modeling drinking behavior in college students, as understanding overall growth was aided by the ability to model predictable ebbs and flows in drinking behavior because students are more likely to drink more on the weekend and on holidays. Similarly, the degree of variability in distress by semester may inform overall growth in this model.

When examining the conditional model, first we introduced the semester growth factor with fall semester's GSI score loadings set at 1 and spring semester's GSI loadings set at 0. The semester growth factor demonstrated a strong effect in two classes, a marginal effect in one, and no effect in the fourth, indicating that there is a high degree of within-subject variability (Table 3). Within-class variability with the introduction of the semester growth factor can be observed in Figure 2.
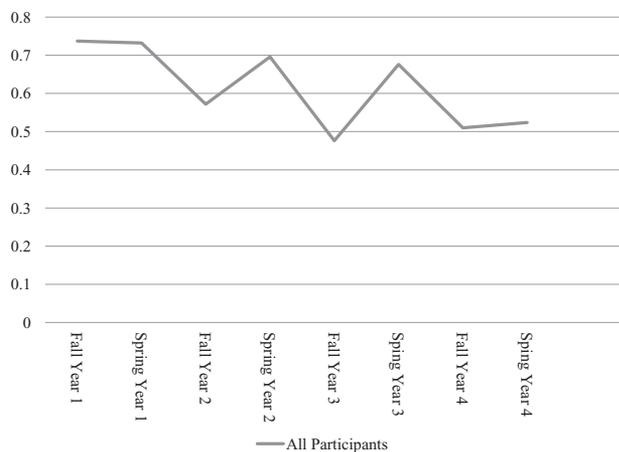
Figure 1 Sample means for one class model (*n* = 155).
Note. Scores are based on estimated marginal means.
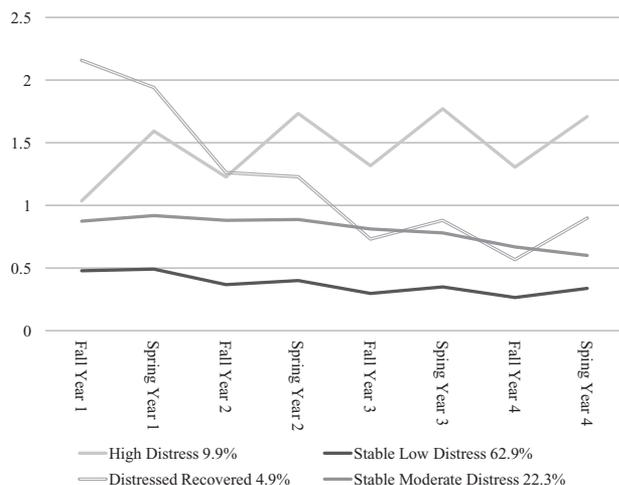
Figure 2 Four class growth mixture model with semester growth factor and personality variables (*n* = 127).
Note. Scores are based on estimated marginal means.

With the addition of personality variables [*anxious attachment* (*m* = 3.37; *SD* = 1.10), *avoidant attachment* (*m* = 3.51; *SD* = 0.84), and *ego-resiliency* (*m* = 43.68; *SD* = 5.35)], 28 individuals dropped out of the analysis because of incomplete data. Class membership was regressed on the personality variables. The addition of the covariates did not change the trajectory patterns from the unconditional model, and percentage of group membership from the unconditional model changed only slightly (Figure 2).

As we were most interested in examining how these covariates inform mental health responses to college over time, we noted the differences in variables between the Stable Low Distress class and the other three classes (Stable Moderate Distress, High Distress, Distressed-Recovered). Therefore, we

chose this class as the reference class. Significant differences between the Stable Low Distress class and the other three classes for both anxious attachment and ego-resiliency were found, while avoidant attachment was not significant in any comparison (Table 4). Anxious attachment was significantly lower in the Stable Low Distress class compared to all other classes, and ego-resiliency was significantly higher in the Stable Low Distress class relative to the High Distress class. Ego-resiliency scores for the Stable Low Distress class were not significantly different from those in the Stable Moderate Distress and Distressed Recovered classes. An alternative set of comparisons showed that the Stable Moderate Distress class also had greater ego-resiliency scores than the High Distress class (Table 4).

DISCUSSION

In this study, we sought to examine diagnostically relevant patterns of distress during college in a cohort of undergraduates recruited at the beginning of their college career and assessed each semester across the 4 years of college. To achieve this goal, we utilized a transdiagnostic measure of distress. This allowed us to explore clinically relevant patterns of distress while remaining agnostic to particular diagnoses.

A preliminary mapping of mean levels of distress across time (Figure 1) revealed that on the whole, our sample was moderately distressed and improved slightly over time. The average scores also suggested variability from fall to spring semester. When we modeled heterogeneous trajectories of distress, however, a markedly more informative portrait of individual variation emerged. Specifically, our analysis revealed four distinct trajectories of distress (Figure 2). The majority of individuals adjusted well to college. The largest class (Stable Low Distress; 62.4%) was characterized by consistently low levels of stress over all four years. This finding clearly indicates that healthy adjustment, consistent with the conceptualization of resilience (Bonanno, 2004), is the most common pattern of response to college. The second-largest class (Stable Moderate Distress; 22.3%) was characterized by a moderate but stable level of stress below the level of clinical significance. This pattern suggests that for a sizable minority of students, college is associated with some stress but little apparent variability over time. However, for approximately 1 in 10 students, college is characterized by a sustained clinically significant degree of distress that gradually worsens over the four years (High Distress; 9.9%). Finally, a small subset of students demonstrated high initial distress at the beginning of college, but adjusted to subclinical levels (i.e., below the established clinical significance level for the SCL-90-R) after approximately four semesters (Distressed Recovered; 4.9%). These findings indicate that mental health among college students tends to cluster in relatively consistent, diagnostically relevant patterns over the four years with the exception of a small minority that demonstrate a marked downward trend in their level of distress across all four years. This may be valuable

Table 4 Multinomial Logistic Regression for Predictors of Class Membership ($n = 127$)

| | Low Distress vs. | | | | | | High Distress vs. | | | |
| | Moderate Distress | | High Distress | | Distressed Recovered | | Moderate Distress | | Distressed Recovered | |
	Est	SE	Est	SE	Est	SE	Est	SE	Est	SE
Anxious Attachment	1.23	.45**	0.79	0.38*	1.49	0.53**	0.43	0.48	0.70	0.54
Avoidant Attachment	0.26	0.40	0.61	0.43	−0.21	0.72	−0.35	0.50	−0.82	0.81
Ego-Resiliency	1.01	0.90	−2.26	1.17*	0.56	1.64	3.27	1.11**	2.81	1.80

Note. Est = estimate; SE = standard error of the estimate.
*$p < .05$. **$p < .01$.

information as it indicates that students are not incubating and getting worse with time but rather they tend to maintain at roughly the same level over the four years with the exception of a small population who improve.

Next, we find that variability in distress by semester is common with most, even those characterized as resilient, showing increased levels of distress in the spring semester. Interestingly, no semester effect was observed in the Stable Moderate Distress class. This indicates that this class is consistent in their levels of subthreshold distress. Also, the semester effect was markedly stronger among those with clinically relevant levels of distress compared to those who demonstrated resilience. These findings indicate that variability in levels of distress by semester is common; however, individuals who are already experiencing high levels are less capable of managing the increased stress over the course of the semester.

Although our data cannot illuminate the precise meaning of the semester effect, several reasonable explanations are available. There is some indication that students display more stress in the spring due to accumulated stress over the academic year (Rohan & Sigmon, 1997). There is also consistent evidence for seasonal variation in mood across populations (Magnusson, 2000). As our data collection occurred close to the beginning and end of the academic year, data collected for the spring semester typically occurred close to the end of the academic year, both of these mechanisms may apply.

Anxious attachment and ego-resiliency were both shown to be associated with patterns of distress in college while avoidant attachment was not. The finding that resilient students were significantly less anxiously attached compared to all other populations is consistent with results indicating that healthy attachment patterns lead to better coping during college (Bernier et al., 2005), and suggests that low levels of anxious attachment may be associated with optimal mental health outcomes during college. The lack of significant association of the outcome trajectories with avoidant attachment was not completely surprising. As we noted earlier, the links between avoidant attachment and longitudinal adjustment is theoretically and empirically variable and suggests that ultimately the nature and direction of this relationship is likely to depend on the stressor event. The process of adjusting to college potentially involves many different kinds of possible stress. In the current study we did not access specific stressors

for individuals and perhaps for this reason we did not observe a clear pattern of findings linking avoidance with adjustment.

Ego-resiliency was also associated with patterns of distress, but most clearly distinguished the chronic distress group. Specifically, ego-resiliency was significantly lower in students with chronically elevated levels of distress relative to both the resilient students and also the students who displayed moderate but consistently subthreshold levels of distress. The resilient and consistently moderate distress groups were not distinguished in their level of ego-resiliency, suggesting that ego-resiliency plays a role in generally healthy adjustment rather than in resilience per se. Although, as we discuss below, the cells for these comparisons were small, these results nonetheless call into question the use of the ego-resiliency scale as a measure of trait resilience.

LIMITATIONS

Though our investigation represents a step forward in the study of college student mental health by examining common stress responses to college, it has several important limitations. First, we distinguished a number of variables as predictors of stress trajectories. Clearly, however, there are other factors that will predict adjustment during college, such as social resources variables, as well as other personality variables. Other variables such as the student's previous home environment could influence the trajectories and even account for the relationship between the trajectories and attachment. Furthermore, while ego-resiliency may measure some qualities of flexible coping, it is not an exhaustive measure and as such is limited in the information it provides. Furthermore, though measured separately, it is unlikely that attachment patterns and ego-resiliency are unrelated to each other. As attachment patterns are formulated early in life, most likely there is a causal relationship between attachment patterns, flexible coping, and outcome heterogeneity. We were limited in our ability to analyze covariates due to sample size. While our sample is relatively large for models based on a single mean, when the population is divided up into classes, our power to test the relationship between classes and covariates becomes limited. This is particularly true when classes are of unequal proportion. In this study two relatively small classes emerged which contain approximately $n = 16$ and $n = 8$ subjects. This limits our ability

to test more complex models such as the interaction between ego-resiliency and anxious and avoidant attachment, though the nature of the relationship deserves exploring, especially in light of the above results.

We examined patterns in a single sample of college students. It is important to note that the sample in our study was not sampled randomly. While the cohort was naïve to the nature of the study, and as such their participation was likely unrelated to the subject matter of the study, we cannot say definitively that this sample is representative. Although our results were informative, their generalizability may be limited as different universities and student bodies may carry unique characteristics that would inform and influence patterns of stress during college.

Additionally, although both attachment style and ego-resiliency are considered trait dimensions and thus are thought to be relatively stable over time, these variables were collected at the onset of the students' third year and as such we are precluded from establishing causal relationships with the trajectories. As a result, the most we can conclude is that they are associated.

Finally, although we mapped trajectories of stress response from the first semester of college to the last, we had no data on students' pre-college adjustment. Had these data been available, we may have been able to identify even more complex patterns of adjustment or explore how pre-college adjustment may have informed the divergent trajectories we did identify.

CONCLUSION

Consistent with our hypothesis, as well as previous empirical work on adjustment following difficult but common events across the lifespan (Bonanno, 2004; Bonanno et al., 2002; Galatzer-Levy, Bonanno, & Mancini, 2010; Galatzer-Levy, Mazursky et al., 2011), we uncovered bounded heterogeneity in stress levels over four years among a representative sample of college students. Our analyses revealed that the majority of students cope well with college, displaying low levels of stress for all four years. Some students display consistently elevated but sub-clinical levels of stress, while a small proportion of students demonstrate clinically elevated levels of distress. A still smaller proportion of students show high rates of stress upon entering college, but demonstrate consistent decline over two years to reach sub-clinical levels by the first semester of their third year. Together, these findings indicate that college is a stressor for many people, but that only a small proportion finds it overwhelming, while the majority adjusts well. We found no indication of incubation of mental health concerns over the four years. If clinically relevant distress emerged, it emerged in the first semester and either remained stable throughout the four years (Stable High Distress class) or decreased over time (Distressed Recovered class). Both anxious attachment and ego-resiliency played important and somewhat unique roles in adjustment to college with resilient students demonstrating consistently lower levels of anxious attachment compared to all

other students, while ego-resiliency was more generally related to good adjustment, even among those with equivalently high levels of anxious attachment.

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