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Article

Emodiversity Among U.S. Emerging Adults: Implications for Health and Wellbeing

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Abstract

Emodiversity, or diversity of emotional experience, has received mixed support in the literature as an indicator of health and wellness. The current investigation seeks to contribute to this literature by addressing how the concepts of positive emodiversity and negative emodiversity are related to several wellness indicators (physical, mental, social) within the U.S. emerging adult population using cross-sectional methods. First, in Study 1, positive and negative emodiversity constructs were examined for concurrent relationships with health and wellness indicators among more than 1,400 emerging adults. Second, in Study 2, using a Time 1/Time 2 study design, Time 2 health variables were regressed on Time 1 positive and negative emodiversity constructs to examine predictive validity. Results demonstrated support for positive emodiversity as a concurrent indicator of health and wellness, but was not associated with future health and wellness. Negative emodiversity, however, was a poor concurrent indicator, but was associated with future health and wellness.

Keywords: emodiversity; emerging adults; anxiety; depression; emotions

1. Introduction

As a relatively new construct, emodiversity or the diversity of emotional experience within the individual, has garnered mixed findings for its relative value in the examination of health and wellbeing. While some studies have reported clear benefits to those experiencing greater emodiversity (e.g., Benson et al., 2018; Quoidbach et al., 2014), others have reported inconsistent findings (e.g., Lee et al., 2022; Ong et al., 2018; Urban-Wojcik et al., 2023), suggesting that other underlying factors may be in force such as age. Much of the literature on emodiversity, however, has used diverse methods and statistical approaches, targeted different health outcomes, and investigated certain populations. Although these mixed findings and disparate approaches have produced doubt regarding the validity of the construct (e.g., Brown & Coyne, 2017), they also suggest that more specific, tailored investigations may elucidate the complex interactions between health and emotions.

As an influential factor, age demographics may exert influence regarding the beneficial, detrimental or null associations emodiversity may have for health and wellbeing. Indeed, emerging adulthood represents a phase of life wherein emotions play a large role in both future and current health and wellness (Arnett, 2007), making it an important demographic to explore regarding emodiversity. Yet, few studies have explored emodiversity within this life phase. Moreover, few, if any, studies have explored the emodiversity construct using cross-sectional methodology. As such, the current investigation seeks to address this gap in the literature by examining emodiversity, both positive- and negative-valenced, within two separate studies based on cross-sectional data gathered among emerging adults in the U.S.

1.1. Emodiversity as a Construct Related to Health and Wellness

Originally applied within environmental science, Shannon's entropy, a biodiversity equation that exemplifies how greater biodiversity is a hallmark characteristic of healthy ecosystems (Magurran, 2004; Shannon, 1948), has been used to represent emodiversity. As such, applied to the individual human experience, similar diversity of emotions is theorized to be indicative of a healthy human profile. This diversity of emotional experience is postulated to go beyond simple emotion valence and intensity to provide an additional metric of a fulfilling emotional experience. Thus, someone who experiences only happiness would be bereft of the fulness of benefits that come by experiencing a wider range of positive emotions (e.g., relaxed, content, enthusiasm, awe, joy). Moreover, one who experienced sadness, irritability, boredom, and fear would have a more fulfilling experience than one who only experienced anger.

In the original study to apply this concept, Quoidbach and colleagues (2014) discovered that a more diverse experience in positive, negative, and global (combined) emotional domains was associated with improved health and wellness. Among two large European sample groups (30,000 and 10,000, respectively), they reported more positive emodiversity (PEMO) and negative emodiversity (NEMO) were related to lower levels of depression and fewer doctor visits. Moreover, this relationship remained even after controlling for the influence of positive and negative affect. Subsequent investigations revealed a more complicated relationship, however.

Using a daily diary methodology, Benson et al. (2018) reported similar findings to Quoidbach et al. (2014). Specifically, their sample of midlife American adults demonstrated that self-reported physical health was related positively to both PEMO and NEMO. However, in a sample of 688 midlife American adults, Ong and colleagues (2018) reported increased PEMO was related to lower biomarkers of inflammation, but NEMO was not related. This suggested that PEMO was related to improved biological health, but that NEMO was not important, contradicting the findings of Quoidbach et al. (2014) and Benson et al. (2018). In further support of NEMO possibly not being a marker of health, Werner-Seidler et al., (2020) reported higher rates of NEMO among a small sample of adult Americans who were clinically depressed. PEMO was also lower among this sample, supporting the findings of Ong et al. (2018) that NEMO may not always be an indicator of better health.

In efforts to clarify these initial contradictory findings, two large studies using ecological momentary assessment through daily diary protocols were conducted. In the first, Urban-Wojcik et al., (2022) examined data from the Midlife in the U.S. (MIDUS) study with over 2,700 midlife Americans. They reported a relationship between PEMO and lower depression, anxiety and physical health symptoms. However, the relationships with NEMO were in the opposite direction, such that NEMO was related to higher depression, anxiety, and physical health symptoms. Second, Lee et al. (2022) used data from MIDUS to examine how emodiversity was related to activity diversity. Interestingly, they reported that both PEMO and NEMO were related to greater activity diversity, or engaging in multiple kinds of daily activities. As such, Urban-Wojcik et al. (2022) found support for only PEMO being related to improved health, while Lee et al. (2022) reported support for both types of emodiversity being related to improved wellbeing, thus still providing mixed findings.

Taken together, these findings are inconsistent and contradictory. While some studies suggest that NEMO and PEMO are associated with improved health, some studies point to a more complicated interpretation such that NEMO may be related to poorer health outcomes under certain conditions. One outstanding characteristic of these studies, however, is the predominant focus on midlife and older adult populations, not emerging adults.

1.2. Emodiversity Among the Emerging Adult Population

In light of these mixed findings among midlife and older adults, other studies began to explore different populations. Yoon and Kim (2022) examined a sample with an age range of 24-70 years in South Korea, which included emerging adults. They reported that increased PEMO was associated with increased wellbeing, but not NEMO, again suggesting that NEMO may not always be beneficial.

Additionally, they reported that while there was no influence of gender, they discovered that PEMO increased with age. In a different investigation, Heshmati and colleagues (2022) explored emodiversity within a Hispanic adolescent population (ages 14-17), which was not an emerging adult population, but younger than previous studies. Using daily diary methodology, they identified higher rates of NEMO being related to increased emotional eating, again suggesting that NEMO may not be beneficial. However, while NEMO was associated with maladaptive behavior, PEMO was not, suggesting that under certain conditions, PEMO may not be associated with health benefits either.

In one of two studies exclusively focused on emerging adults, Forster and Loughheed (2022) examined emodiversity within an emerging adult population (ages 17-30) of undergraduate students in western Canada using daily diary methodology during the COVID-19 pandemic restrictions. Providing further mixed results, they reported that low NEMO was associated with higher depressive symptoms and anxiety, as well as lower wellbeing. Furthermore, PEMO was not associated with any of these health metrics. Thus, increased NEMO was a marker of improved psychosocial health and wellness, whereas PEMO was not. Collectively, these studies conducted among emerging adults provide further contradicting evidence regarding emodiversity and health. It is important to note that these studies had unique characteristics beyond age that may have influenced results (e.g., outside the U.S., COVID-19 pandemic).

As such, limited insight regarding how emodiversity may operate among emerging adults in the U.S. regarding health and wellness is currently available in the literature. Moreover, even among these few studies, there are inconsistencies which warrant further investigation. Indeed, studies have highlighted the need to further refine the concept and application of emodiversity (Brown & Coyne, 2017; Johnson et al., 2025; Urban-Wojcik et al., 2022) and the U.S. emerging adulthood population represents an important area for such investigation. Emerging adulthood is a phase of life wherein attitudes have not yet crystallized, emotions play a disproportionately large role in daily living, self-concept is still forming, and they are more susceptible to social influence (Arnett, 2007; Coccia & Darling, 2016; Sears, 1986). All these characteristics of emerging adulthood suggest emodiversity may likely play an important role in their overall health and wellness.

Finally, the predominant approach to examining emodiversity within the literature has been to use ecological momentary assessment, which provides insight into the unique ebb and flow of phenomena (Park et al., 2004). Although typically regarded as a superior approach to studying fluctuating and dynamic processes, ecological momentary assessment can be expensive, time-intensive, and difficult to conduct (Shiffman et al., 2008). Moreover, little has been done to explore the construct of emodiversity calculated from cross-sectional estimates of retrospective recall. Indeed, the adaptation of emodiversity constructs for cross-sectional exploration provides a foundation to investigate emodiversity influences and correlates that may transcend the momentary experience, as well as invite future cross-sectional studies to be conducted. Therefore, applying cross-sectional approaches to emodiversity investigations, particularly among accessible emerging adult populations (e.g., college students), could make the emodiversity construct more versatile for investigation within other study designs.

1.3. The Present Investigation

The present investigation examined the concept of positive and negative emodiversity within a sample of U.S. emerging adults ages 18 to 30 using cross-sectional data. While much of the literature contains conflicting and even contradictory findings regarding the health implications for emodiversity, restricting the age range may elucidate this complicated relationship for emerging adults. Regardless, given the inconsistencies across the entire literature and among the few studies examining emodiversity among emerging adults, we proposed two non-directional research questions, one for positive emodiversity (PEMO) and one for negative emodiversity (NEMO). Moreover, we included a variety of health and wellness constructs to enhance the ability to investigate these relationships and provide further confidence in the results across three domains (physical, mental, social). Specifically, we examined subjective physical health and physical

symptoms to represent physical health; satisfaction with life, body appreciation, depressive symptoms, perceived stress, and anxiety to represent mental health; and social support, social integration, loneliness, interpersonal conflict, and daily social media time to conceptualize social health. We selected each of these constructs based on previous studies that have demonstrated links between these health and wellness variables with measures of emotionality (e.g., Quoidbach et al., 2014; Wright et al., 2017; Wright et al., 2023).

RQ1: What is the relationship of positive emodiversity (PEMO) to physical health (subjective physical health, physical symptoms), mental health (anxiety, depressive symptoms, perceived stress, satisfaction with life, body appreciation), and social health (interpersonal conflict, loneliness, social integration, social media time, social support) indicators among an emerging adult population?

RQ2: What is the relationship of negative emodiversity (NEMO) to physical health (subjective physical health, physical symptoms), mental health (anxiety, depressive symptoms, perceived stress, satisfaction with life, body appreciation), and social health (interpersonal conflict, loneliness, social integration, social media time, social support) indicators among an emerging adult population?

We examined these research questions in two studies. First, we calculated emodiversity based on cross-sectional retrospective data regarding emotional experience over the past 30 days and examined how PEMO and NEMO were related to health. Second, we calculated PEMO and NEMO similarly in a Time 1/Time 2 study design so that these estimates could be used to predict health outcomes at the Time 2 measurement.

2. Study 1

2.1. Method

2.1.1. Participants & Procedure

In accordance with the Declaration of Helsinki, approval from the local institutional ethics board at Brigham Young University – Idaho was obtained on 05/17/2022 (#S22-02). Prospective student participants within introductory psychology courses on campus were solicited by email invitation. Students were required to participate in research for course credit and allowed to select from several options, including the current study. Students followed a link wherein they provided consent and completed an online questionnaire pertaining to college student life experiences at a location of their choice. Informed consent for participation was obtained from all subjects involved in the study. Data were collected across multiple semesters using this same procedure spanning the years 2023 to 2024. Completion of the online questionnaire took a median time of 53.55 minutes. After identifying responses that indicated an age below 18 or above 30, a failure on the attention check (indicating they had not completed the survey to the best of their ability), and a lack of permission for publication purposes, 63 responses were removed. Participants ($n=1,411$) were an average of 20.24 ($SD=2.09$) years of age and comprised of mostly women (60.2%). Moreover, most of the sample indicated White ethnicity (85.5%) with Hispanic/Latino(a) (5.7%), Black (2.3%), Asian (1.6%), Native American (0.5%), Native Hawaiian (0.6%), and Other/More than one (3.8%) represented. Most participants were Freshmen (58.0%) and Sophomore (28.8%), with 47.7% of the entire sample indicating they were first semester students. Relationship status was single for most (63.1%), though being in a committed relationship (24.8%), engaged to be married (4.5%), married (7.4%), and divorced/separated (0.2%) were also observed. On average, student participants were taking 12.75 ($SD=2.17$) credits and, while about half were not currently employed (54.6%), many indicated having a part-time job (41.9%). Participants came from families of relatively high socioeconomic status where average education was 3.48 ($SD=1.27$; 3=Mother/Father received Bachelor degree, 4=Mother/Father received Masters degree) and average income was 4.40 ($SD=1.40$; 4=\$75,000-\$100,000, 5=\$100,000-\$150,000).

2.2. Measures

2.2.1. Demographic Constructs

The questionnaire queried a range of demographic information including age, gender, relationship status, ethnicity, education level, credit enrollment, and employment status. In addition, socioeconomic status (SES) was assessed using two questions (Wright et al., 2025). One regarding parental education with six categories of increasing education (1=both mother and father have no college education, 6=mother or father received advanced training, e.g., medical school, law school) and the other focused on household income for the past 12 months on a seven-point scale (1=<\$25,000, 7=>\$150,000). For both SES questions, “decline to respond” and “do not know” options were provided but were not included in analyses.

2.2.2. Emotional Experience

Differential Emotion Scale. Positive and negative emotional experiences were examined using the Differential Emotion Scale (Philippot, Schaefer, & Herbertte, 2003). This measure captured nine positive (e.g., awe, joy, hope) and nine negative emotional states (e.g., fear, anxiety, shame) on a five-point frequency scale (1=never, 5=most of the time). Both demonstrated acceptable internal consistency (α 's=.82, .83, respectively).

Positive and Negative Emodiversity. Closely following the computational formula provided by Shannon's entropy and mirroring Quoidbach et al. (2014) and others (e.g., Urban-Wojcik et al., 2022), we calculated both positive and negative emodiversity. While there can be some limitations to this approach (see Brown & Coyne, 2017), this formula allows for a measure of richness and evenness aspects of diversity rather than one at the expense of the other. This also allows for a better comparison to studies within the literature that have used similar methods. Using the positive and negative emotions within the Differential Emotion Scale, we computed positive and negative emodiversity indexes. Specifically, we divided the frequency of one emotional experience by the total number of frequencies of all types of emotion, which provides a proportion of that emotion within the larger emotional valence (i.e., positive, negative). Then, we multiplied this proportion by its natural log, which produces a transformed value for computation. Next, we repeated this for each emotion represented, so that each emotion had a transformed value. Finally, we then summed all these values to represent emodiversity within positive and negative domains, respectively and multiplied each total by -1. This produces a scale where higher values represent a more diverse emotional experience.

2.2.3. Physical Health

Subjective Overall Health. Subjective physical health was measured using the single-item EuroQol Fifth Dimension (Kind et al., 2005) where participants rated their own physical health on a scale from 0 (worst physical health) to 100 (best physical health).

Physical Symptom Inventory. Physical health symptoms were measured using Spector & Jex's (1998) 18-item Physical Symptom Inventory (e.g., headache, fatigue). Participants indicated the presence of any of these symptoms during the past 30 days. As a checklist, no internal consistency estimates were calculated.

2.2.4. Mental Health

Satisfaction with Life Scale. Using a seven-point scale, satisfaction with life (Diener et al., 1985) was captured with five items where participants indicated their level of agreement regarding their current life appraisal (1=strongly disagree, 7=strongly agree). One item reads, “In most ways, my life is close to my ideal”. Internal consistency was acceptable (α =.87).

Body Appreciation Scale. Body appreciation (i.e., body image) was examined on a seven-point agreement scale (1=not at all true, 7=very true) with the thirteen-item Body Appreciation Scale (Avalos et al., 2005). Higher scores represent greater appreciation for one's physical body. A

representative item includes, "I feel good about my body." Internal consistency was acceptable ($\alpha=.94$).

CESD-5. Acute depressive symptomology during the past week was captured using the CES-D five-item measure (Bohannon et al., 2003) on a four-point scale (1=rarely or none of the time; 4=most or all of the time). A sample item was "I felt depressed." Scale internal consistency was acceptable ($\alpha=.75$).

Perceived Stress Scale. Using Cohen et al.'s (1983) Perceived Stress Scale, overall life stress was examined using seven items on a five-point frequency scale (1=never, 5=very often). One of the questions in this scale was "how often have you felt that you were unable to control the important things in your life?" Internal consistency was acceptable for this scale ($\alpha=.81$).

Anxiety Scale. Using the same five-point frequency scale as above, anxiety during the past three months was assessed using the four-item measure (anxious, worried, at ease, comfortable) from Butz and Yogeewaran (2011). Internal consistency was acceptable ($\alpha=.82$).

2.2.5. Social Health

Interpersonal Support Evaluation List. To capture perceived availability of social support, we used the Interpersonal Support Evaluation List (ISEL; Cohen & Hoberman, 1983), which has twelve items on a four-point agreement scale (1=definitely false, 4=definitely true). One of the items reads, "There is someone I can turn to for advice about handling problems with my family." Internal consistency was acceptable ($\alpha=.87$).

Social Integration Scale. The eight-item measure of social integration (i.e., in-person social interactions) on a daily frequency scale during the past month by Twenge et al. (2017) was used to capture behavioral social support. Sample behaviors include going shopping, going to parties or other social activities, and getting together with friends informally. As a behavior checklist, internal consistency estimates were not computed.

Short Loneliness Scale. Using the three-item Short Loneliness Scale (Hughes et al., 2004), perceived loneliness during the past month was assessed on a five-point frequency scale (1=never, 5=all the time). A sample item reads, "How often do you feel left out?" Acceptable internal consistency was observed ($\alpha=.84$).

Workplace Interpersonal Conflict Scale. Using a modified version of the six-item measure from Wright et al. (2017), interpersonal conflict with others in general (not in the workplace) was assessed on a five-point frequency scale (1=never, 5=very often) for the past 3 months. An example item reads, "how often have you felt like you were treated unfairly by others?" Internal consistency of the measure was acceptable ($\alpha=.87$).

Daily Time on Social Media. We queried daily time spent on social media by asking how much time they spent on all social media each day during the past month on a sliding scale (0 to 10 hours). This has been done many times in previous studies (e.g., Wright et al., 2023).

2.2.6. Data Analysis

First, to determine relationships between the emodiversity constructs and health variables, we computed correlations. Next, to control for the influence of positive and negative affect, we conducted a series of regression analyses where each outcome variable was regressed on the mean affect variable and the corresponding emodiversity variable. This enabled the identification of any unique relationship between the health variable and emodiversity above and beyond the relationship between the health variable and affect. Following generally accepted statistical protocol (Howell, 2020), we computed regression analyses only for those outcome variables demonstrating a significant bivariate correlation with the emodiversity variable. Finally, we explored a few alternative explanations by examining age, gender, relationship status, and socioeconomic status relative to emodiversity.

2.3. Results

Means, standard deviations and other descriptive information are provided in Table 1.

PEMO and NEMO were significantly positively related ($r=.25, p<.001$). Positive affect was related to PEMO ($r=.48, p<.001$) and not NEMO ($p>.05$), while negative affect was related to NEMO ($r=.19, p<.001$) and not PEMO ($p>.05$). Participants reported experiencing significantly higher positive affect ($M=3.49, SD=0.63$) than negative affect ($M=2.24, SD=0.64; t[1410]=46.65, p<.001, d=2.48$). Moreover, participants experienced significantly higher PEMO ($M=2.16, SD=.03$) than NEMO ($M=2.12, SD=.04; t[1410]=30.45, p<.001, d=1.62$). These findings suggest that participants were experiencing nontrivial higher levels of positive affect and PEMO than their respective counterparts (negative affect, NEMO).

Table 1. Study 1 Correlations between Emotional and Health Variables.

Variable	M(SD)	PA	NA	PEMO	NEMO
Demographics					
Age	20.24 (2.09)	.04	-.08***	.03	.03
SES Education	3.48 (1.27)	-.01	-.07***	.02	-.03
SES Income	4.40 (1.40)	-.01	-.10***	.02	-.01
Physical Health					
Subjective Health	79.65(13.56)	.27***	-.27***	.13***	-.01
Physical Symptoms	5.45(3.59)	-.12***	.40***	-.06	-.02
Mental Health					
Depressive Symptoms	8.71(3.13)	-.41***	.61***	-.15***	-.06
Satisfaction with Life	4.70(1.28)	.59***	-.38***	.23***	.03
Body Appreciation	5.12(1.27)	.34***	-.42***	.15***	.02
Perceived Stress	2.66(0.64)	-.50***	.59***	-.14***	-.05
Anxiety	2.84(0.75)	-.46***	.66***	-.13***	-.16***
Social Health					
General Social Support	3.15(0.55)	.42***	-.33***	.13***	-.02
Loneliness	2.67(0.92)	-.40***	.45***	-.12***	-.02
Interpersonal Conflict	1.91(0.69)	-.16***	.39***	-.01	.14***
Social Integration	0.40(0.21)	.26***	-.11***	.11***	.01
Social Media Time	171.15(161.14)	-.13***	.23***	-.07**	.02

Note: * $p < .05$, ** $p < .01$, *** $p < .001$. PA = Positive Affect, NA = Negative Affect, PEMO = Positive Emodiversity, NEMO = Negative Emodiversity. SES Family Education represents the education level of parents and SES Family Income is family income per past 12 months, with higher values representing greater education and income, respectively.

2.3.1. Research Question 1 (Positive Emodiversity)

In accordance with our first research question, we examined correlations between positive emodiversity (PEMO) and each of our health outcomes. Ten of the twelve physical, mental, and social health variables were significantly related to PEMO (see Table 1), such that increased PEMO were associated with increased health. Two exceptions emerged: the number of physical symptoms and interpersonal conflict, which were both not significantly related.

Next, we examined each of the statistically significant bivariate correlation relationships in individual linear regression models that included positive affect as a control variable to account for shared variance (see Table 2). Overall, the pattern of results suggested that physical health is not explained by PEMO beyond that which affect can already explain, as subjective physical health was not related to PEMO when positive affect was included. Mental and social health, however, were different. For many of the mental and social health outcomes (depressive symptoms, satisfaction with life, perceived stress, anxiety, social support, loneliness), PEMO accounted for variation beyond

positive affect. However, notable exceptions included body appreciation, social integration and social media time.

Table 2. Study 1 Positive Emodiversity Regression Analyses.

Outcome Variable, Predictor Variables	<i>F(df)</i>	<i>B</i>	<i>b</i>	<i>t, p</i>	<i>R</i> ²
Subjective Health	54.86(2,1408)***				.07
Positive Affect		5.75	.27	9.11, <.001***	
PEMO		2.60	.01	0.19, .850	
Satisfaction with Life	406.71(2,1404)***				.36
Positive Affect		1.27	.63	25.65, <.001***	
PEMO		-2.99	-.07	2.78, .006**	
Body Appreciation	91.79(2,1408)***				.12
Positive Affect		.70	.35	12.08, <.001***	
PEMO		-.47	-.01	0.37, .709	
Depressive Symptoms	142.45(2,1408)***				.17
Positive Affect		-2.17	-.44	15.72, <.001***	
PEMO		6.28	.06	2.10, .036*	
Perceived Stress	243.32(2,1408)***				.26
Positive Affect		-.57	-.56	21.25, <.001***	
PEMO		2.88	.13	4.92, <.001***	
Anxiety	200.32(2,1405)***				.22
Positive Affect		-.61	-.52	19.19, <.001***	
PEMO		2.93	.11	4.23, <.001***	
General Social Support	154.13(2,1408)***				.18
Positive Affect		.40	.46	16.75, <.001***	
PEMO		-1.75	-.09	3.36, <.001***	
Social Integration	51.04(2,1407)***				.07
Positive Affect		.09	.27	9.19, <.001***	
PEMO		-.15	-.02	-0.69, .488	
Loneliness	138.23(2,1408)***				.16
Positive Affect		-.65	-.44	15.92, <.001***	
PEMO		2.98	.09	3.39, <.001***	
Social Media Time	11.77(2,1408)***				.02
Positive Affect		-31.54	-.12	4.09, <.001***	
PEMO		-58.17	-.01	0.35, .729	

Note: **p* < .05, ***p* < .01, ****p* < .001. PEMO = Positive Emodiversity. Due to multicollinearity, several of the directional signs of the beta coefficient values changed for positive emodiversity when positive affect was also included. The magnitude of the main effect of positive affect was larger than positive emodiversity enough to offset the original relationship and switch the direction or sign of that relationship. Proper interpretation of these is made by consulting the original sign of the bivariate correlation (see Table 1).

It should also be noted that in many of the models, the direction of relationship between PEMO and the health outcome variable changed when positive affect was included as a control variable. This is likely due to multicollinearity between these two variables. As such, this requires interpretation of the direction of the relationship to rely upon the original bivariate correlation analysis as the strength of the relationship between the outcome variable and affect was of such a larger magnitude to reverse the sign for the emodiversity variable. Thus, in response to RQ1, we found PEMO to be a significant predictor beyond that accounted for by positive affect for six of the ten variables statistically related to PEMO.

2.3.2. Research Question 2 (Negative Emodiversity)

Using a similar analytic strategy for our second research question regarding negative emodiversity (NEMO), we discovered few associations. In fact, only two of the health variables were related to NEMO: anxiety and interpersonal conflict. Anxiety had a negative relationship, such that as NEMO increased, anxiety decreased. However, interpersonal conflict was in the opposite direction, suggesting that NEMO was associated with increased conflict. These findings contradict each other, suggesting NEMO may have differential associations with different facets of health and wellbeing.

As there were two health variables that produced statistically significant correlations with NEMO, only two linear regressions were conducted (see Table 3). NEMO remained a significant factor in explaining anxiety and interpersonal conflict beyond negative affect in the regression models, respectively. However, these were in opposing directions, suggesting that NEMO may have further nuanced or even conflicting associations with health and wellness, despite controlling for negative affect.

Table 3. Study 1 Negative Emodiversity Regression Analyses.

Outcome Variable, Predictor Variables	<i>F(df)</i>	<i>B</i>	<i>b</i>	<i>t, p</i>	<i>R</i> ²
Anxiety	763.62(2,1405)***				.52
Negative Affect		.83	.72	38.16, <.001***	
NEMO		-4.98	-.29	15.54, <.001***	
Interpersonal Conflict	127.17(2,1408)***				.15
Negative Affect		.40	.37	14.95, <.001***	
NEMO		1.04	.07	2.63, .009**	

Note: **p* < .05; ***p* < .01; ****p* < .001. NEMO = Negative Emodiversity.

2.4. Discussion

Findings from Study 1 suggest that PEMO is associated with improved health outcomes. Specifically, these results suggest that an increase in PEMO corresponds with improvements in subjective health, depressive symptoms, satisfaction with life, body appreciation, perceived stress, anxiety, social support, loneliness, social integration, and less daily social media time. Moreover, these relationships were robust such that PEMO accounted for variation in these constructs beyond positive affect. This is in-line with the literature that has reported increased PEMO was related to improvements in health (Quoidbach et al., 2014; Ong et al., 2018; Urban-Wojcik et al., 2022; Yoon & Kim, 2022) and is consistent with theories regarding connections between positive emotions, cognitions, and behaviors (Fredrickson, 2004).

Results provided limited support for NEMO as a variable related to health and the few findings that did were in opposing directions. As such, these results provide further contradicting evidence where NEMO has emerged as a positive predictor of health in some (Benson et al., 2018; Quoidbach et al., 2014), negative in some (Forster & Loughheed, 2022; Urban-Wojcik et al., 2022; Werner-Seidler

et al., 2020), and a non-predictor in others (Ong et al., 2018; Johnson et al., 2025). While anxiety seems to decrease in the presence of NEMO, interpersonal conflict seems to increase, which suggests that NEMO does not have a unilateral positive or negative influence on overall health across mental and social domains. Offering some potential explanation, interpersonal conflict is associated with a greater range of negative emotions (Wright et al., 2017) and, of all the negative emotions queried, anxious was the most frequently reported, suggesting a potential dampening effect of anxiety on NEMO, such that when anxiousness was higher, other negative emotions were lower.

3. Study 2

Building on the limitation of the one-time cross-sectional design in Study 1, we conducted Study 2. Specifically, data based on retrospective reports of affect were used to compute PEMO and NEMO in a Time1/Time 2 study design to then predict subsequent health outcomes three months later at the Time 2 assessment.

3.1. Method

3.1.1. Participants & Procedure

In accordance with the Declaration of Helsinki, following ethics board approval at Brigham Young University – Idaho on 04/03/2024 (#W24-23), participants were solicited among students within two upper division psychology campus courses by email invitation. Students were required to participate for course credit but were given the option to complete an alternative assignment. Prospective participants followed a link and completed an online questionnaire pertaining to their experience in the course to evaluate course effectiveness in a location of their choice. Informed consent for participation was obtained from all subjects involved in the study. Data were collected across multiple semesters spanning the years 2024 to 2025. Completion of the online questionnaire took a median of 33.68 minutes. Of the total of 288 responses, 14 were removed due to age being above 30, failure on the attention check, or because they did not provide permission to use their data for publication purposes. A total of 47 completed the first questionnaire and did not complete the second (17% attrition). Participants ($n=274$) were an average of 22.73 ($SD=2.35$) years of age and comprised of slightly more women (55.1%). Moreover, most of the sample indicated White ethnicity (82.8%) with Hispanic/Latino(a) (9.5%), Black (1.8%), Asian (1.1%), Native Hawaiian (1.1%), and Other/More than one (3.6%) represented. Most participants were Seniors (44.2%) and Juniors (37.2%). Relationship status of single was most common (43.1%), though married (36.1%), being in a committed relationship (16.8%), engaged to be married (2.6%), and divorced/separated (1.5%) were also observed. On average, student participants were taking 12.68 ($SD=2.67$) credits, and most were currently employed (63.1%). Participants came from families of relatively high socioeconomic status where average education was 3.48 ($SD=1.30$; 3 = Mother/Father received Bachelor degree, 4=Mother/Father received Masters degree) and average income was 4.20 ($SD=1.48$; 4=\$75,000-\$100,000, 5=\$100,000-\$150,000).

3.1.2. Measures

Measures in Study 2 were identical to Study 1, with one exception. General social support was not assessed, as the Interpersonal Support Evaluation List was not included in Study 2. Internal consistency estimates for the Differential Emotion Scale (Philippot et al., 2003) were acceptable at both time points for positive (α 's=.80, .83, respectively) and negative affect (α 's=.80, .81, respectively). All other internal consistency estimates are reported in Table 4.

Table 4. Study 2 Correlations between Time 1 Emotional and Time 2 Health Variables.

Variable	M(SD)	T1 α , T2 α	T1 PA	T1 NA	T1 PEMO	T1 NEMO
Demographics						

Age	23.73 (2.35)	N/A	-.30**	-.01	-.07	.06
SES Education	3.48 (1.30)	N/A	-.13*	-.07	.02	.01
SES Income	4.20 (1.48)	N/A	.07	-.14	.30**	-.01
Physical Health						
T2 Subjective Health	74.30(16.90)	N/A	.25**	-.24**	.10	.01
T2 Physical Symptoms	5.57(3.75)	N/A	-.14*	.28**	-.02	-.01
Mental Health						
T2 Depressive Symptoms	8.93(3.42)	.74, .79	-.40**	.39**	-.22**	-.17**
T2 Satisfaction with Life	4.89(1.33)	.83, .89	.52**	-.29**	.25**	.15*
T2 Body Appreciation	4.97(1.44)	.95, .97	.35**	-.36**	.17**	.06
T2 Perceived Stress	2.67(0.67)	.82, .85	-.42**	.39**	-.28**	-.11
T2 Anxiety	2.97(0.77)	.81, .83	-.36**	.45**	-.23**	-.24**
Social Health						
T2 Loneliness	2.68(1.04)	.82, .87	-.35**	.33**	-.18**	-.12
T2 Interpersonal Conflict	2.10(0.77)	.84, .87	.18**	.33**	.00	.08
T2 Social Integration	0.32(0.21)	N/A	.18**	-.05	.02	-.03
T2 Social Media Time	174.62(156.22)	N/A	-.12	.13*	-.06	-.02

Note: * $p < .05$, ** $p < .01$, *** $p < .001$. T1 = Time 1 assessment; T2 = Time 2 assessment. PA = Positive Affect, NA = Negative Affect, PEMO = Positive Emotion, NEMO = Negative Emotion. Cronbach's α internal consistency estimates are reported for both Time 1 and Time 2 in the third column, as applicable. SES Family Education represents the education level of parents and SES Family Income is family income per past 12 months, with higher values representing greater education and income, respectively.

3.1.3. Data Analysis

We followed a similar analytic strategy as Study 1. To determine relationships between the emotion variables at Time 1 and health variables at Time 2, we computed correlations. Next, to control for the influence of positive and negative emotion at Time 2, we conducted a series of regression analyses where each outcome variable at Time 2 was regressed on the emotion variable at Time 2 and the corresponding emotion variable at Time 1. Similar to Study 1, we only computed these regression analyses for those outcome variables at Time 2 demonstrating a significant relationship with the emotion variable at Time 1. Finally, we explored the reverse causation hypothesis by modeling health outcome variables at Time 1 as predictors for the emotion variables at Time 2 for each original regression model conducted.

3.2. Results

Means, standard deviations and other descriptive information are provided in Table 4. PEMO and NEMO were significantly and positively related at Time 1 ($r=.13$, $p<.05$) and at Time 2 ($r=.21$, $p<.01$). Suggesting some trait-like tendencies, PEMO at Time 1 was related to PEMO at Time 2 ($r=.46$, $p<.001$) and NEMO was similar ($r=.50$, $p<.001$). Participants experienced similar levels of PEMO ($t[508]=.79$, $p=.428$) and NEMO ($t[508]=1.52$, $p=.129$) at both time points. Age, SES Education, and SES Income were not significantly related to PEMO or NEMO ($p>.05$) at either time point with one exception, as SES Income was positively related to PEMO at Time 1 (see Table 4). PEMO did not differ between the genders. However, women reported significantly less NEMO than men at Time 1 (MWomen=2.11, SD=.05; Mmen=2.13, SD=.04; $t[266]=3.29$, $p=.001$) and at Time 2 (MWomen=2.11, SD=.05; Mmen=2.13, SD=.04; $t[234]=3.40$, $p<.001$).

3.2.1. Research Question 1 (Positive Emodiversity)

Correlation analyses revealed that PEMO at Time 1 was significantly ($p < .05$) related to six wellness variables at Time 2 (depressive symptoms, satisfaction with life, body appreciation, perceived stress, anxiety, loneliness). Therefore, six separate multivariate regression analyses were conducted where these six Time 2 variables were individually regressed on PEMO at Time 1 while controlling for positive affect at Time 1 (see Table 5). All six regression analyses revealed nonsignificant ($p > .05$) relationships, suggesting no association of PEMO beyond positive affect. As such, PEMO was not associated with future health and wellness.

Table 5. Study 2 Positive and Negative Emodiversity Regression Analyses of Time 2 Outcomes.

T2 Outcome, T1 Predictor Variables	F(df)	B	b	t, p	R ²
T2 Satisfaction with Life	58.37(2,233)***				.28
T1 Positive Affect		1.32	.60	8.38, <.001***	
T1 PEMO		-4.91	-.12	1.73, .086	
T2 Body Appreciation	16.57(2,233)***				.13
T1 Positive Affect		.94	.39	5.04, <.001***	
T1 PEMO		-3.23	-.08	0.96, .340	
T2 Depressive Symptoms	22.23(2,233)***				.16
T1 Positive Affect		-2.44	-.43	5.62, <.001***	
T1 PEMO		5.43	.05	0.69, .490	
T2 Perceived Stress	24.97(2,233)***				.18
T1 Positive Affect		-.44	-.40	5.28, <.001***	
T1 PEMO		-.60	-.03	0.40, .692	
T2 Anxiety	17.85(2,233)***				.13
T1 Positive Affect		-.47	-.37	4.69, <.001***	
T1 PEMO		.02	.01	0.01, .989	
T2 Loneliness	16.74(2,233)***				.13
T1 Positive Affect		-.67	-.39	5.00, <.001***	
T1 PEMO		2.00	.06	0.82, .413	
T2 Satisfaction with Life	17.54(2,233)***				.13
T1 Negative Affect		-.70	-.34	5.38, <.001***	
T1 NEMO		6.62	.22	3.56, <.001***	
T2 Depressive Symptoms	32.31(2,233)***				.22
T1 Negative Affect		2.38	.44	7.48, <.001***	
T1 NEMO		-20.10	-.26	4.45, <.001***	
T2 Anxiety	54.30(2,233)***				.32
T1 Negative Affect		.63	.52	9.41, <.001***	
T1 NEMO		-6.05	-.35	6.35, <.001***	

Note: * $p < .05$, ** $p < .01$, *** $p < .001$. T1 = Time 1 assessment; T2 = Time 2 assessment. PEMO = Positive Emodiversity; NEMO = Negative Emodiversity.

3.2.2. Research Question 2 (Negative Emodiversity)

Following the same analytic procedure, NEMO at Time 1 was significantly ($p < .05$) related to three wellness variables at Time 2 (depressive symptoms, anxiety, life satisfaction). Three separate multivariate regression analyses were conducted, such that each of these three Time 2 variables were regressed on NEMO at Time 1, controlling for negative affect at Time 1 (see Table 5). Each of these analyses resulted in statistically significant ($p < .05$) relationships, suggesting that NEMO was associated with each of these wellness variables beyond that explained by negative affectivity. Moreover, NEMO was negatively associated with both depressive symptoms and anxiety as well as a positively with life satisfaction, suggesting increased NEMO was associated with future wellness benefits.

3.2.3. Alternative Explanations Analyses

For each of the six PEMO and three NEMO regression analyses conducted for RQ1 and RQ2, we conducted reverse causation analyses such that Time 2 PEMO and Time 2 NEMO, respectively, were regressed on the outcome variables. Results can be seen in Table 6. Notably, nearly every bivariate relationship that was statistically significant in the original analyses was also statistically significant in these analyses. While these results suggest potential for reverse causality, it is important to note that across all nine of these analyses, R^2 was substantially greater for the original directionality (emodiversity predicting health outcomes) compared to the reverse equation ($M = +.10$; Range: $+.05$ to $+.19$). Thus, the greatest explanatory power was observed in the original direction: PEMO and NEMO predicting future health and wellness.

Table 6. Study 2 Reverse Regression Analyses of Hypothesized Directional Relationships.

T2 Outcome, T1 Predictor Variables	F(df)	B	b	t, p	R ²
T2 PEMO	10.86 (2,233)***				.09
T1 Positive Affect		.02	.33	4.50, <.001***	
T1 Depressive Symptoms		.001	.09	1.17, .242	
T2 PEMO	11.15 (2,232)***				.09
T1 Positive Affect		.02	.36	4.38, <.001***	
T1 Satisfaction with Life		-.003	-.12	1.43, .153	
T2 PEMO	10.20 (2,233)***				.08
T1 Positive Affect		.02	.29	4.36, <.001***	
T1 Body Appreciation		-.001	-.03	0.41, .684	
T2 PEMO	10.22 (2,233)***				.08
T1 Positive Affect		.01	.26	3.48, <.001***	
T1 Perceived Stress		-.002	-.03	0.45, .650	
T2 PEMO	9.98 (2,232)***				.08
T1 Positive Affect		.02	.28	3.91, <.001***	
T1 Anxiety		-.001	-.02	0.21, .834	
T2 PEMO	10.12 (2,233)***				.08
T1 Positive Affect		.02	.29	4.29, <.001***	
T1 Loneliness		.00	.01	0.16, .877	
T2 NEMO	6.33 (2,232)**				.05
T1 Negative Affect		.01	.14	1.97, .050	

T1 Satisfaction with Life	.01	.24	3.50, <.001***
T2 NEMO	9.93 (2,233)***		.07
T1 Negative Affect	.02	.25	3.10, .002**
T1 Depressive Symptoms	-.01	-.33	4.17, <.001***
T2 NEMO	16.59 (2,232)***		.13
T1 Negative Affect	.02	.31	4.04, <.001***
T1 Anxiety	-.03	-.44	5.72, <.001***

Note: * $p < .05$, ** $p < .01$, *** $p < .001$. T1 = Time 1 assessment; T2 = Time 2 assessment. PEMO = Positive Emodiversity; NEMO = Negative Emodiversity.

3.3. Discussion

Findings from Study 2 suggest that PEMO at Time 1 was not associated with improved health outcomes at Time 2. This suggests that PEMO is not predictive of health outcomes for emerging adults or, at least not for the eleven variables considered as part of mental, physical and social wellness in the current investigation. PEMO may be a construct more sensitive or prone to change based on circumstances of the person (e.g., daily uplifts), which may be perceived differently over time (Park et al., 2004). However, our analyses uncovered a moderate correlation of PEMO at Time 1 and 2, suggesting some consistency in experiencing PEMO within-person. Alternatively, it is possible that methodological characteristics (e.g., PEMO construct creation from cross sectional data), sample demographics (e.g., emerging adulthood), or historical characteristics (e.g., time within semester) influenced these results.

Interestingly, NEMO at Time 1 was associated with improvements in three of the health outcomes at Time 2. This lends further support to the notion that having a diverse negative emotional experience is indicative of better health and wellness (Forster & Loughheed, 2022; Quoidbach et al., 2014). NEMO may be particularly important as it may provide protection from an individual delving too deeply into any one negative emotion (e.g., anxiety, sadness) and, thereby, prevent poor mental health such as depression and anxiety. This may also extend to improvements in life satisfaction, as well. However, NEMO may not impact other health and wellness variables, as our results suggest the other eight variables were not related to NEMO. Similar to PEMO, a moderate correlation of NEMO at Time 1 and 2 was observed, suggesting consistency in experiencing NEMO over time.

4. General Discussion

The current investigation comprised two studies aimed at examining the constructs of positive and negative emodiversity and their associations with health and wellness variables among an U.S. emerging adult population using cross-sectional data. Study 1 results demonstrated several significant concurrent associations between positive emodiversity (PEMO) and improved health while uncovering only a few health associations for negative emodiversity (NEMO). Study 2, on the other hand, established some predictive validity of NEMO for the three wellness outcomes of depressive symptoms, anxiety and satisfaction with life, whereas PEMO demonstrated no such relationship. Collectively, these results support emodiversity as a health and wellness construct among emerging adults and suggests that a cross-sectional assessment of emotional experience may be used to examine emodiversity and related health and wellness, including future health outcomes. These findings have important implications for understanding emodiversity and future research in affect and wellness, particularly among emerging adults.

First, findings suggest that PEMO is modestly related to many wellness variables across physical, mental and social domains for emerging adults. This is consistent with prior research that has found PEMO to be positively related to improved health and wellness indicators (Benson et al., 2018; Ong et al., 2018; Quoidbach et al., 2014; Urban-Wojcik et al., 2022; Yoon & Kim, 2022). Moreover, these findings support a potential mechanism behind the broaden and build theoretical framework

(Fredrickson, 2004) wherein a more diverse and broad experience of positive emotions may, at least in the short term, perpetuate a cycle of positive emotions, cognitions (e.g., positive affirmations), behaviors (e.g., daily uplifts), and health in an upward, interdependent, spiral. The observation that PEMO is concurrently but not predictively associated with increased health and wellness beyond the influence of positive affect suggests a more nuanced relationship over time, however. Indeed, it may be that PEMO is more fleeting, contingent on occurrences of events that may not be in one's control (i.e., interpersonal daily uplifts), particularly during the emerging adulthood phase of life (Arnett, 2007). Importantly, this is in reference to a diversity in positive emotion, not experiencing positive emotion itself, as the main effects of positive emotions have a contrary relationship (Catalino & Tov, 2022).

Building on this idea, PEMO is likely further influenced by individual perceptions and appraisals, which are profoundly impacted by other exogenous (e.g., stressors, demands; Lazarus & Folkman, 1984) and endogenous factors (e.g., happiness valuation, optimism; Mauss et al., 2011), which may be particularly potent during emerging adulthood (Arnett, 2007). After a period of time, the beneficial impacts of PEMO, if not sustained by other cognitions and behaviors (Fredrickson, 2004), may lose their potency in promoting health. Indeed, as suggested by the Evaluative Space Model (Cacioppo & Berntson, 1994), baseline emotionality may be positively skewed (positivity offset), such that positive emotions may be assumed as the norm, requiring substantial and sustained positive input to effect long-term changes. As such, PEMO may not be a durable predictor of future health outcomes for emerging adults, but a momentary indicator of a more fulfilling life, particularly in the U.S.

Second, the opposing pattern of results for NEMO offers insight into a complicated process. In Study 1, very few wellness variables were related to NEMO and these were inconsistent in direction, suggesting NEMO may not have a unilateral healthy influence for emerging adults, which has been suggested by some prior studies among midlife and older adults (e.g., Ong et al., 2018; Urban-Wojcik et al., 2022; Werner-Seidler et al., 2020). However, Study 2 findings provided a contrast as NEMO demonstrated a relationship with future depressive symptoms, anxiety and satisfaction with life, consistent with previous studies of NEMO having a positive influence on health (Benson et al., 2018; Forster & Loughheed, 2022; Quoidbach et al., 2014). This may be indicative of a negativity bias, such that the robust influence of negative emotions and cognitions on overall wellness may supersede the positive (Rozin & Royzman, 2001) and have longer duration (Larsen, 2009). Indeed, it may be that more balance in negative affectivity exerts a lagged, though robust, influence beyond what the more transient balance of positive emotions (PEMO) can provide. In the short term, therefore, it may be that NEMO is inconsistent, but over a period of time, may offer counteracting effects to protect against detrimental wellness outcomes, particularly among emerging adults where many experiences are novel and emotionally stimulating (Coccia & Darling, 2016).

Third, our findings have important implications for the assessment of the emodiversity construct. Our study provides evidence that cross-sectional data can be used to create emodiversity constructs for both concurrent and predictive applications. Moreover, in line with another study among undergraduate students (i.e., emerging adults; Forster & Loughheed, 2022), we identified a modest positive relationship between PEMO and NEMO, suggesting that these two constructs should not be conceptualized as opposing and that both can, in fact, be in simultaneous operation. Indeed, whereas some positive and negative emotions themselves may be considered opposing, the diverse experience of negative affectivity (e.g., sadness, boredom, irritability, fear) and the diverse experience of positive affectivity (e.g., happiness, relaxed, excited, joyful) are not as directly coupled. Building on this, the diverse emotional experience may have some dispositional aspects, suggesting that propensities for PEMO and NEMO may be linked to personality characteristics, which may be helpful in emerging adult theory.

Finally, our results also suggest that efforts should be made to dissuade the dogmatic perspective that any single emotion, be it positive (e.g., happiness) or negative (e.g., sadness), is to be expressly sought after or experienced. Instead, the value provided by a diverse range of emotional

experience should be advocated, as this corresponds with health and wellness currently (PEMO) and in the future (NEMO). Thus, while greater wellbeing can lead to emodiversity, focusing on emotional diversity initially seems to correspond with future health and wellness, especially among emerging adults.

4.1. Potential Limitations and Future Research

Notwithstanding the contributions of this investigation, potential limitations should be acknowledged. First, our data were cross-sectional, precluding strong causal inferences or clear interpretations of nuanced momentary processes. However, our use of two study designs bolsters confidence in the results. Second, our methodological design may have some other challenges. For instance, the interpretation of the multivariate regression models is hampered by the inherent multicollinearity in the model, as emodiversity was calculated from the same variables as affect with an applied transformation. Moreover, the self-report and temporal nature of the data introduce potential subjective and retrospective biases that cannot be controlled or parceled out. Nevertheless, emotional experience is subjective, making this type of bias unavoidable to some extent. Third, although we selected constructs from previous studies, the health and wellness constructs in this investigation may not offer a comprehensive view of health and wellness, as the constructs selected were not equal in number across the domains (physical, mental, social) and other constructs may have been omitted. Finally, sample and cohort characteristics may hamper generalizability for other groups, even emerging adults, such as those of different ethnicity, lower socioeconomic status, or different cultural perspectives.

Future research should seek to expand upon these limitations and build on the findings from this study. As this work was exploratory in nature, further work should be done among emerging adults in both college and other contexts to confirm these findings using both cross-sectional and ecological momentary assessment designs for both concurrent and predictive validity. Expanding further into domains of health and wellbeing, future examinations should consider additional variables (e.g., grades, work performance) and more objective biometrics (e.g., blood pressure). Finally, influential factors for emerging adults such as gender, socioeconomic status, technology use, and romantic relationships (Wright et al., 2024) should be further investigated relative to emodiversity.

5. Conclusions

In conclusion, our use of two study designs in the current investigation to establish both concurrent and predictive validity of positive and negative emodiversity constructs among an emerging adult population provides a meaningful contribution to the literature. Offering insight into the operation of complex affective processes that influence wellbeing, the results uncovered a beneficial influence of diverse emotional experience within positive and negative domains for concurrent and future health and wellness. Moreover, this investigation provides evidence that emodiversity constructs can be effectively applied in examining health and wellness by using one-time assessment data. Going forward, emodiversity could be considered in many other contexts and methodological designs as an indicator of health and wellness.

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