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jagr@umh.es

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Lisha, Nadra E.; Leventhal, Adam M.; Rohrbach, Luanne; Spruijt-Metz, Donna; Sun, Ping;  
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## THE RELATIONSHIP OF EMERGING ADULthood TRAJECTORIES TO DRUG USE, AND OTHER CORRELATES

### LA RELACIÓN DE LAS TRAYECTORIAS DE EDAD ADULTA EMERGENTES CON EL USO DE DROGAS Y OTROS CORRELATOS

Nadra E. Lisha<sup>1</sup>, Adam M. Leventhal<sup>2</sup>, Luanne Rohrbach<sup>2</sup>, Donna Spruijt-Metz<sup>2</sup>, Ping Sun<sup>2</sup> & Steve Sussman<sup>2</sup>

<sup>1</sup>Division of General Internal Medicine, University of California, USA

<sup>2</sup>Department of Preventive Medicine, Keck School of Medicine of USC, USA

#### Abstract

Interest in "Emerging Adulthood" (EA) as a unique developmental period has increased. This study examined the heterogeneity of EA among at-risk youth (N=1,677) by identifying trajectories of development across individuals. First, an 8-item version of the Inventory of Dimensions of EA (IDEA) measure was tested for factorial invariance across three time points; the 5-item EA measure was found to be factorially invariant. Next, latent class growth modeling identified three unique developmental trajectories. Lastly, classes were compared on demographics and health-risk behaviors. Class 1 represented a large, low-risk class (highest on EA). Classes 2 and 3 were comparably sized (~5% of the sample). Class 2 appears to be a high-risk class that decreases in EA, while Class 3 appears to be a medium-risk class that increases in EA. This study confirms that not everyone experiences EA similarly and that continuation high school students do not circumvent EA (move directly to adulthood).

*Keywords: emerging adulthood, at-risk youth, latent class analysis, substance use.*

#### Resumen

El interés en la "Edad Adulta Emergente" (EA) como un periodo de desarrollo único ha aumentado. Este estudio examinó la heterogeneidad de la EA entre los jóvenes en riesgo (N=1677) mediante la identificación de las trayectorias de desarrollo en los individuos. En primer lugar, una versión de 8 ítems del Inventario de Dimensiones de EA (IDE) fue probada para la invariancia factorial en tres momentos temporales; la versión de 5 ítems de EA resultó ser factorialmente invariante. A continuación, el modelado de clases latentes crecientes identificó tres trayectorias de desarrollo únicas. Por último, se compararon los datos demográficos y los comportamientos de riesgo para la salud. La clase 1 representa una amplia clase de bajo riesgo (mayor en EA). Se compararon los tamaños de las clases 2 y 3 (~5 % de la muestra). La clase 2 parece ser una clase de alto riesgo que disminuye en EA, mientras que la clase 3 parece ser una clase de riesgo medio que aumenta en EA. Este estudio confirma que no todo el mundo experimenta la EA de la misma forma y que los estudiantes de instituto no eluden la EA (pasar directamente a la edad adulta).

*Palabras clave: edad adulta emergente, jóvenes en riesgo, análisis de clases latentes, uso de sustancias.*

Correspondencia: Nadra E. Lisha, Ph.D nadralisha@gmail.com  
530 Parnassus Ave  
Division of General Internal Medicine  
University of California  
San Francisco, California

Emerging Adulthood (Arnett, 2000a, 2000b) is defined as the developmental period between adolescence and young adulthood characterized by change, turmoil, positive expectations and sense of the future and increased substance use and risk behaviors. Five primary features define the distinct developmental period between adolescence and young adulthood known as emerging adulthood. The five domains (Arnett, 2004) are: (1) age of identity explorations (primarily in relationships and work), (2) age of instability, (3) utmost self-focused time of life, (4) age of feeling in-between (no longer an adolescent, but not yet an adult), and (5) the age of possibilities (unmatched optimism and number of opportunities available).

The Inventory for Dimensions of Emerging Adulthood (IDEA) was created to measure the degree of subjective entrenchment into common experiences in this developmental period. This “process” measure is the only one of its type in the field. In the original validation study, five factors that were proposed (1. Age of identity explorations, 2. Age of instability, 3. The self-focused age, 4. The age of feeling in-between, and 5. The age of possibilities). During the scale development an additional dimension, other-focus, was created. In the first validation study of the IDEA, Reifman, Arnett and Colwell (2007) found that when comparing age groups, the IDEA sub-scales for *identity exploration* (i.e., *trying out various possibilities, especially in love and work*), *experimentation/possibilities* (i.e. *a time when hopes are high, and individuals have an unparalleled chance to transform their lives*), and *negativity/instability* (i.e. *a time of changes in various aspects of life such as relationships, school, work, moving, which can be exciting, but also intense*), and for *self-focus* (i.e. *few obligations to others such as parents, spouse or children, allow individuals to focus on themselves to a great degree*) were all highest in the 18 to 23 year old age group, and lower in the older age groups. *Other-focus*, exhibited the reverse pattern. The authors also found that across studies individuals in the emerging adulthood sample scored higher on *identity exploration*, *other-focus*, *self-focus*, and *feeling “in-between”* than did younger respondents (sixth through twelfth graders). Without longitudinal evidence, it is impossible to know if cultural and historical disparities across age cohorts rather than actual developmental processes account for these differences. Perhaps due to specific characteristics such as feeling in-between, instability, exploring the identity, and the lack of prescribed behavioral norms

(Arnett, 2005) emerging adults exhibit the highest prevalence of drug use in comparison to individuals in other periods of life (Chen & Jacobson, 2012). Drug use and other risk behaviors are not a required condition of EA, but often go together.

Although, high school students are typically still considered adolescents, some evidence demonstrates that *continuation high school* students reach emerging adulthood at a younger age (Sussman, 2010). The timing, order, and success of transitions into adulthood may affect the likelihood of beginning, continuing, or escalating deviant behaviors (Newcomb & Bentler, 1988; Sampson & Laub, 1995). Specifically, premature or precocious transitions into adulthood can have negative implications for drug use (Krohn, Lizotte, & Perez, 1997). In effect, some have found that only about 40 to 50 percent of the population follow a “normative sequence of transitions” into adulthood (Rindfuss, Swicegood, & Rosenfeld, 1987). At-risk youth exhibit an increased probability of encountering disorderly transitions into adulthood (Krohn et al., 1997; Martin, Blozis, Boeninger, Masarik, & Conger, 2014).

Continuation high school students are more likely to experience the demands of adult life (e.g. having children at an earlier age, dropping out of school, getting married, and working at low-paying jobs) earlier than youth in a more normative trajectory (Sussman, 2010). These same individuals are also more likely to exhibit unconventional attitudes a lack of emotional self-control, interpersonal difficulties, and have unplanned pregnancies (Brook, Whiteman, Cohen, Shapiro, & Balka, 1995).

It is possible that instead of passing through emerging adulthood, continuation high school students move directly from adolescence to adulthood. While this is conceivable theoretically, the evidence does not point in this direction. If continuation high school students passed straight into adult status, certain characteristics should be present in this demographic. For example, continuation high school students should have found a stable job course, focus on others and the self, be married, should make independent decisions, and feel stability, among other characteristics (Arnett, 2004). Instead, it is conceivable that continuation high school students, and other non-normative youth, experience a difficult transition into emerging adulthood compared to normative-trajectory peers (Sussman, 2010). Sussman

found that in a sample of continuation high school students a number of characteristics supported the proposition that these youth reach emerging adulthood at an earlier age. The frequency of alcohol and drug use was high, educational status was indicative of a population still in evolution, employment data reflected wanting to take on different jobs.

Evidence indicates that difficulties in transition to adult roles is associated with drug use at an early age (Newcomb & Bentler, 1988; Rohrbach, Sussman, Dent, & Sun, 2005). Disrupted family formation and career development is positively associated with higher crime and drug use (Thornberry, 1987). Precocious transitions into adult status, such as teenage pregnancies, increase the chances of marital instability and thus increase the probability of continued drug use (Furstenberg, Brooks-Gunn, & Morgan, 1989; Hayes, 1987). While mainstream individuals typically plan pregnancies and they are part of a transition to adult status, it is possible that with these younger, more at risk, youth pregnancies are associated with instability. As precocious transitions into adult roles might be detrimental to normal functioning in society, it might be important for drug prevention programs to focus on youth who are the highest risk for drug abuse. Using the IDEA to measure developmental trajectories might be an effective way to examine the transitions that at-risk youth are experiencing.

The original IDEA was 31 items. Since then 21-item and 8-item versions have been developed, and have demonstrated construct validity (Baggio, Iglesias, Studer, & Gmel, 2014; Lisha et al., 2014). We are the first to use as shorter, 5-item subscale. In general, the items on the IDEA, while intending to measure multiple dimensions of emerging adulthood, tend to load together. Thus, it is possible to develop very brief measures to tap entrenchment in emerging adulthood. However, the IDEA has not been examined longitudinally to investigate whether the scale is factorially invariant.

Although data on drug use etiologies are high in volume, and longitudinal analyses of these antecedents is becoming more popular, most studies fail to investigate how developmental factors related to drug and alcohol use change over time. One effective approach for examining longitudinal data is latent growth curve modeling (LGM). LGM allows for modeling of growth and individual differences over time (McCardle & Epstein, 1987;

Meredith & Tisak, 1990). LGM is a valuable technique that can allow the researcher to model constructs such as emerging adulthood. Some methodological concerns that often pose a problem include missing data and model measurement error; LGM is able to account for these problems and provide accurate estimates of the results. Given the utility of these techniques it is surprising that only a paucity of studies employ these advanced modeling approaches to study developmental processes over time among teens and emerging adults (defined by age range), and none examine the emerging adulthood construct longitudinally.

While LGM is a significant advance from previous statistical techniques, LGM assumes that the observed trajectories of growth represent a sample from a single population of individuals that are characterized by a single average status and by a single average rate of change. That is to say that all individuals in the given sample begin at the same place and grow at the same rate. However, it more likely that a sample comes from more than one population and that each population has its own unique starting point and growth trajectory. Conversely, latent class growth modeling (LCGM) assumes that the data is comprised of a mixture of groups, and that the group membership is "latent" or unobserved (Muthén, 2001). Thus, this framework can be used to identify different developmental trends of latent classes/groups over time. This method is proposed here to allow for the identification of two or more emerging adulthood trajectory classes with qualitatively unique patterns of emerging adulthood trends based on baseline level and slope, such as rapid increasers, versus slower increasers, versus those who do not change meaningfully over time.

### Present Study

The goal of the present study is to determine whether individuals can be classified into discrete latent groups based on emerging adulthood status by using LCGM to identify the number of classes. It is hypothesized that the points at which the latent classes trajectory exhibit the highest scores while be related to high levels of substance use and deviant behaviors. Risk behaviors may indicate difficulties with resolving the emerging adulthood process. This study aims to answer the following questions, "Do high-risk youth experience emerging adulthood like other youth?" "Can the IDEA adequately

capture emerging adulthood experiences for this population?" and "Are there multiple pathways or experiences of emerging adulthood and do these differentially predict substance use?"

## METHOD

### Participants and procedures

Participants are from 24 continuation high schools that were part of a larger drug prevention study in Southern California (Lisha et al., 2012). Schools were recruited as a convenience sample based on specific criteria such as number of students and ethnic composition of the school. Typically continuation high school populations attend this type of school because of extreme truancy, poor grades, drug use, violence, other illegal behaviors, or other disruptive activities. Continuation high school students have an increased likelihood of using drugs and alcohol than the general population and, as mentioned, demonstrate features of emerging adulthood such as being out of school, working, moving out of the parental home, by around 17 years of age (Sussman, 2010). All procedures were approved by the university's Institutional Review Board.

Of the 2397 students enrolled in the selected classes, 1694 (70.7%) were consented to participate in the study. Of these, 1676 students completed the pretest survey. A close-ended, self-report questionnaire was administered to students at pretest. If a student was absent during the data collection day, an absentee packet was left with instructions. The university's Institutional Review Board approved all study procedures.

The present sample consisted of youth aged an average of 16.8 years ( $SD = .90$ ) who were majority male (57.8%). The sample was 64.3% Latino, 13.3% mixed ethnicity, 11.0% White, 6.3% other ethnicity (not specified), and 5.1% African American. Half lived with both parents, only 17.5% mostly spoke a language other than English at home, and approximately 49.3% and 55.9% of youths' fathers and mothers, respectively, had at least completed high school.

### Survey measures

All measures used baseline data, year one, and then a combination of years 2, 3 and 4 to minimize missingness.

The third time point variable was created by first using any available year 2 data; if missing year 3 data was used, and then if still missing any available year 4 data was used.

*Emerging adulthood* was measured using a reduced 5-item scale at all timepoints. The scale included at least one item from each subscale. The question stem was "For the next set of questions think about this time in your life. When we say "this time," we mean what is going on now, plus what has gone on in the last few years, plus what you think your life will be like in the next few years. Think about a 5-year period of time, with right now in the middle. For each question below, mark the box that best describes this time in your life. Be sure to put only one check mark per line. Is this period of your life a..." (1 = *definitely not*, 2 = *probably not*, 3 = *maybe*, and 4 = *definitely yes*). First a reduced scale of 8 items (reduced measure used in all years but Time 1) was created by conducting an exploratory factor analysis on the 21-item measure from Time 1. While all items loaded highly together, 8 items that loaded the most together were retained. The shortened 8-item scale ( $\alpha = .88$ ) was created by selecting the 8 items that loaded the most on the first factor. Next, factorial invariance was examined over time using *Mplus* and 5-items were retained. These items pertained to emerging adulthood as being a time of: independence, defining yourself, seeking a sense of meaning, deciding on your own beliefs and values, and learning to think for yourself.

### Correlates

*Demographics.* Key demographic variables (i.e. age, gender, high school graduation completion, marital status, and parenthood) were selected as they might provide concrete markers of the transition to young adulthood. For example, we tentatively speculated that older age, male gender, lack of completion of high school, not being married, and not being a parent would be more strongly associated with being in emerging adulthood (i.e., scoring higher on the 5-item adapted IDEA measure).

*Risk Behaviors.* Participants were asked, "How many times in the last month have you used..." for each substance use categories (alcohol use, getting drunk on alcohol, marijuana). All the substance use items were measured on 12-point scales (0 times to over 100 times). The reliability of the drug-use item format used here has been previously established (Graham et al., 1984). In

addition, participants were asked, "During the past 30 days (or 12 months), with how many people have you had sexual intercourse?" (0 = 0 people, 1 = 1 person, 2 = 2 people, 3 = 3 people, 4 = 4 people, 5 = 5 people, 6 = 6 people, 7 = 7 people, 8 = 8 people, 9 = 9 people, 10 = 10 people, 11 = more than 10 people).

**Addiction.** Ever having been addicted to alcohol and drugs was assessed (Sussman & Sussman, 2011) using a dichotomous variable (1 = yes, 0 = no) such that participants were asked "*Sometimes people have an "addiction" to a certain drug or other object or activity. An addiction occurs when people experience the following: (1) They do something over and over again to try to feel good, for excitement, or to stop feeling bad, (2) They can't stop doing this thing, even if they wanted to, (3) Bad things happen to them or to people they care about because of what they are doing. Have you ever been addicted to the following things?"*

**Intercept and slope.** Two latent variables (intercept and slope) were created using emerging adulthood indicators at all three waves of data (Curran, Stice, & Chassin, 1997; Fleming, Mason, Mazza, Abbott, & Catalano, 2008).

## Statistical analyses

### *Test factorial invariance across time points*

The factorial invariance of the 8-item reduced IDEA was examined to determine if the three-factor structure of the IDEA is consistent across time points. Structural equation modeling (SEM) allows for the factor structures to be modeled and compared simultaneously across all time points. The indicator loadings can then be compared between groups and if these loading are not significantly different then factorial invariance will be assumed (Drasgow, 1984; Drasgow & Kanfer, 1985). Model fit indicators were also used to assure good model fit (Chi-square, degrees of freedom,  $p$ , CFI, and RMSEA with 95% confidence intervals). In the case that full factorial invariance is not achieved, partial invariance can be considered satisfactory (Byrne, Shavelson, & Muthen, 1989). An iterative process was used, such that if factorial invariance was not achieved with the full 8-item IDEA, items with the lowest factor loadings across time points were eliminated one by one until configural invariance was achieved.

### *Latent class analysis and growth mixture modeling*

Growth mixture modeling allows both categorical and continuous latent variables to be combined into the same model. Latent class growth mixture modeling is a statistical method that provides trajectory classification probabilities for each participant, classifies individuals in their most likely class based on the previous probabilities, and allows for regression of class membership to be made on covariates (Muthén, 2001; Muthén & Shedden, 1999).

Thus, first, the optimal number of growth trajectories was ascertained based on select fit indices and theoretical models. There is not one established fit index that should be used. Bayesian information criterion (BIC) which indicates a more parsimonious model when the value is low (high log likelihood estimate and low number of parameters) (Muthén, 2002; Schwarz, 1978). In addition, an *entropy* summary statistic indicates the quality of the classification. Values of this statistic range from 0 to 1; values closer to 1 represent better classification quality (Muthen et al., 2002). The Lo-Mendell-Rubin likelihood ratio test of model fit is used to quantify the likelihood that the data can be described by a model with one-less class and a  $p$ -value smaller than 0.05 indicating that the additional class significantly improves fit over a model with  $k - 1$  classes (Lo, Mendell, & Rubin, 2001). The structural equation modeling analyses present in this paper used the full information maximum likelihood (FIML) method in *Mplus* to account for any missing data (Little & Rubin, 1987; Rubin, 1976). FIML directly estimates model parameters and standard errors using all the raw data that is available across all the waves of data collected rather than imputing or filling in missing values and therefore is the optimal manner to deal with missing data to date (Collins, Schafer, & Kam, 2001). We chose the model based on entropy, and while a low BIC is important, it is imperative the class sizes remain a reasonable size (e.g. greater than  $N = 50$ ).

After the final model was selected, participants were assigned to the trajectory class for which they had the highest probability of membership based on this model. Classes were compared on a variety of correlates at each time point using analysis of variance and pairwise contrasts in SAS.



## RESULTS

*Test of factorial invariance.* Longitudinal invariance analysis was conducted in several steps. The initial 8-item baseline model was tested for configural invariance; this model was not terrible, but had room for improvement (CFI = 0.931, TLI = 0.924, RMSEA = 0.042) thus items with the lowest factor loadings across time points were eliminated one by one until configural invariance was achieved. This was realized with a 5-item structure (CFI = 0.959, TLI = 0.950, RMSEA = 0.040). The items that were eliminated included “Time of open choices?” “Time of planning for the future?” and “Time of gradually becoming an adult?”

Factor loadings were then constrained to be equal across time to test for weak invariance. The weak invariance model was acceptable as it satisfied the fit indices well (CFI = 0.952, TLI = 0.946, RMSEA = 0.041). The fact that metric invariance (“weak invariance”) held, indicates that the items were related to the latent factor equivalently across time, or more simply, that the same latent factor was being measured at each time. Further, equality of intercepts was imposed on the model to test for strong invariance. The strong invariance model also

had acceptable values on the fit indices (CFI = 0.932, TLI = 0.932, RMSEA = 0.046). Finally, equality of item uniqueness across time was further imposed to test for strict invariance. The strict invariance model was also satisfied with the fit indices (CFI = 0.917, TLI = 0.924, RMSEA = 0.049). Thus, factorial invariance was achieved using the 5-item model and further longitudinal analyses are acceptable. A score was computed for each individual based on the factor loadings of the strong invariance model. This score was used in subsequent growth curve models and other analyses.

*Mixture modeling: extracting trajectories.* Based on careful examination of the entropy, BIC, AIC, Adjusted BIC, the Vuong-Lo-Mendell-Rubin Likelihood ratio test, and the Bootstrapped parametric likelihood ratio test it was determined that the optimal solution was the 3-class solution (*entropy* = 0.88, *BIC* = 5486.44, *Vuong-Lo-Mendell-Rubin Likelihood p-value* = 0.0011). Class1 was the largest (90.1%), followed by Class 2 with 5.1% of the sample, and Class 3 with 4.8% of the sample based on final class counts and proportions for the latent class patterns based on the estimated model.

Table 1. Fit indices for latent class analysis

BIC	Entropy	N1	N2	N3	N4	N5	N6	N7	LMRL
6174.39		1659							
5763.82	0.85	1550	109						0.0024
5486.44	0.88	1495	84	80					0.0013
5293.42	0.83	142	69	39	1409				0.0011
5181.63	0.78	67	1329	163	38	62			0.2516
5124.1	0.79	163	28	39	1326	49	54		0.4240
5163.67	0.78	126	47	11	1124	276	44	31	0.7103

*Description of trajectory classes.* Overall the sample has a mean age of 16.77 (SD = 0.94, N = 1658) at the first time point, 18.44 (SD = 0.98, N = 1099) at the second time point, and 19.84 (SD = 1.01, N = 834) at the last merged time point.

Based on final class counts and proportions for the latent class patterns based on estimated posterior probabilities (see Figure 1) Class 1 represented a group of subjects who begin high in emerging adulthood, but also increase significantly over time. The slope factor ( $\mu = 0.11$ ,  $p < .0001$ ) and the intercept factor ( $\mu = 3.56$ ,  $p < .0001$ ) were

significantly different from zero, indicating that overall the individuals did not start at a score of zero in emerging adulthood and that there was significant, though not steep increases in emerging adulthood over time. The intercept and slope were significantly correlated ( $r = -0.23$ ,  $p < .0001$ ), signaling that initial status on emerging adulthood and the slope of emerging adulthood move in opposite directions (e.g. those with a high initial status on emerging adulthood have lower slope scores or less positive growth in emerging adulthood over time).

Table 2. Class membership ( $N = 1,658$ ) and endorsement frequencies of the correlates using the best fitting LCGM solution

	Class 1		Class 2		Class 3	
Proportion ( $N$ , %)	1465, 90.1		84, 5.1		80, 4.8	
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
Age <sub>1</sub>	16.8 <sub>a</sub>	0.92	16.42 <sub>b</sub>	1.07	16.79 <sub>a</sub>	0.97
30-day cigarette use <sub>1</sub>	2.46 <sub>a</sub>	2.84	2.79 <sub>a</sub>	3.53	2.57 <sub>a</sub>	3.07
30-day cigarette use <sub>2</sub>	2.51 <sub>a</sub>	3.13	2.31 <sub>a</sub>	3.22	2.71 <sub>a</sub>	3.13
30-day cigarette use <sub>3</sub>	2.52 <sub>a</sub>	3.10	2.68 <sub>a</sub>	3.27	2.18 <sub>a</sub>	2.77
30-day alcohol use <sub>1</sub>	2.03 <sub>a</sub>	1.6	2.20 <sub>a</sub>	2.32	2.37 <sub>a</sub>	1.99
30-day alcohol use <sub>2</sub>	1.85 <sub>a</sub>	1.47	2.44 <sub>b</sub>	2.89	2.19 <sub>ab</sub>	1.81
30-day alcohol use <sub>3</sub>	1.47 <sub>a</sub>	0.8	1.38 <sub>a</sub>	0.49	1.44 <sub>a</sub>	1.05
30-day drunk on alcohol <sub>1</sub>	1.74 <sub>a</sub>	1.42	1.65 <sub>a</sub>	1.44	2.16 <sub>b</sub>	1.99
30-day drunk on alcohol <sub>2</sub>	1.53 <sub>a</sub>	1.2	1.88 <sub>b</sub>	2.22	1.84 <sub>b</sub>	1.56
30-day drunk on alcohol <sub>3</sub>	1.42 <sub>a</sub>	0.72	1.22 <sub>a</sub>	0.42	1.47 <sub>a</sub>	1.14
30-day marijuana use <sub>1</sub>	2.75 <sub>a</sub>	3.06	3.38 <sub>a</sub>	3.73	3.36 <sub>a</sub>	3.39
30-day marijuana use <sub>2</sub>	2.14 <sub>a</sub>	2.54	2.84 <sub>b</sub>	3.70	3.59 <sub>b</sub>	4.04
30-day marijuana use <sub>3</sub>	2.06 <sub>a</sub>	2.39	2.00 <sub>a</sub>	2.53	2.48 <sub>a</sub>	2.76
12-month number of sexual partners <sub>1</sub>	2.01 <sub>a</sub>	2.40	2.46 <sub>a</sub>	3.12	1.85 <sub>a</sub>	2.24
12-month number of sexual partners <sub>2</sub>	1.54 <sub>a</sub>	1.91	2.12 <sub>b</sub>	3.16	1.58 <sub>ab</sub>	1.97
12-month number of sexual partners <sub>3</sub>	1.61 <sub>a</sub>	1.87	2.08 <sub>b</sub>	2.74	1.91 <sub>a</sub>	2.53
30-day number of sexual partners <sub>1</sub>	0.78 <sub>a</sub>	1.19	1.38 <sub>b</sub>	2.37	0.87 <sub>a</sub>	1.82
30-day number of sexual partners <sub>2</sub>	0.69 <sub>a</sub>	0.97	0.94 <sub>a</sub>	1.72	0.80 <sub>a</sub>	1.45
30-day number of sexual partners <sub>3</sub>	0.78 <sub>a</sub>	0.78	0.95 <sub>a</sub>	1.20	0.67 <sub>a</sub>	0.80
	%		%		%	
Male (% yes) <sub>1</sub>	56.16 <sub>a</sub>		76.19 <sub>b</sub>		67.5 <sub>b</sub>	
High school graduate <sub>2</sub>	32.85 <sub>a</sub>		10.53 <sub>b</sub>		19.44 <sub>b</sub>	
Was a parent <sub>1</sub>	6.07 <sub>a</sub>		9.52 <sub>a</sub>		3.80 <sub>a</sub>	
Was a parent <sub>2</sub>	9.44 <sub>a</sub>		14.29 <sub>a</sub>		8.45 <sub>a</sub>	
Was a parent <sub>3</sub>	17.11 <sub>a</sub>		21.62 <sub>a</sub>		18.37 <sub>a</sub>	
Married <sub>1</sub>	0.74 <sub>a</sub>		1.19 <sub>a</sub>		1.27 <sub>a</sub>	
Married <sub>2</sub>	1.52 <sub>a</sub>		3.51 <sub>a</sub>		1.39 <sub>a</sub>	
Married <sub>3</sub>	3.77 <sub>a</sub>		8.11 <sub>a</sub>		2.00 <sub>a</sub>	
Addicted to alcohol (% yes) <sub>3</sub>	15.28 <sub>a</sub>		11.11 <sub>a</sub>		21.28 <sub>a</sub>	
Addicted to drugs (% yes) <sub>3</sub>	9.92 <sub>a</sub>		5.56 <sub>a</sub>		10.64 <sub>a</sub>	

*Note:* Matching subscripts indicated no differences between classes.



The second class represented a group of subjects who rose significantly and more steeply in emerging adulthood over time. This class began at the lowest level of emerging adulthood at the first wave, but rose steadily. The slope factor ( $\mu = 0.74$ ,  $p < .0001$ ) was significantly different than zero, and the intercept factor ( $\mu = 1.90$ ,  $p < .0001$ ) was significantly different from zero, indicating that overall the individuals did not start at a score of zero in emerging adulthood, but that there was significant growth in emerging adulthood over time. The intercept and slope were significantly correlated ( $r = -.87$ ,  $p < .0001$ ), signaling a negative relationship between initial status of emerging adulthood and changes over time.

For Class 3, the subjects reported a steady and fairly steep decrease in emerging adulthood over the three survey waves. The slope factor ( $\mu = -0.56$ ,  $p < .0001$ ) and the intercept factor ( $\mu = 3.32$ ,  $p < .0001$ ) were significantly different from zero, indicating that overall the individuals did not start at a score of zero in emerging adulthood and that there was significant decreases in emerging adulthood over time. The intercept and slope were significantly correlated ( $r = -.40$ ,  $p < .0001$ ), signaling a negative relationship between initial status of emerging adulthood and changes over time.

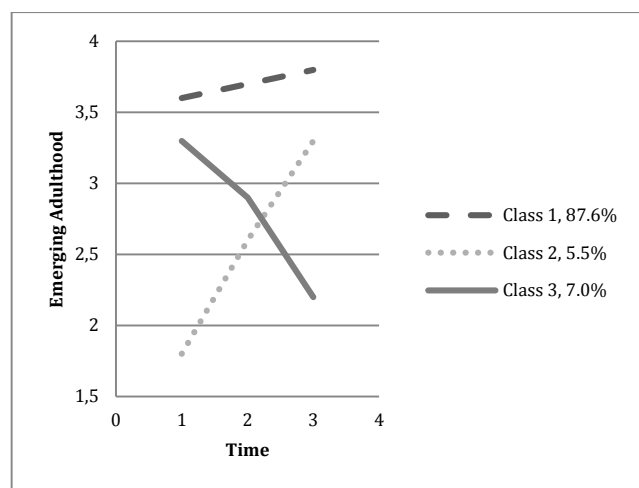


Figure 1. Estimated and actual sample means and growth trajectories based on final class counts and proportions for the latent class patterns based on estimated posterior probabilities.

*Latent classes and correlates.* Table 2 provides descriptive information (means and frequencies) of correlates by class using most likely class assignments. Pairwise comparisons by class were used to examine the differences. Class 1 had less males compared to Class 2 and Class 3; Class 1 had more high school graduates than

Class 2 and Class 3 at Time 2. Class 2 was younger than Class 1 and Class 3,

Class 1 had less marijuana use compared to Class 2 and Class 3 at Time 2; Class 1 had a lower frequency of getting drunk than Class 2 and Class 3 at Time 2; Class 3 had a higher frequency of drunkenness than Class 1 and Class 2 at Time 1; and Class 1 exhibited lower 30-day alcohol use than Class 2 at Time 2.

Class 1 exhibited fewer 12-month sexual partners than Class 2 at Time 2; and Class 2 had more 30-day sexual partners than Class 1 and Class 3 at Time 1. No differences were found between classes for being a parent, being married, or ever having been addicted to alcohol, or any drug.

## DISCUSSION

The findings provide an interesting and diverse picture of emerging adulthood. This variation is indicative of the heterogeneity of this period. One study found that non-college attending individuals use more substances during the emerging adulthood period than do their college-student peers (White, Labouvie, & Papadaratsakis, 2005). Those who engage in substance use earlier tend to be at a higher risk for poorer outcomes later in life than those who do not (Riggs, Chou, Li, & Pentz, 2007; Tucker, Ellickson, Orlando, Martino, & Klein, 2005).

The first validation study of the IDEA (Reifman, Arnett, & Colwell, 2007) examined how emerging adulthood scores by sub-scale differed by age group. These results were evaluated in a cross-sectional sample and thus required verification over a longer period of time. This longitudinal verification was needed to know whether these differences are due to cultural and historical disparities across age cohorts rather than actual developmental processes. In addition, other studies tend to find convergence among the items composing the IDEA. That is, multiple factors have not been replicated. Still, the Reifman study is valuable in that scores on the IDEA were highest during the emerging adulthood years, consistent with tenants of this developmental period. Certainly, more research is needed with the full measure. Our current paper addresses this limitation.

### Latent class growth curve model

The LCGM analysis extracted three latent classes. The groups were of very different sizes, Class 1, “low risk class,” represented the largest group and Class 2, “high risk class,” and Class 3, “moderate risk group,” were close in size. The shape of the trajectory was different between classes for both intercept and slope; the groups were all significantly different from each other. The steepest slope was found in Class 2, these individuals increased linearly in emerging adulthood across the time points. Emerging adulthood is expected to increase from 18, peak, and then decline until approximately age 25 when adulthood is reached (Arnett, 2004; Reifman et al., 2007). Class 1 was the largest group, with a very stable but increasing trajectory through time on emerging adulthood; this class started the highest (intercept) on emerging adulthood and significantly increased in emerging adulthood over time. Class 3 started relatively high on emerging adulthood but declined over time. Had the sample been normative youth, not continuation high school students, we might expect that the groups would look a bit different. It is possible that more normative youth would follow the pattern of Class 2 by increasing rather steeply as they enter emerging adulthood. Continuation high school youth are expected to have reached emerging adulthood earlier than normative youth (Sussman, 2010) and this might explain why the largest group is not characterized by steep growth.

### Latent class and correlates

Lastly, we examined how each class differed at each time point on a variety of correlates. Class 1 seems the *lowest risk class* as they are composed of relatively less males ( $d = 0.0026$  and  $0.0017$  respectively), had a lower marijuana frequency ( $d = 0.27$  and  $0.54$  respectively), and were drunk less often ( $d = 0.27$  and  $0.25$  respectively) than the *high and moderate risk classes*. The *low risk class* also was found to have a lower frequency of drinking ( $d = 0.37$ ) and less past year sexual partners ( $d = 0.37$  at time 1 and  $d = 0.29$  time 2) compared to the *high risk class*. The *low risk class* also had a higher graduation rate than the *moderate risk class* ( $d = 0.01$ ) and *high risk class* ( $d = 0.04$ ). Class 2, the *high risk class* was younger ( $d = 0.41$  and  $0.36$  respectively) and had a higher number of past month sexual partners ( $d = 0.46$  and  $0.24$  respectively) compared to the *low risk and moderate risk classes*. Class 3, the *moderate risk class*, had a higher frequency of

drunkenness compared to the high risk class ( $d = 0.29$ ). Based on these correlates it appears that entering emerging adulthood earlier in life might have some sort of protective effect on youth allowing them to engage less frequently in risky behaviors. It appears that a steep increase in emerging adulthood might add some additional risk. The most curious class is the *moderate risk class*, which declines over time in entrenchment in emerging adulthood. This class is perhaps specific to continuation high school youth as they might experience this period differently. Perhaps this group enters emerging adulthood earlier because of their circumstances; more independence might have landed them in these schools, but it is difficult for them to adjust and they “regress” in some ways over time.

### Limitations

The limitations of this work include the use of a single continuation high school sample limiting generalizability. In addition, while growth curve modeling makes use of FIML to account for missing data, there was still substantial attrition over the study period. It should also be noted that LCGM yields probabilities of class membership; thus the assignment of individuals to classes (while model based) involves a degree of uncertainty that is not reflected in the comparisons. Another limitation is that it would have been ideal to start out with the full IDEA measure, which was not practical in the current study. Arguably, a new or modified measure of emerging adulthood processes is needed as the measure at least in this sample was unidimensional, even in its 21-item version (Lisha et al., 2014). A further limitation is that it is not clear why there were few differences in Time 3 across groups. It is not clear whether different trajectories are only transiently associated with risk behaviors, though this lack of difference does not appear to be due to a measurement confounder. A foremost limitation is the sample size of the individual latent classes. The latent trajectory groups were imbalanced, and one class was considerably bigger than the other two groups. Thus, there is a question of power in the ability to detect effects with the Time 3 correlates.

### Conclusion

The present study sought to examine possible trajectories during emerging adulthood. Three latent growth trajectories were extracted from the data. More

importantly, this study provides verification that continuation high school students are indeed entering emerging adulthood and do not simply bypass it by moving directly to adulthood. The most surprising finding is the trajectory for Class 3. Individuals in this group begin in emerging adulthood but decline consistently over time. We would think this group might enter emerging adulthood early, and resolve it early as well by entering adulthood. However, typical markers of having reached adulthood, such as having a job, being married, or being a parent are not higher in this Class at Time 3 compared to the other Classes. Future research should continue to examine emerging adulthood over longer periods time to see how transitions during this fragile period affect outcomes later in life.

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