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EMPIRICAL RESEARCH

A Latent Class Analysis of Adolescents in First-Year University: Associations with Psychosocial Adjustment Throughout the Emerging Adult Period and Post-University Outcomes

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Abstract
The long-term outcomes for adolescents who struggle in first-year university remain unexplored. This 7-year longitudinal study aimed to identify distinct groups of adolescents based on their characteristics/behaviors in first-year university, and then assess whether these groups differ in psychosocial adjustment trajectories (i.e., mental health, positive relationships) throughout the emerging adult period, as well as in graduation rates, employment characteristics, and reflections on time spent at university. Participants ($N = 1017$; 71% female; Year 1 $M_{age} = 19$ years) enrolled in a Canadian university completed a survey annually for 7 years. Four groups in Year 1 were identified: *Good Students* who exhibited no difficulties; *Sensation-Seeking* who prioritized social engagement and substance use over academic engagement but reported no psychological adjustment difficulties; *Struggling Students* who had the most difficulties; and *Club Involved* who exhibited high club involvement. The Struggling Students Group continued to have more psychosocial adjustment difficulties than the other groups during and after university, were more likely to drop out of university, and to later have less job satisfaction. This group requires the most support. Consideration also should be given to the Sensation-Seeking Group, as they reported a lack of academic motivation (and regret about that later) and also were more likely to drop out of university. At the same time, they may be more difficult to target given that they did not report psychosocial difficulties. Overall, the findings highlight the need for early support and discourage a 'one-size fits all' method for promoting psychosocial adjustment.

Keywords Late adolescents · Emerging adults · Psychosocial adjustment trajectories · University · Post-university outcomes

Introduction

Higher education (e.g., university) is thought to predict subsequent psychosocial adjustment, such as mental health and positive relationships (Pascarella and Terenzini 2005). At the same time, the transition to and from university often involves considerable instability (e.g., leaving home, frequent residential moves, creating new social networks, etc.). While many students navigate this transition successfully, others experience difficulties. The reasons why some students experience vulnerability during this transitional period likely are diverse and multifaceted (Baltes et al. 1998). One way to assess this diversity is to uncover groups of adolescents who exhibit distinct characteristics and behaviors in first-year university, and then investigate whether these group differences negatively impact subsequent psychosocial adjustment, including graduation rates and finding fulfilling employment after university. Knowledge of distinct patterns of adolescent characteristics and behaviors in first-year university, and the course of psychosocial adjustment problems among these groups across the emerging adult period (18–25 years), however, is limited. The current study addresses this concern with a study of 1017 adolescents in first-year university who were followed for 7 years (i.e., until ~25 years of age).

The age period from 18 to 25 years in Western culture often is a transitional period of identity exploration (i.e., exploring careers, self-discovery, developing intimate relationships) and instability (e.g., in love and work) – Arnett (2000). These characteristics may be true especially for university students, as they are confronted with important but often competing developmental tasks: learning to be

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independent in the context of a rigorous academic environment, yet also developing new social networks that can provide support during this transitional period (Vaughan et al. 2009). At the same time, adolescents vary in their experiences during the first year of university. While some adolescents may seek out new social opportunities, others may have difficulty initiating new social networks and experience social isolation (e.g., Buote et al. 2007). Some adolescents may become influenced by the greater opportunities to engage in problem behaviors (e.g., substance use) in university. For example, while heavy drinkers in high school are less likely to go to university than their more moderate drinking peers, this association reverses in university, in that the proportion of heavy drinkers in university exceeds the proportion of heavy drinkers in non-university samples (Bachman et al. 2008). Of concern, approximately 40% of university students engage in episodic heavy drinking (Johnston et al. 2007), which has been associated with consequences, including later bedtimes (e.g., Galambos et al. 2013) and academic problems (e.g., lower grades, skipping classes; Perkins 2002). Further, the high cost of university forces some adolescents to be employed during the academic year, sometimes creating difficulties in keeping up with schoolwork (e.g., Miller et al. 2008). Some adolescents also may suffer from a lack of academic engagement (e.g., low time management, limited goals for university) and/or adjustment difficulties (e.g., depressive symptoms, behavioral inhibition, stress, sleep problems, e.g., Boehm et al. 2016; Robbins et al. 2004). Indeed, an assessment of whether there are groups of adolescents who exhibit distinct characteristics and behaviors in first-year university is critical for a holistic understanding of adjustment difficulties during the transition to and from university (Lanza et al. 2010).

Developmental theories, such as Erikson's (1968) Theory of Psychosocial Development, however, suggest that this transitional period during first-year university also can set the foundation for long-term psychosocial adjustment (Schulenberg et al. 2004). The challenge is to assess whether group differences on student characteristics and behaviors in first year university negatively impact both short-term and long-term psychosocial adjustment or whether they are unique to the university context (Schulenberg and Zarrett 2006). In this study the focus is on psychosocial adjustment indicators that are relevant both during and after the university context, such as depressive symptoms, behavioral inhibition, stress, sleep problems, and friendship quality.

Most of the research on psychosocial adjustment among students enrolled in university, however, has focused only on one time point, or on short-term transitions [e.g., from grade 12 to first-year university, from first year to second year, or in a few cases, from first year to outcomes assessed only at graduation, Robbins et al. 2004, and Galambos and Krahn 2008 for an assessment from graduation to outcomes (depression and anger) reported after university]. Two recent studies assessed change in sleep patterns (Galambos et al. 2013), work orientation, identity, and intimacy (Lascano et al. 2013) among 198 students across 4 years of university, excluding those who left university prior to graduation. However, no researchers have followed students annually throughout university and continued to follow them annually after leaving university, nor have they included an extensive multi-domain set of variables over time. Pascarella and Terenzini (2005) emphasize that adaptation to new contexts (e.g., undergraduate programs, work) may take a few years; therefore, a long-term focus on psychosocial adjustment is necessary in order to assess change.

An advantage of a longitudinal study that includes post-university years is that there also is an opportunity to investigate whether group differences on first-year university student characteristics and behaviors have implications for later success beyond psychosocial adjustment, specifically graduation rates and employment. It also provides an opportunity to ask participants, post university, to reflect on their university years to see what, in hindsight, they regretted about university and what they felt hindered their motivation to do well. These reflections then can be matched to group differences in first-year university. For example, adolescents who prioritize socializing over academic engagement in first-year university (e.g., going out drinking with new friends and then skipping classes) may later regret their lack of academic motivation. At the same time, adolescents who prioritize academic success without also developing social ties in first-year university may later regret their lack of social engagement. Identifying whether distinct groups of university students have different outcomes and regrets about their experiences during university remains an unexplored gap in the literature.

Current Study

The current study aims to extend previous research by assessing students' psychosocial adjustment both during and after university and by including an extensive multi-domain set of variables. The 7-year longitudinal study focuses on three main questions. Are there groups of adolescents who exhibit distinct patterns of characteristics and behaviors (across multiple domains, including academic engagement; social engagement at university, social support, student behaviors, and psychological adjustment) in their first year of university (Research Question 1)? Do these groups differ in patterns of stability or change in psychosocial adjustment (depressive symptoms, behavioral inhibition, stress, sleep problems, and general friendship quality) across the emerging adult period (i.e., from 19 to 25 years) (Research Question 2)?

Do these groups differ in whether their members graduated or dropped out from university, in the characteristics of their jobs at Year 7, and in what they regretted and felt had hindered their motivation to do well in university (Research Question 3)? Given the lack of research examining whether there are distinct group differences in long-term psychosocial adjustment among adolescents in first-year university, the research questions in this study are exploratory.

Method

Participants

Participants were 1095 undergraduates (71.1% female) enrolled at a mid-sized university in southern Ontario, Canada, who completed a survey annually for 7 years. At the time of entry to the study, all participants were in their first year of university ($M = 19$ years, $SD = 0.93$). Data on SES indicated that mean levels of education for mothers and fathers fell between "some college, university, or apprenticeship program" and "completed a college/apprenticeship and/or technical diploma". The sample was comprised predominantly of domestic Canadians (88%), and common ethnic backgrounds of these participants other than Canadian were British (19%), Italian (16.8%), French (9.5%), and German (9%), consistent with the broader demographics for the region (Statistics Canada 2006). The majority of international students were from Asia (36.1%), European Union (15.7%), the Caribbean (10.2%), and Africa (10.2%). Of the 1095 participants, 38 (3.4%) transferred to a community college prior to graduation, 13 (1.19%) were still registered as students at the university in Year 7, 12 (1%) were registered for 6 years but had not graduated as of Year 7, and 15 (1.37%) transferred to another university prior to graduation but information about graduation was unknown. These 78 participants were not included in the analyses, leaving a final sample of 1017 participants.

Procedure

Participants were invited to complete a survey examining stress and coping in university through posters, classroom announcements, website postings, and residence visits. Any student enrolled in first-year university was eligible to participate in the current study. The sample was generally representative of the university population [i.e., proportion of students in the various academic departments; student majors included social sciences (37%), applied health sciences (19%), humanities (13%), business (12%), education (8%), mathematics and sciences (6%), and 5% not specified]. In Year 1, participants were given either monetary compensation or course credit for their participation. Monetary compensation was given in Years 2 to 7. Each year, starting in Year 2, all participants who participated in the first assessment were invited to participate again (even if they were no longer registered at the university) by way of e-mails and phone calls. All seven assessments were completed between the end of January and March, four to six months after they had started university. The study was approved by the University Research Ethics board prior to survey administration, and active informed consent was obtained from all participants. Participants also provided active consent to have their university grades and enrollment status (graduated, dropped out, etc.) accessed from the Registrar (98% gave consent).

Missing Data

Missing data across the 7 years occurred within each assessment time because some participants did not finish the entire questionnaire [missing data ranged from a minimum of 4.05% (Year 1) to a maximum of 6.09% (Year 6)], and because some participants did not complete all seven waves of the survey (i.e., they could not be reached or chose not to participate in all seven waves). In total, 43.1% completed all 7 waves, 14.7% completed 6 waves, 8.1% completed 5 waves, 6.2% completed 4 waves, 5.0% completed 3 waves, 6.4% completed 2 waves, and 16.5% completed 1 wave. Note that some participants (19%) did not participate for a year or two but then participated again in later years. In other words, someone who participated in 4 waves, for example, might participate in Years 1, 3, 4, and 6. A MANOVA conducted with "number of completed waves" as the independent variable and Year 1 study variables as the dependent variables was significant, Wilks $\lambda = 0.731$, $p < 0.001$, $\eta^2 = 0.051$. Post hoc tests revealed that participants who took part in all seven waves reported less skipping of classes and higher goals for university, better time management, and less substance use than those with only one wave. Participants who took part in all seven waves also had a higher admitting average and first-year grades than those who participated in one to three waves. Participants who took part in six waves had a higher admitting average and first-year grades than those with one wave, and participants who took part in five waves had higher first-year grades than those with only one wave. Missing data were imputed using the expectation-maximization (EM) algorithm, with all study variables and demographics included in the analyses. EM retains cases that have missing data, thus avoiding the biased parameter estimates that can occur with pairwise or listwise deletion (Schafer and Graham 2002).

Measures

Measures include demographics; Year 1 measures of academic engagement (admitting average, type of high school courses, first-year university average, goals for university,

time management, skipping class), social engagement at university (social ties at university, club activities, professor/student interaction), social support (i.e., general friendship quality), student behaviors (bedtime during the week, substance use, paying job), and psychological adjustment (depressive symptoms, behavioral inhibition, stress, sleep problems); Years 2 to 7 measures of psychosocial adjustment (depressive symptoms, behavioral inhibition, stress, sleep problems, general friendship quality); and post-university outcomes (graduated vs. dropped out of university, job characteristics, regrets and barriers to doing well at university).

Demographics

A demographic questionnaire was administered to assess sex (1 = male, 2 = female) and parental education. Parental education was assessed with one item per parent, on a scale of 1 = *did not finish high school* to 6 = *professional degree*, which was averaged for participants reporting on both parents ($r = 0.42$).

Admitting average

The six high school course grades that were used for calculating the admitting average were accessed from the university's Registrar's Office at Year 7 with permission from the participants. The six courses were averaged to form the overall admitting average.

Type of high school courses

The number of senior high school courses taken at the "college or university" vs. "university" level was accessed from the university's Registrar's Office at Year 7 with permission from the participants. "College or university" level courses provide students with both theoretical and practical knowledge, while "university" level courses are designed to prepare students for university by emphasizing theory, research, and independent learning. The proportion of "university" to "university or college" high school courses was calculated for each participant. Higher scores indicated a higher proportion of "university" courses.

First-year university average

Overall first-year average across all courses was accessed from the university's Registrar's Office at Year 7 with permission from the participants.

Goals for university

Participants' goals for university were assessed in Year 1 and compiled from two questions on the Student Adaptation to College Questionnaire (SACQ, Baker and Siryk 1986; "I have well-defined goals in terms of what I want to accomplish in school", "I know why I'm in university and what I want out of it". See Dahmus et al. (1992) for information on SACQ reliability and validity. The questions were measured on a 5-point Likert scale ranging from 1 = *not at all like me* to 5 = *completely like me* ($r = 0.50$). Responses were averaged, with higher scores indicating more well-defined goals.

Time management

Time management was assessed in Year 1 with six items from the SACQ (Baker and Siryk 1986; e.g., "I have been keeping up to date on my academic work", "I start my assignments and studying for tests early", "I have trouble getting started on homework"), measured on a 5-point Likert scale ranging from 1 = *not at all like me* to 5 = *completely like me* ($\alpha = 0.86$). A principal components analysis indicated that these items formed one factor (factor loadings ranged from 0.73 to 0.83). Items were recoded as appropriate and averaged so that higher scores indicated better time management.

Skipping class

The frequency of skipping class was assessed in Year 1 with the question "During a typical month of school, how often do you skip class?" The question was assessed on a 5-point Likert scale ranging from 1 = *never* to 5 = *almost always*. Higher scores represented a greater frequency of skipping classes.

Social ties at university

The social ties construct was assessed in Year 1 and compiled from three questions on the SACQ (Baker and Siryk 1986; "I have several close social ties at university", "I am satisfied with how much I am participating in social activities at university", and "I am meeting people and making friends at university"), assessed on a 5-point Likert scale ranging from 1 = *not at all like me* to 5 = *completely like me* ($\alpha = 0.68$). A principal components analysis indicated that these items formed one factor (with factor loadings ranging from 0.74 to 0.82). Responses were averaged, with higher scores representing greater university social ties.

Club activities

The frequency of engaging in clubs during the first year of university was based on the question: "Since the previous September, how often have you participated in school or community clubs that are not sports clubs?" Note that a

question assessing participation in sports clubs inadvertently was missed from the survey. Responses for club involvement were recorded on a 6-point Likert Scale ranging from 1 = *never* to 6 = *several times a week*, with higher scores indicating greater frequency of participation in club activities.

Professor/student interaction

Level of satisfaction in Year 1 with the amount of professor/student interaction was created with the question: "I was satisfied with the level of student-professor interaction that I experienced during my first year of university". It was coded on a Likert scale, ranging from 1 = *strongly agree* to 5 = *strongly disagree*. Scores were recoded such that higher scores indicated greater satisfaction with professor/student interaction.

General friendship quality

General friendship quality was assessed from Years 1 to 7 and was based on the peer component of the well-validated Inventory of Parent and Peer Attachment (Armsden and Greenberg 1987). Friendship quality was assessed using 18 items (e.g., "My friends are concerned about my well-being", "My friends listen to what I have to say", "I can count on my friends when I need to get something off my chest", "I trust my friends") measured on a 4-point Likert scale ranging from 1 = *almost always or always* to 4 = *almost never or never*. Responses were averaged such that higher scores represented higher general friendship quality. Cronbach alphas over the 7 years ranged between 0.85 and 0.90.

Bedtime during the week

Participants were asked in Year 1 to indicate what time they "normally fall asleep". Higher scores indicated later bedtime (e.g., 12 = midnight, 13 = 1:00 am, etc.)

Substance use

Substance use was measured in Year 1 by combining responses to three questions related to alcohol and marijuana use. Frequency of past year alcohol use was assessed on an 8-point Likert scale ranging from 1 = *never* to 8 = *every day*, and "average consumption per alcohol use event" was scored on a 6-point Likert scale ranging from 1 = *less than 1 drink* to 6 = *over 10 drinks*. Participants also were asked "In the past 12 months, how often did you use hash, marijuana (weed, joint)", coded on a 6-point Likert scale ranging from 1 = *never* to 6 = *every day*. A principal components factor analysis indicated that the three scales formed one factor (with factor loadings ranging from 0.79 to 0.87), and thus, were averaged together (with frequency of alcohol recoded to a 6-point scale) to form a composite, with higher scores indicating higher levels of substance use ($\alpha = 0.79$).

Paying job

Prevalence of working at a paying job during Year 1 was assessed with the question "Did you work at a paying job during the first year of university". Responses were scored as 1 = *no* and 2 = *yes*. For participants who indicated that they worked a paying job, the frequency of hours worked also was assessed with the question: "On average, how many hours do you work each week?".

Depressive symptoms

Depressive symptoms in the last 2 weeks were assessed from Years 1 to 7 using the well-validated Center for Epidemiologic Studies Depression Scale – CES-D (Radloff 1977). The 20-item scale (e.g., "I felt depressed", "I felt sad", "I felt like doing nothing") was measured on a 5-point Likert scale ranging from 1 = *none of the time* to 5 = *most of the time*, such that higher scores indicated higher levels of depressive symptoms. Cronbach alphas over the 7 years ranged between 0.89 and 0.94.

Behavioral inhibition

Behavioral Inhibition Scale (BIS) was assessed from Years 1 to 7 using the well-validated BIS/BAS scale (Carver and White 1994), given that it has been linked to anxiety (e.g., Chronis-Tuscano et al. 2009). The BIS assesses sensitivity to unpleasant stimuli/situations. It included seven items (e.g., "I worry about making mistakes") measured on a 4-point Likert scale ranging from 1 = *strongly disagree* to 4 = *strongly agree*. Higher scores indicated higher behavioral inhibition. Cronbach alphas over the seven years ranged between 0.72 and 0.80

Stress

To assess perceived stress from Years 1 to 7, participants completed a 25-item measure of daily hassles from Willoughby (2008). Participants were asked to indicate the frequency of being bothered by daily hassles with friends, peers, and work (e.g., "not having enough money", "not having enough time", "problems with friends"). Responses ranged from 1 = *almost never bothers me* to 3 = *often bothers me*. Each year, from Years 2 to 7, participants were asked each year if they were currently enrolled as students. If they indicated they were not a student, they did not

receive in that year the 9 items (out of the 25) that specifically assessed school hassles (e.g., "trying to get good marks", "too much schoolwork", "taking tests/exams", etc.) as these questions were not relevant for them. It was important to keep the nine school items in the survey for participants who were currently students, however, as school hassles would be particularly relevant in terms of stress for them (note that the analyses were rerun with the nine items deleted from all survey years, and the results remained the same). Scores on the measure were averaged such that higher scores represented higher perceived stress. This measure has demonstrated good internal consistency among undergraduate students (Hamza and Willoughby, 2013). Cronbach alphas over the seven years ranged between 0.83 and 0.86.

Sleep problems

Sleep problems were assessed from Years 1 to 7 using the Insomnia Severity Index (ISI; Morin, 1993—see Bastien et al., (2001) for a validation study of the ISI). Four items assessed the severity of insomnia symptoms: difficulty falling asleep, staying asleep, problems waking up too early, and problems staying awake, with responses ranging from 1 = *no problem* to 5 = *very severe problems*. Additionally, one item assessed the degree to which participants were satisfied with their sleep patterns on a 5-point Likert scale, ranging from 1 = *very satisfied* to 5 = *very dissatisfied*. The extent of participant's perceived daytime impairment as a result of their sleep patterns also was assessed, based on a 4-point Likert scale, ranging from 1 = *rarely interferes* to 4 = *very often interferes*. Responses were scored (with sleep pattern responses recorded to a 5-point scale) such that higher scores indicated more sleep problems. Cronbach alphas over the 7 years ranged between 0.77 and 0.80.

Graduated vs. dropped out of university

Information about whether participants graduated or dropped out from university prior to graduation was obtained from the Registrar at Year 7 and was scored as 1 = graduated or 2 = dropped out. Overall, 805 participants (79% of the sample) graduated at some point within the 7 years, with 56% of these participants graduating by the end of Year 4 and 37% by the end of Year 5. In contrast, 212 participants (21% of the sample) dropped out of university prior to graduating, with 38%, 37%, 14%, and 12% leaving at the end of the 1st, 2nd, 3rd, and 4th year of university, respectively.

Job characteristics

Job characteristics were assessed in Year 7. First, participants were asked if they were currently students, and if so, whether they were enrolled in undergraduate or graduate/professional programs. The remaining participants were asked if they had a job, scored as 1 = *no*, and 2 = *yes*. If the response was a yes, participants were provided with additional questions about their job. The first three items were "Do you currently have a full-time or part-time job?", scored as 1 = *part-time* and 2 = *full-time*, "What is your current income per year?", scored as 1 = *under $5 K* to 8 = *over $50 K*, and "Does your job correspond with your qualifications/training?", scored as 1 = *no* and 2 = *yes*. Whether participants were feeling competent, experiencing good relationships, and had autonomy at their job also were assessed using a 14-item adapted version for work of the Basic Needs Questionnaire (Deci et al. 2001) that included 2 items for feeling competent (e.g., I feel competent at my job, $r = 0.65$), 3 items for having good relationships (e.g., I find the relationships I form with other people at my job are important, $\alpha = 0.64$), and 9 items for autonomy (e.g., I have some control over what happens at my job, $\alpha = 0.92$). The items were coded on a Likert scale, ranging from 1 = *do not agree* to 5 = *strongly agree*.

Regrets and barriers to doing well at university

In Year 5, participants were asked to respond to two open-ended questions: "What regrets, if any, do you have about your time at university?", and "What hindered your motivation to do well or succeed at university"? The data first were coded through identifying semantic similarities and differences in responses that were considered pertinent to each question. Codes were then analyzed and combined at a broader level in order to develop themes. All of the codes and themes were created separately by two research assistants and then discussed to ensure reliability.

Statistical Analyses

All analyses were conducted with R (R Core Team 2017) and Mplus 8 (Muthén and Muthén 1998–2017). First, a person-centred latent class analysis (LCA) was conducted using participants' characteristics and behaviors at Year 1 as indicators (i.e., sex, parental education, admitting average, type of high school courses, first-year university average, goals for university, time management, skipping class, social ties at university, general friendship quality, club involvement, psychological well-being, sleep problems, bedtime during the week, substance use, professor/student interaction, and part-time job). The LCA allowed us to explore whether distinct groups of participants could be identified based on their responses to these items. In order to determine the number of groups that were best represented by the data, four criteria were considered: (1) interpretability of the classes, (2) Bayesian information criterion

(BIC), such that smaller values of BIC indicate a better fit model, (3) significance of the Lo-Mendell-Rubin Adjusted Likelihood Ratio Test (LMR- LRT), such that once non-significance is reached, the number of classes prior to non-significance is defined as the appropriate number, and (4) average latent class posterior probabilities are close to 1.00 (Nylund et al. 2007). Entropy (an index of confidence that individuals belong to the correct class and that adequate separation between latent classes exist) also was examined; scores > 0.80 are good, but there is no set cut-off criterion for entropy (Jung and Wickrama 2008). To check that the LCA created distinct groups, a MANOVA, controlling for sex, parental education, and multiple comparisons ($p < 0.0083$), was conducted to examine group differences on the Year 1 indicators of student characteristics and behaviors.

Next, to assess group differences in psychosocial functioning from Years 2 to 7, growth curve analyses were conducted separately for depressive symptoms, behavioral inhibition, stress, sleep problems and general friendship quality. The growth curve analysis assesses both within-person change and between-person differences. Specifically, the analysis assesses whether each participant's adjustment scores change over time (i.e., within-person change) and then whether any variables that differ across participants (i.e., between-person differences; e.g., groups from the LCA and covariates such as sex and parental education) predict those changes (Preacher et al. 2008).

Change was assessed using model fit statistics and trajectory factors (intercept and slope). Model fit was evaluated using the comparative fit index (CFI), and the root mean squared error of approximation (RMSEA). As recommended by Hu and Bentler (1995), CFI values > 0.95 and RMSEA's < 0.07 (simultaneously) were used as the criteria for a well-specified model. To test for non-linearity in the slopes, linear, quadratic, and cubic factors were tested for each growth curve to determine the best fit to the data as calculated by the χ^2 difference test. If the models were not significantly different, the more parsimonious model with greater degrees of freedom was selected as the best fitting model. After deciding on the best fitting model for each psychosocial adjustment trajectory, comparisons among the LCA groups (i.e., between-person differences) were conducted using dummy coding in the growth curve analysis for each of the five psychosocial functioning trajectories, controlling for group comparisons.

In addition, differences among the LCA groups in relation to the percentage of participants who ended up graduating vs. dropping out of university by Year 7 were assessed with an ANOVA. Group differences in status (whether participants were employed, students, etc.) at Year 7 were examined with a Crosstab analysis. For participants employed in Year 7, a MANOVA analysis was conducted to assess group differences in the characteristics of their jobs. The ANOVA and MANOVA analyses used $p < 0.0083$ to control for multiple comparisons. Finally, the themes identified in the open-ended questions about participants' regrets and barriers to success at university were descriptively assessed across groups. Only themes that included responses from at least 10% of the sample were analyzed.

Results

Preliminary Analyses

Descriptive statistics for the Year 1 study variables are shown in Table 1 and Fig. 3. All variables met guidelines for skewness and kurtosis. Figure 1 shows the correlations among the Year 1 study variables. The strongest correlations in Year 1 were between admitting average (from high school) and first-year university grades, $r = 0.570$, between depressive symptoms and stress, $r = 0.541$, and between depressive symptoms and sleep problems, $r = 0.532$. Being female was moderately correlated with stress, $r = 0.332$. All other correlations between the study variables and either sex or parental education were small or trivial (Cohen 1988).

The strongest correlations among longitudinal adjustment variables and job characteristics were correlations among the same adjustment variable at adjacent time periods (e.g., depressive symptoms with rs ranging from 0.468 between Years 1 and 2 to 0.632 between Years 3 and 4; BIS

Table 1 Means and standard deviations for year 1 study variables

Variables	Mean	SD
Sex	71% female	
Parental education	3.672	1.298
Admitting average	79.508	5.378
Type of high school courses	0.711	0.162
First-year university average	67.888	10.893
Goals for university	3.580	1.059
Time management	2.778	0.903
Skipping class	2.408	0.934
Social ties at university	3.210	0.907
Club involvement	1.855	1.376
Professor/student interaction	3.006	0.847
General friendship quality	3.222	0.475
Bedtime during the week, with 12.00 = midnight	12.809	1.406
Substance use	3.108	1.147
Part-time job	1.191	0.393
Depressive symptoms	2.095	0.648
Behavioral inhibition	2.744	0.459
Stress	1.921	0.322
Sleep problems	13.932	4.294

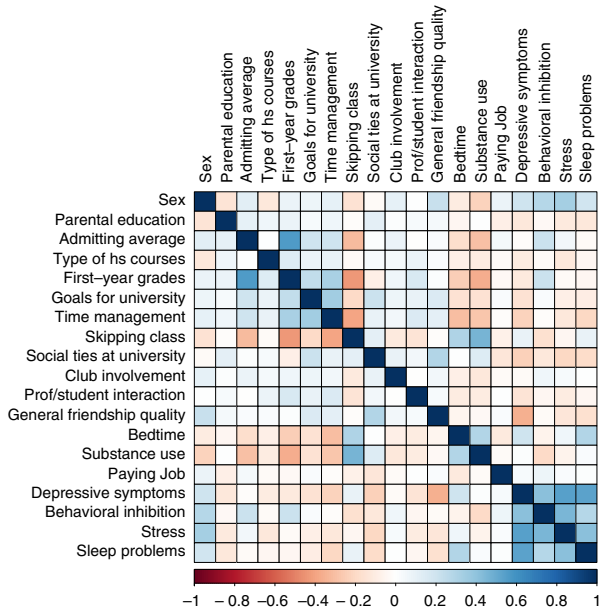

Fig. 1 Correlation table for year 1 variables

with rs ranging from 0.551 between Years 1 and 2 to 0.775 between Years 5 and 6). The highest correlations for the job characteristic measures were between the competence, relationships, and autonomy subscales on the Basic Needs Questionnaire (Deci et al. 2001), rs = 0.578–0.622. Whether participants had a part-time vs. full-time job was correlated with income at 0.449, and job autonomy and job qualifications/training were correlated at 0.339. In all analyses, there were no issues with multicollinearity among the study variables.

Primary Analyses

The primary analyses investigated three exploratory research questions.

Research question 1: Using LCA, are there groups of adolescents who exhibit distinct patterns of characteristics and behaviors (across multiple domains, including academic engagement; social engagement at university, social support, student behaviors, and psychological adjustment) in their first year of university?

The LCA was conducted for 1–5 classes. Fit indices indicated that the four-class solution was considered the optimal model (see Table 2). The LMR-LRT became nonsignificant at five classes, indicating that adding the fifth class did not significantly improve the model. Furthermore, the entropy value for four classes was 0.835 and the average latent classes posterior probabilities ranged from 0.882 to 0.977, indicating that a high proportion of participants were correctly classified. There also was good distinction among the four classes. Finally, the drop in the BIC from four to five classes was much smaller than the drop from three to four classes, again suggesting that the four-class solution best fit the data. Classes were characterized as follows: Good Students (34.51% of sample), Sensation-Seeking Students (26.45% of sample), Struggling Students (24.25% of sample), and Club Involved students (12.78% of sample)—see Fig. 2.

The results of the MANOVA examining group differences on the LCA indicators was significant, Wilks $\lambda = 074$, $p < 0.001$, $\eta^2 = 0.607$. See Table 3 for results. The Good Students Group was distinguished from the other groups by having higher grades, academic skills, and satisfaction with professor/student interaction as well as lower skipping of classes, social ties at university (in comparison to the Sensation-Seeking and Club Involved Groups), substance use, and earlier bedtime during the week. The Sensation-Seeking Group was distinguished from other groups by having lower grades, academic skills, depressive symptoms, behavioral inhibition, and stress as well as higher skipping of classes, substance use, later bedtime during the week, and a higher number of males. The Struggling Students Group was distinguished by having lower SES, grades, university-preparation high school courses, academic skills, social ties, and general friendship quality, as well as higher depressive symptoms, behavioral inhibition, stress, substance use, and later bedtime during the week. The Club Involved Group was distinguished primarily by very high club involvement.

Research question 2: Do the groups found at Year 1 differ in patterns of stability or change in psychosocial adjustment (depressive symptoms, behavioral inhibition, stress, sleep problems, and general friendship quality) across the emerging adult period (i.e., from 19 to 25 years)?

Separate growth models were identified for depressive symptoms, behavioral inhibition, stress, sleep problems, and general friendship quality from Years 2 to 7 by first testing each variable on a linear growth model, in which the paths from the slope factor to the measured variables were fixed in a linear progression, followed by models in which a quadratic and cubic factor were added to the slope factor in order to test for nonlinearity. For each of the models, the intercept factor loading was set to 1 at all time points. Thus, the mean of the intercept represents the average score for the sample at the starting point (i.e., Year 2) of the trajectory, whereas the mean of the slope represents the average rate of change from Years 2 to 7. See Table 4 for results of χ^2_{diff} tests, model fit statistics, as well as means and variances of the intercept and slope factors for each trajectory. For all variables, adding the quadratic slope to the slope factor was the best fitting model, although for both depressive symptoms and behavioral inhibition the mean and variance for the quadratic slope were not significant;

Table 2 Latent class analysis fit indices at Year 1

Number of classes	BIC	Entropy	Conditional probabilities	Loglikelihood *p* value	BLRT *p* value
2 Classes	54027.45	0.798	0.919–0.954	<0.001	<0.001
3 Classes	53180.94	0.793	0.894–0.926	<0.001	<0.001
4 Classes	52887.07	0.835	0.882–0.977	<0.001	<0.001
5 Classes	52823.04	0.853	0.873–0.971	0.7586	<0.001

For an explanation of the fit indices see the first paragraph of the Statistical Analyses section on page 12
BIC bayesian information criterion, *BLRT* bootstrapped likelihood ratio test

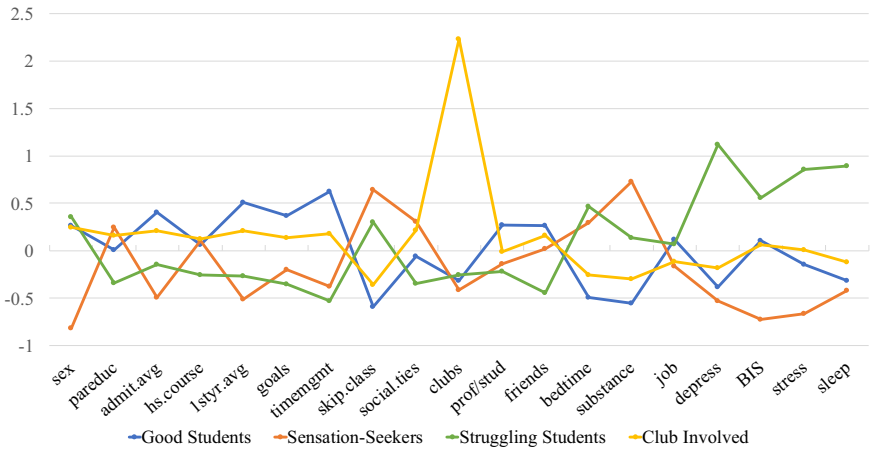

Fig. 2 Results of latent class analysis. Shown are standardized means of the Year 1 latent class indicators. Pareduc = parental education, admit.avg = admitting average, hs.course = type of high school courses, 1styr.avg = first-year university average, goals = goals for university, timemgmt = time management, skip.class = skipping class, social.ties = social ties at university, clubs = club involvement, prof/stud = professor/student interaction, friends = general friendship quality, bedtime = bedtime during the week, substance = substance use, job = paying job, depress = depressive symptoms, BIS = behavioral inhibition, sleep = sleep problems. Higher scores on sex = female and job = yes

thus, for these two adjustment variables the linear model was chosen in further analyses.

Depressive symptoms, stress, and sleep problems on average exhibited significant declines as well as variability in the rate of change over time, while friendship quality on average demonstrated a non-significant decline, but importantly, significant variability in the rate of change over time. The significant quadratic slope for stress, sleep problems, and friendship quality showed that for these adjustment variables, the declines over time were followed by a significant upturn. In contrast, behavioral inhibition was alone in exhibiting a small increase over time, as well as variability in the rate of change over time.

Next, analyses assessing whether the four LCA groups differed in their intercept and slope factors for each adjustment trajectory (i.e., testing the between-group differences) were conducted using dummy coding with three sets of comparison analyses ($p < 0.0167$ to control for multiple comparisons). For the first set, the Good Students Group was selected as the reference group, and for the second set, the Sensation-Seeking Group was used as the reference group. For the third set, the Struggling Students Group was used as the reference group. Each set of dummy variables was entered separately (different analyses) into the growth model for each of the five trajectories as predictors of the intercept, slope and other identified slope factors (e.g., quadratic slope) depending on the best fitting baseline model. Results indicated that significant group differences only were found for the intercepts (scores at Year 2), not the slope factors. In other words, the groups did not differ in their rate of change from Years 2 to 7—see Table 5 and Fig. 3. Thus, any group differences found at Year 2 were maintained over time from Years 2 to 7.

The Struggling Students Group maintained their more negative adjustment from Year 1 over time relative to the other groups. The Struggling Students Group had less positive scores than the other groups on all of the adjustment indicators at Year 2 (i.e., there were significant group differences on the intercepts). Further, given the non-significant differences between the groups on the slope factors from Years 2 to 7, the disadvantage for the Struggling Students Group continued from Years 2 through to Year 7. This was true even though each group's scores for depressive symptoms, stress, and sleep problems became less negative over time.

In contrast, the Sensation-Seeking Group continued to not differ from the Good Students Group on depressive

Table 3 Mean and standard deviations for Year 1 latent class indicators by group

Variables	Good students $n = 351$ 34.51%	Sensation-seeking $n = 269$ 26.45%	Struggling students $n = 267$ 26.25%	Club involved $n = 130$ 12.78%
Sex (male = 1 vs. female = 2)	1.832_{a}	1.342_{b}	1.873_{a}	1.823_{a}
Parental education	3.682_{a}	3.989_{a}	3.234_{b}	3.885_{a}
Admitting average	81.697_{a}	76.875_{c}	78.734_{b}	80.635_{a}
Type of high school courses	0.722_{a}	$0.729_{a,b}$	0.671_{b}	0.732_{a}
First-year university average	73.485_{a}	62.362_{d}	64.985_{c}	70.160_{b}
Goals for university	3.970_{a}	3.370_{b}	3.209_{b}	3.727_{a}
Time management	3.344_{a}	2.442_{c}	2.300_{c}	2.940_{b}
Skipping class	1.858_{d}	3.006_{a}	2.691_{b}	2.073_{c}
Social ties at university	3.160_{b}	3.491_{a}	2.898_{c}	3.408_{a}
Club involvement	$1.422_{b,c}$	1.285_{c}	1.506_{b}	4.923_{a}
Professor/student interaction	3.235_{a}	2.891_{b}	2.822_{b}	3.000_{b}
General friendship quality	3.347_{a}	3.230_{a}	3.010_{b}	3.299_{a}
Bedtime during the week	12.121_{b}	13.223_{a}	13.469_{a}	12.455_{b}
Substance use	2.475_{d}	3.945_{a}	3.266_{b}	2.767_{c}
Paying job (no = 1 vs. yes = 2)	1.237_{a}	1.126_{a}	1.217_{a}	1.146_{a}
Depressive symptoms	1.848_{c}	1.754_{c}	2.821_{a}	1.980_{b}
Behavioral inhibition	2.794_{b}	2.415_{a}	2.998_{c}	2.765_{b}
Stress	1.874_{b}	1.708_{c}	2.196_{a}	1.920_{b}
Sleep problems	12.593_{b}	12.126_{b}	17.760_{a}	13.425_{b}

Means within the same row that share subscripts are not significantly different

Table 4 Results of chi-square difference tests, model fit statistics, and means of the intercept and slope factors for each adjustment trajectory

Variables	χ^2_{diff} test	Model Fit CFI, RMSEA	Intercept M (SE) σ^2	Slope M (SE) σ^2	Quadratic Slope M (SE) σ^2
Depressive symptoms	NA[a]	0.984, 0.059	2.082 (0.017)*** 0.239***	−0.036 (0.003)*** 0.004***	nsig nsig
Behavioral inhibition	NA[a]	0.984, 0.067	2.762 (0.012)*** 0.108***	0.004 (0.002)* 0.001***	nsig nsig
Stress	32.803 (4)***	0.984, 0.069	1.935 (0.009)*** 0.058***	−0.057 (0.005)*** 0.006***	0.003 (0.001)** 0.000***
Sleep problems	101.209 (4)***	0.997, 0.031	14.321 (0.115)*** 9.992***	−0.484 (0.060)*** 0.848***	0.025 (0.011)* 0.009
Friendship quality	26.855 (4)***	0.987, 0.054	3.189 (0.014)*** 0.125***	−0.011 (0.009) 0.015**	0.004 (0.002)* 0.001***

σ^2 = variance, NA = not applicable, nsig = non-significant

* = $p < 0.05$; ** = $p < 0.01$; *** = $p < 0.001$

[a]Linear slope was chosen as the quadratic mean and variance were non-significant

symptoms, sleep problems, and general friendship quality from Years 2 to 7. Moreover, the differences in stress found between the Sensation-Seeking and Good Students Groups at Year 1 were no longer there from Years 2 to 7. The same was true for the differences found between the Sensation-Seeking and Club Involved Groups at Year 1 on depressive symptoms and stress. Thus, the Sensation-Seeking Group did not differ from the Good Students and Club Involved Groups on depressive symptoms, stress, sleep problems, and general friendship quality from Years 2 to 7. However, the Sensation-Seeking Group did maintain their lower scores from Year 1 on behavioral inhibition relative to the Club Involved and Good Students Group from Years 2 to 7.

Finally, the Good Students and Club Involved Groups only differed in Year 1 on depressive symptoms, with Good Students reporting lower scores than the Club Involved Group. In Years 2 to 7, however, this group difference in depressive symptoms was no longer significant. In fact, the Good Students and Club Involved Groups had similar scores and trajectories across the 7 years on all the adjustment indicators.

Table 5 Group comparisons predicting well-being, sleep problems, and general friendship quality growth factors

Variables	Group comparisons	Growth factors		
		Intercept Std. Est. (SE)	Linear slope Std. Est. (SE)	Quadratic slope Std. Est. (SE)
Depressive symptoms	Good vs. SS	0.015 (0.043)	−0.025 (0.109)	
	Good vs. Struggling	0.506 (0.037)***	−0.222 (0.112)$^{+}$	
	Good vs. Clubs	0.083 (0.038)+	−0.113 (0.097)	
	SS vs. Struggling	0.485 (0.051)***	−0.208 (0.147)	
	SS vs. Clubs	0.064 (0.050)	−0.098 (0.128)	
	Struggling vs. Clubs	−0.374 (0.056)***	0.083 (0.117)	
Behavioral inhibition	Good vs. SS	−0.213 (0.043)***	0.055 (0.103)	
	Good vs. Struggling	0.166 (0.039)***	−0.083 (0.095)	
	Good vs. Clubs	0.012 (0.037)	−0.091 (0.090)	
	SS vs. Struggling	0.405 (0.051)***	−0.150 (0.146)	
	SS vs. Clubs	0.195 (0.048)***	−0.162 (0.135)	
	Struggling vs. Clubs	−0.188 (0.060)**	−0.034 (0.124)	
Stress	Good vs. SS	−0.013 (0.041)	0.014 (0.079)	−0.026 (0.076)
	Good vs. Struggling	0.418 (0.035)***	−0.137 (0.073)	0.029 (0.075)
	Good vs. Clubs	0.053 (0.035)	−0.026 (0.068)	0.020 (0.072)
	SS vs. Struggling	0.412 (0.045)***	-0.106 (0.092)	0.078 (0.100)
	SS vs. Clubs	0.049 (0.043)	−0.010 (0.084)	0.063 (0.092)
	Struggling vs. Clubs	−0.358 (0.049)***	0.088 (0.087)	−0.014 (0.093)
Sleep problems	Good vs. SS	0.051 (0.043)	−0.071 (0.085)	0.042 (0.148)
	Good vs. Struggling	0.407 (0.038)***	−0.090 (0.078)	−0.008 (0.134)
	Good vs. Clubs	0.083 (0.038)+	−0.066 (0.073)	0.071 (0.130)
	SS vs. Struggling	0.353 (0.053)***	−0.029 (0.109)	−0.040 (0.176)
	SS vs. Clubs	0.032 (0.050)	−0.025 (0.100)	0.067 (0.163)
	Struggling vs. Clubs	−0.280 (0.057)***	−0.004 (0.124)	0.109 (0.202)
Friendship quality	Good vs. SS	0.032 (0.048)	−0.001 (0.088)	0.029 (0.086)
	Good vs. Struggling	−0.271 (0.043)***	0.040 (0.080)	−0.001 (0.078)
	Good vs. Clubs	−0.055 (0.041)	0.172 (0.079)$^{+}$	−0.180 (0.077)$^{+}$
	SS vs. Struggling	−0.346 (0.058)***	0.072 (0.117)	0.018 (0.115)
	SS vs. Clubs	−0.087 (0.054)	0.226 (0.114)$^{+}$	−0.208 (0.110)
	Struggling vs. Clubs	0.226 (0.063)***	0.202 (0.138)	−0.241 (0.124)$^{+}$

Good = Good Students Group (scored as 1), SS = Sensation-Seeking Group (scored as 2), Struggling = Struggling Students Group (scored as 3), Clubs = Club Involved Group (scored as 4). All variables measured from Years 2 to 7. Results from the covariates (sex and parental education) can be obtained from the first author

$^{+} = p < 0.05$; ** $= p < 0.0167$; *** $= p < 0.001$

Research Question 3: Do the groups found at Year 1 differ in whether their members graduated or dropped out from university, in the characteristics of their jobs at Year 7, and in what they regretted and felt had hindered their motivation to do well in university?

There were significant group differences in the percentage of its members who graduated vs. dropped out from university, $F(3,103) = 20.891$, $p < 0.001$. Follow-up analyses indicated that the Good Students and Club Involved Groups both were less likely to drop out of university (10.54% and 10.77%, respectively) than the Sensation-Seeking and Struggling Students Groups (31.97% and 28.09%, respectively).

The crosstab analysis examining group differences in the percentage of participants who were students, employed, or unemployed was significant, $\chi^2 = 33.177$, $p < 0.001$. There was only one difference—the Good Students Group was more likely than the Sensation-Seeking Group to be enrolled in a graduate or professional program.

For the participants who indicated that they were employed in Year 7, there were significant group differences in their reported job characteristics, Wilks $\lambda = 0.911$, $p < 0.001$, $\eta^2 = 0.031$. The Good Students Group on average had higher incomes than the Struggling Students Group, and both the Good Students and Club Involved Groups were more likely than the Sensation-Seeking and Struggling Students Groups to have a job that matched their qualifications. In addition, the Good Students and Sensation-Seeking Groups were more likely than the Struggling Students Group to think they were competent, had good relationships, and had more autonomy at their job. There were no significant group differences in whether participants had a part-time or full-time job. The specific group comparisons for job characterstics can be found in Table 6.

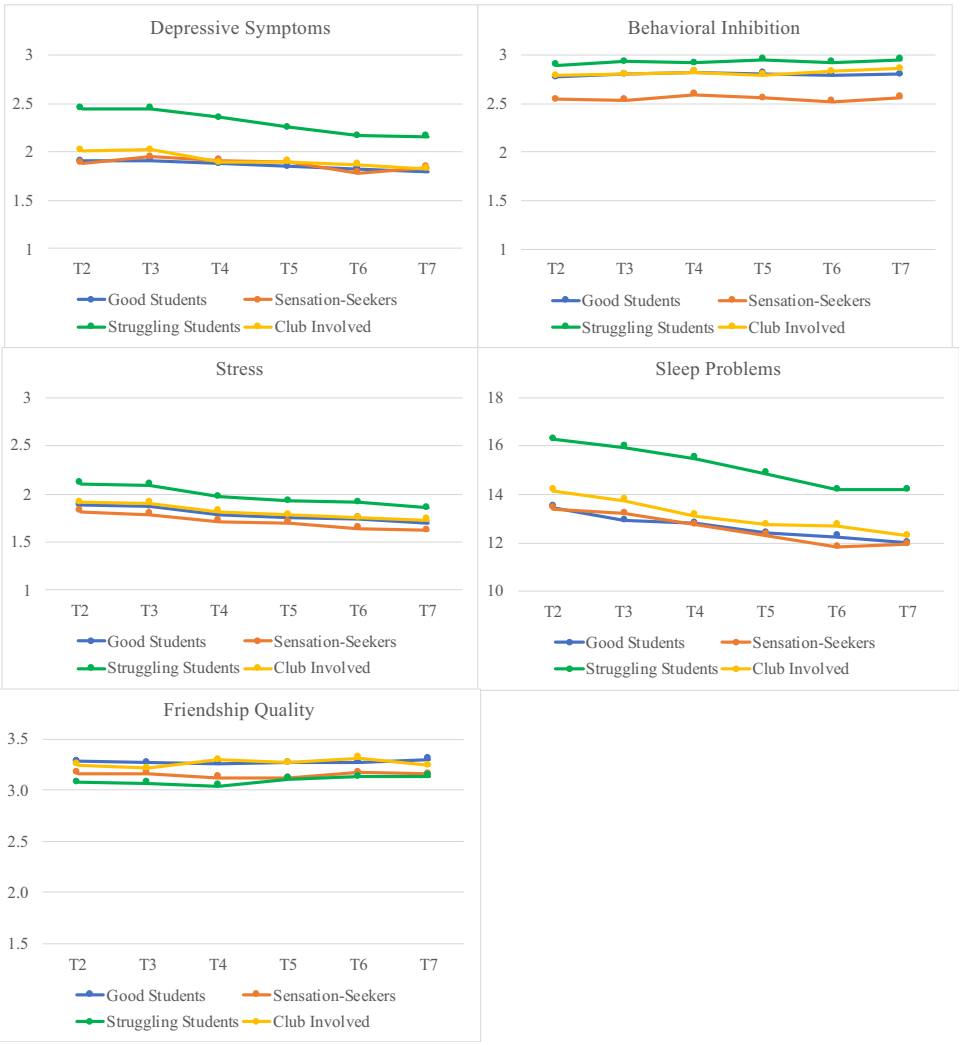

Fig. 3 The latent growth trajectories for depressive symptoms, behavioral inhibition, stress, sleep problems, and general friendship quality across the four groups. T = year of assessment

Table 6 Means and standard deviations for job characteristics by group, measured in Year 7

Variables	Good students	Sensation-seekers	Struggling students	Club involved
Status in Year 7 (Crosstab Analysis):				
Graduate/professional student	15.1%$_a$	5.2%$_b$	6.0%$_{a,b}$	6.2%$_{a,b}$
Undergraduate student	2.0%$_a$	1.1%$_a$	0.7%$_a$	0.0%$_a$
Employed	72.9%$_a$	84.8%$_a$	86.5%$_a$	85.4%$_a$
Not employed	10.0%$_a$	8.9%$_a$	6.7%$_a$	8.5%$_a$
For employed students only (MANOVA Analysis):				
Part-time vs. full-time job	1.749 (0.369)$_a$	1.870 (0.225)$_a$	1.754 (0.330)$_a$	1.712 (0.361)$_a$
Income	6.013 (1.409)$_a$	6.008 (1.263)$_{a,b}$	5.567 (1.313)$_b$	5.902 (1.391)$_{a,b}$
Job matches qualifications	1.795 (0.331)$_a$	1.679 (0.311)$_b$	1.650 (0.352)$_b$	1.834 (0.273)$_a$
Feel competent at job	6.025 (0.796)$_a$	5.971 (0.867)$_a$	5.826 (0.915)$_b$	5.874 (0.890)$_{a,b}$
Good relationships at job	5.764 (0.892)$_a$	5. 665 (0.813)$_a$	5.495 (1.026)$_b$	5.707 (0.936)$_{a,b}$
Autonomy at job	5.352 (0.918)$_a$	5.167 (0.902)$_a$	4.911 (1.077)$_b$	5.155 (1.092)$_{a,b}$

Means within the same row that share subscripts are not significantly different. Part-time job was coded as 1 and full-time job as 2 Responses to "Job matches qualifications" question were coded as no = 1 and yes = 2

There were two themes that arose out of the qualitative responses to both what participants regretted about their time in university and what they thought hindered their motivation to do well. Overall, there was consistency in the important themes across the groups. For example, a sizeable minority of all four groups identified that they regretted not engaging in more social activities, volunteering, and extra-curricular activities while in university, as well as not focusing more

on academics. Descriptively, the Sensation-Seeking Group was less likely than the other Groups to mention that they regretted not engaging in more social activities, volunteering, and extra-curricular activities (21% vs. 37%, 42%, and 38% for Good Students, Struggling Students, and Club Involved Students, respectively), but more likely than the other Groups to regret not focusing more on academics (30% vs. 13%, 15%, and 16% for Good Students, Struggling Students, and Club Involved Students, respectively).

Similarly, a sizable minority of all four groups identified using technology too much (e.g., TV, social media, etc.) and having low academic motivation as hindering their motivation to do well or succeed in university. Again, descriptively, the Sensation-Seeking Group was less likely than the other Groups to mention that their use of technology hindered their motivation to do well (18% vs. 32%, 41%, and 36% for Good Students, Struggling Students, and Club Involved Students, respectively), but more likely than the other Groups to think that having low academic motivation hindered their motivation to do well (28% vs. 12%, 13%, and 15% for Good Students, Struggling Students, and Club Involved Students, respectively).

Discussion

Although many adolescents successfully adjust to university, some experience psychosocial adjustment difficulties. Individual differences in the developmental trajectories of psychosocial adjustment (i.e., mental health and positive relationships) both during and after university is not well understood. The current study addressed this gap in the literature by examining psychosocial adjustment from late adolescence across the emerging adult age period (i.e., 19–25 years of age). Specifically, the current study examined whether distinct groups of adolescents would emerge in first-year university based on multi-domain characteristics and behaviors, whether these groups would differ in their trajectories of psychosocial adjustment during and after university, and whether these groups would differ in their rates of graduation, job attainment, and reflections on their university tenure.

Overall, there was heterogeneity within the sample, as four distinct groups of adolescents were identified in the LCA based on Year 1 characteristics and behaviors. The Good Students Group was distinguished from the other groups by having higher academic engagement (including grades, goals, time management, etc.) and fewer problematic behaviors (e.g., low substance use, earlier bedtimes). The Sensation-Seeking Group had lower academic engagement, higher problematic behaviors (substance use, later bedtimes), but the lowest psychological adjustment difficulties. Thus, this group did not appear to be stressed in first-year university. In contrast, the Struggling Students Group was distinguished by significantly less positive scores than the other Groups across most domains, and they were the only group to report poor psychosocial adjustment. The Club Involved Group was distinguished primarily by its very high club involvement. Thus, adolescents in the first year of university present with unique challenges and interests.

The second research question addressed whether there were group differences in psychosocial adjustment trajectories during and after university. Overall, the Sensation-Seeking Group showed similar psychosocial adjustment trajectories to both the Good Students and Club Involved Groups. Despite their lower academic performance in first year, the Sensation-Seeking Group reported positive adjustment in other areas in first year, such as having positive relationships with friends, more social ties, and low anxiety. On the other hand, they engaged in more substance use than their peers in first year, suggesting that overall they were prioritizing social experiences over academic experiences and likely continuing to do so throughout their university tenure. In fact, after university a large number of the participants in this group (30%) indicated regret that they had lacked academic motivation and did not spend more time on academic activities during university.

Of concern, the trajectory for the Struggling Students Group continued to show significantly poorer psychosocial adjustment than the other groups. Even though their psychosocial adjustment trajectories improved over time, so did the trajectories of the other groups. In other words, the Struggling Students Group maintained their significantly poorer psychosocial adjustment than the other groups from Years 1 to 7. Thus, the Struggling Students are an important group to target for academic and psychosocial adjustment support.

An analysis of whether the four groups differed in their graduation rate and job characteristics also was conducted. While the Sensation-Seeking Group did not appear to have any psychosocial adjustment difficulties during or after university, they were more likely than the Good Students and Club Involved Groups to drop out of university and feel that their job in Year 7 did not match their qualifications. Again, these findings point to the potential problem of prioritizing social engagement over academic achievement. Despite their positive experience with the social aspects of university, these participants later recognized that they did not pursue future-oriented goals, namely, to obtain a degree and full-time job within their field of interest.

The Struggling Students continued to report difficulties in terms of post-university outcomes. They were more likely than the Good Students and Club Involved Groups to drop out of university, to feel that their job in Year 7 did not match their qualifications, and to report significantly lower income than the Good Students Group and less positive

scores on their job characteristics than their peers. These findings reinforce the importance of identifying Struggling Students early in their education. Intervening early may help them adapt to their environment, perform well, and obtain a satisfying job. This is important, as job satisfaction is an important predictor of mental health and well-being during adulthood (Bowling et al. 2010). One such intervention could be courses or workshops in the first year of university focused on developing psychosocial competencies. Ando (2011) found that a course targeting adjustment and psychosocial distress significantly reduced students' anxiety and improved their social self-efficacy compared to students who attended a course on another topic. Another brief intervention program used videos of senior students discussing their experiences in university to teach first-year students what difficulties or failures they might encounter and ways in which they could manage or prevent those failures (Van Overwalle and De Metsenaere (1990)). In comparison to a control group which did not participate, the intervention program was associated with a higher number of students passing their first-year exams (see also Stephens et al. 2014).

In contrast to the Struggling Students Group, the Good Students Group consistently did well across all factors considered during and after university. Good Students were more likely to pursue graduate/professional school, had higher paying jobs, and reported having a job in their chosen field. Additionally, they were more likely to think they were competent, had good relationships, and had more autonomy at their job compared to the Struggling Students Group. Thus, well-adjusted students perform better within the university environment, but also have more positive outcomes when they leave.

Interestingly, a sizable group of participants from all groups mentioned that their use of technology hindered their motivation to do well in university. Reliance on technology in the classroom has become standard in education (Weaver and Nilson 2005). When not necessary for accessibility purposes, however, technology provides constant access to distractions (e.g., social media and streaming services). In fact, Wood et al. (2012) found that when university students were randomly assigned to various technology-use vs. no technology-use (e.g., using pencil and paper) conditions while receiving the same lecture, the no technology condition outperformed the technology-use condition on a test of the lecture material. Thus, the participants in this study without accessibility needs may rightfully have acknowledged that their technology use hindered their success in university.

Additionally, participants commonly mentioned that they regretted not engaging in more social activities, volunteering, and extracurricular activities during university. These experiences are an important aspect of learning. The classroom provides theoretical knowledge but advancing beyond the classroom helps students learn new skills, interact with different people, and build social connections that could help them get a job (Spera et al. 2013). In fact, a recent study by Guilmette et al. (2019) found that extracurricular involvement that required weekly attendance and provided regular performance feedback was associated with university students' tendency to persist regardless of obstacles, and in turn, with perceived academic success. Adolescents should be made aware early on in high school and first-year university that these experiences are vital for their education.

An important application of the current study is that interventions to improve academic performance, psychosocial adjustment, and retention should be targeted based on students' needs. In particular, it is vital to identify students who struggle across multiple domains to try to address these issues early in their education. Ensuring that struggling students have access to mental health services and academic support in high school and first-year university may help them close the adjustment gap and attain more positive outcomes.

Recently, there has been a focus on university students' mental health by the media, governments, and researchers (e.g., recent attention to suicides; Mancini and Roumeliotis 2019; Sivertsen et al. 2019). The current study found that for the majority of the student population, psychosocial adjustment, including mental health difficulties, was not a problem. In fact, this problem was only relevant for one group (24% of the sample), although this percentage may be higher for universities with a greater proportion of students from systematically disadvantaged groups who receive limited support (lower SES, minorities, disabilities, etc.). Regardless, universities may use their resources more successfully if they create targeted programs for the specific students that require additional help. For example, the current study found that the Struggling Students Group had lower parental education, lower grades in high school, and took fewer university-preparatory classes, indicating that they entered university less prepared academically. It is important to identify these adolescents early on to ensure interventions are accessible and used by those that need them. For universities, one way to do so would be to target adolescents who enter university with lower admitting averages.

Targeting all adolescents in first-year university with low admitting averages, however, may not be the most efficient approach, given that the Sensation-Seeking Group also entered university with lower grades. Despite their poorer academic performance, this group reported low levels of psychosocial difficulties. These adolescents may need less support given that they do not report adjustment difficulties and ultimately end up reporting that they are doing well in their jobs. However, they are more likely to drop out of

university and regret their lack of academic motivation. Given their lack of motivation, adolescents in this category might benefit from taking a gap year (taking a year off between high school and university) to help them solidify their academic goals prior to entering university. Taking a gap year is associated with higher academic motivation (Martin 2010) and academic achievement in university (Martin et al. 2013) particularly for high school students who have lower grades and are unsure of their future goals (Rose Birch and Miller 2007). In addition, adolescents in the Sensation-Seeking Group might benefit from getting more involved in structured extra-curricular activities during university (e.g., through volunteering in research labs, participating in clubs) to help identify a desired career path. They also might benefit from early assistance on how to balance the academic and social aspects of first year university.

It is important to acknowledge the limitations of the current study. First, although as many potential influencing variables as possible were included in the study, it is likely that there are important variables that were missed. For example, first-generation students and students with learning disabilities may face unique challenges in the university context that were not included in the analyses (Cawthon and Cole 2010). Future research would benefit from understanding how academic and psychosocial adjustment, as well as retention and job attainment, differ for these various groups. Second, the substance use questions specified a time frame of the past year. Thus, participants' substance use in the first year of university could have captured participants' use prior to the start of the university. Third, the current study may be limited by involving a sample of students from a single university. The medium-sized, public university context may have different challenges and benefits than other institutions; however, all universities have similar goals and structures, and thus it is unlikely that the results of this study would be dramatically different if conducted elsewhere.

Despite the above limitations, this study used rigorous methods to identify distinct groups of adolescents in first-year university. Psychosocial adjustment was assessed for seven years, including both during and after university. This is the first study to examine these variables for the entirety of the adolescents' undergraduate degree and beyond, thus including the entire emerging adult period. As a result, the longitudinal analysis provides a more accurate investigation of student subgroups and their psychosocial outcomes. By extending the assessment period to include outcomes after university, including graduation rates, employment, and student reflections of their university tenure, an investigation of which subgroups of adolescents in first-year university had persistent problems with psychosocial adjustment over time could be included.

Conclusion

Research on psychosocial adjustment among university students has tended to focus on one time point or on short-term transitions. Thus, the long-term adjustment outcomes for adolescents who struggle in first-year university remain unexplored. The current study addressed this limitation by investigating group differences in adolescents' psychosocial adjustment both during and after university, and by assessing an extensive multi-domain set of student characteristics and behaviors. Four distinct groups of adolescents emerged in the first year of university, namely a Good Students Group, a Sensation-Seeking Group, a Struggling Students Group, and a Club Involved Group. By measuring group differences in psychosocial adjustment during and after university, analyses could assess whether any difficulties persisted throughout emerging adulthood. Of particular importance, the Struggling Students Group struggled the most, academically and psychosocially, both during and after university. Considering that their difficulties persisted beyond university, this study highlights that this group needs the most support to foster more positive outcomes. Additionally, consideration should be given to the Sensation-Seeking Group, as they reported a lack of academic motivation and an increased risk of dropping out of university. At the same time, they may be more difficult to target given their low levels of psychosocial difficulties. Providing assistance on how to balance academic and social activities in university might be helpful for this group. Another way to alleviate their lack of academic motivation may be to encourage these adolescents to take a gap year after high school and develop a better idea of what they want to get out of university. Overall, the findings from this study should discourage a 'one-size fits all' method for improving adjustment outcomes over time.

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Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethical Approval This study has ethics approval from Brock University (REB 09-118 from 2009 to 2015, 16-324 from 2016 to present).

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