

Running Head: HAPPY STUDENTS' ACADEMIC SUCCESS

Tracking Affect and Academic Success across University:

Happy Students Benefit from Bouts of Negative Mood

Erin T. Barker

Department of Psychology, Concordia University, Montreal, Quebec Canada

Andrea L. Howard

Department of Psychology, Carleton University, Ottawa, Ontario, Canada

Nancy L. Galambos

Department of Psychology, University of Alberta, Edmonton, Alberta, Canada

Carsten Wrosch

Department of Psychology, Concordia University, Montreal, Quebec Canada

Accepted for publication, *Developmental Psychology*, August 2016

Author Contributions

All authors contributed to the development of the study concept. Study design and data collection were the responsibility of N.L. Galambos, A.L. Howard, and E.T. Barker. E.T. Barker drafted the Introduction and Discussion sections. A.L. Howard performed the data analysis and drafted the Methods and Results sections. All co-authors provided critical revisions and approved the final version of the manuscript for submission.

This is a word file of an unedited manuscript that has been accepted for publication in *Developmental Psychology*. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content.

HAPPY STUDENTS' ACADEMIC SUCCESS

Abstract

We examined how positive and negative affect covary within individuals over time and how patterns of association between affective traits and states relate to academic success across four years of university. Participants were 187 full-time first-year students at a large Canadian university who completed questionnaires about recent affective experiences in six waves across 4 years. Grade point average for each year of study was provided by the Registrar's office. Our analysis identified an adaptive pattern characterized by the maintenance of high positive affect ("chronic happiness") *and* the co-occurrence of time-limited bouts of negative affect. Our results are consistent with findings showing productive consequences of experiencing positive and negative affect in tandem and the development of emotion regulation capacity across the transition to adulthood.

Keywords: *affect; academic success; university students; longitudinal; emotion regulation*

HAPPY STUDENTS' ACADEMIC SUCCESS

Tracking Affect and Academic Success across University: Happy Students Benefit from Bouts of Negative Mood

In their developmental account, Diamond and Aspinwall (2003) define emotion regulation *capacity* as the ability to *flexibly coactivate, coordinate, and direct* – i.e., manage – emotional states towards goals that arise within particular developmental contexts. In the current study we examine how positive and negative affective traits and states interact and predict academic success during the transition to adulthood. Patterns or combinations of positive and negative affect that are linked to academic success should reflect adaptive emotion regulation capacity.

In the developmental literature most research on emotion regulation capacity emphasizes either early or late periods of the life course (Diamond & Aspinwall, 2003). For example, across infancy and early childhood, research highlights the role of parents in supporting the development of adaptive emotion regulation skills that lead to later prosocial outcomes (e.g., Spinrad et al., 2006). At the other end of the life course, research has focused on the implications of age-related changes in emotional experience (e.g., emotional reactivity or functions) for social relationships in midlife and old age (e.g., Charles, Piazza, Luong, & Almeida, 2009; Kunzmann, Kappes, & Wrosch, 2014). Although there is a large literature on the regulation of negative emotions and particularly depressive symptoms during adolescence and the transition to adulthood (e.g., Burwell & Shirk, 2007; Silk, Steinberg, & Morris, 2003; Zimmermann, & Iwanski, 2014), fewer studies have examined emotion regulation capacity more generally across this period.

The transition to adulthood places high demands on individual emotion regulation capacity; adolescents are required to move from a position of dependence on one's family of origin to a position of self-reliance and adult forms of interdependence (Carstensen, Isaacowitz & Charles, 1999; Tanner, 2006). Increased cognitive control and associated maturation of the prefrontal cortex between adolescence and the mid-20s support adaptive emotion regulation, and emotional well-being tends to improve (Riediger & Klipker, 2014). For example, on average,

HAPPY STUDENTS' ACADEMIC SUCCESS

positive affect increases (Ross & Mirowsky, 2008) and negative affect decreases (Galambos, Barker, & Krahn, 2006) from the late teens into the 20s. Likewise, normative patterns of personality development reflect gains in emotion regulation capacity. These include increases in conscientiousness, agreeableness, and emotional intelligence, and decreases in neuroticism (Parker, Saklofske, Wood, Eastabrook, & Taylor, 2005; Soto, John, Gosling, & Potter, 2011).

Many adolescents in Western countries initiate the transition to adulthood at college or university (Bureau of Labor Statistics, 2013; Galarneau, Marisette, & Usalca, 2013), which usually involves goals for academic achievement. Academic success (Parker, Summerfeldt, Hogan, & Majeski, 2004) and student retention (Parker, Hogan, Eastabrook, Oke, & Wood, 2006) are predicted by improvements in university students' capacity to manage their emotional experiences. Furthermore, academic success is enhanced in students who are capable of experiencing positive emotional states related to academic achievement goals (positive academic emotions, Pekrun, Elliot, & Maier, 2009), and related to student engagement (e.g., vigor and dedication, Schaufeli, Martínez, Pinto, Salanova, & Bakker, 2002). Indeed, when positive affect is actively valenced and high in approach motivation (e.g., energetic), attentional resources narrow in on goal-relevant information, which can contribute to success more generally (Harmon-Jones, Gable, & Price, 2013).

Positive emotions also contribute to successful outcomes by broadening and building behavioral and psychological resources (e.g., coping resources; Fredrickson, 2001). In the university context, positive emotions contribute to gains in academic self-efficacy (Ouweneel, Le Blanc, & Schaufeli, 2011) and are associated with perceptions of high control (Goetz, Frenzel, Stoeger, & Hall, 2010), both of which have a strong relation to GPA (see meta analysis by Richardson, Abraham, & Bond, 2012). Thus, students who are able to manage their emotions to maintain high levels of positive affect during university may be building broad psychological resources like agency and self-efficacy along the way, while at the same time focusing those resources on specific tasks that will ultimately lead to academic success.

HAPPY STUDENTS' ACADEMIC SUCCESS

That said, positive emotions alone may not tell the whole story of academic success. Although the chronic experience of negative emotions (e.g., depressive symptoms), if paired with low levels of positive emotions, may contribute to low academic performance (Eisenberg, Gollust, Golberstein, & Hefner, 2007; Wintre & Yaffe, 2000), negative affect that is elicited in response to specific problems may also alter cognitive scope (Harmon-Jones et al., 2013) and build regulatory capacity (Wrosch & Miller, 2009). For example, among adolescent girls, periods of negative affect preceded enhanced abilities to regulate goals (e.g., disengagement from unattainable goals), which in turn predicted improvements in affect (Wrosch & Miller, 2009). Alternatively, negative affect may likewise motivate psychological and behavioral change in service of academic success if the experience of negative emotions indicates insufficient progress with a particular goal and triggers a behavioural response aimed at overcoming goal-related problems (Carver & Scheier, 1990; Frijda, 1988; Nesse, 2000).

In support of these arguments, results from a daily diary study showed that university students who regularly experienced positive affect and occasionally experienced negative affect across one semester achieved the greatest academic success (Oishi, Diener, & Lucas, 2007). Similarly, university students with learner profiles that included high positive affect and moderate negative affect achieved the greatest academic success (Shell & Husman, 2008; for empirical evidence with regards to other life outcomes, see also Diener & Seligman, 2002). These results reflect short-term associations between affective experiences and academic success and suggest that students who are able to sustain elevated levels of positive affect and experience only occasional bouts or moderate levels of negative affect may be particularly able to achieve academic success.

The Current Study

The aim of the current study was to identify and link interacting patterns of positive and negative affect to academic success during the transition to adulthood. We considered this association between long-term patterns of self-reported affect and academic success as reflecting adaptive emotion management. This novel conceptualization provides an indirect or implicit

HAPPY STUDENTS' ACADEMIC SUCCESS

examination of emotion regulation capacity and its consequences, and a robust test of the hypothesis that students who are able to maintain positive affect and elicit negative affect in certain circumstances may be particularly able to achieve academic success across the university years.

We accomplished our aim statistically by examining how different combinations of within-person reports (time-limited bouts or states) and between-person reports (individual differences or traits) of affect were associated with academic success across 4 years of university. We expected that individuals who, on average, sustained high levels of positive affect across their university years (i.e., happy students; trait-level) and who also experienced only average levels of negative affect (trait) or time-limited bouts of elevated negative affect (state) would have the highest GPAs over time. This pattern could reflect an academically successful student who managed his or her emotions over the long term to maintain high levels of positive affect in tandem with either average levels or time-limited increases in negative affect. This profile is consistent with findings showing productive consequences of experiencing elevated positive and negative affect in tandem.

Second, we expected that students who sustained high levels of negative affect across their university years and who also reported either low trait or state positive affect would have the lowest GPAs (i.e., unhappy students). This pattern may reflect an academically unsuccessful student who managed his or her emotions over the long term to maintain high levels of negative affect along with low levels of positive affect. This profile is consistent with the association between depressive experiences and low GPA (e.g., Eisenberg et al., 2007 Wintre & Yaffe, 2000).

Method

Participants

Participants were 187 full-time first-year students at a large Canadian university taking part in *Making the Transition II*, a web-based study of health-related behaviors and ongoing academic performance. Sixty percent of students were women ($n = 113$), and students' ages

HAPPY STUDENTS' ACADEMIC SUCCESS

ranged from 17.5 to 19.8 years ($M=18.4$, $SD=.44$). Based on self-reports, the ethnic distribution was 72% White, 16% Asian/South Asian, 5% mixed ethnicity, and 5% another visible minority (2 students declined to report). Students lived at home with parents (53%), in campus residence (28%), in an apartment alone or with roommates (13%), or with non-parent relatives (5%). Most lived in two-parent households while growing up (86%), and the majority of students' mothers (73%) and fathers (75%) had completed two-year college or four-year university degrees. Given these characteristics, this sample is representative of the university from which it was drawn and is not substantially different from other large Canadian universities. University enrolment in Canada is strongly associated with having lived in two-parent families in high school and with parents' postsecondary education. Furthermore, the percentage of students in the current sample enrolled in various university faculties (i.e., colleges, such as Arts or Science) closely matched the actual faculty distribution of first-year students at the university.

Procedures

The study was approved by the university research ethics review committee in accordance with the Government of Canada's Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans. In Fall 2005, participants were recruited from compulsory first-year classes across campus. Research assistants described the study to students who were present on the day of their recruitment visit and students interested in participating in the study provided contact information to the research team. Students were then contacted by email and invited to complete an initial paper-and-pencil questionnaire in groups at the beginning of the semester (baseline: September or October); 198 students attended, close to our goal of 200 participants. Participants were then invited to complete web-based questionnaires each month across their first year (through April 2006); they were invited to participate again near the end of their second (March 2007; paper-and-pencil questionnaire), third (February 2008; web-based questionnaire), and fourth (March 2009; web-based questionnaire) years of university. Data for the current study are taken from six waves: baseline, December 2005, April 2006, and the 2007, 2008, and 2009 surveys.

HAPPY STUDENTS' ACADEMIC SUCCESS

Although changes in survey mode can result in changes in response rates and data quality (e.g., via social desirability), these concerns are greater when survey delivery changes from an aural procedure (e.g., telephone or in-person interview) to a visual procedure (e.g., paper-and-pencil or web-based; Dillman et al., 2009). Results from two comparisons of data quality between web-based and paper-and-pencil survey modes found that personality inventories were equivalent in several respects across modes (e.g., measurement invariance, mean differences; Bjornsdottir et al., 2014; Chuah, Drasgow, & Roberts, 2006). Furthermore, a recent meta-analysis showed that the influence of social desirability was equivalent between paper-and-pencil and web-based survey administration (Gnambs & Kaspar, 2016). With regards to the measure of affect used in the current study, the Positive and Negative Affect Schedule (Watson, Clark, & Tellegen, 1988), the subscales showed high and consistent internal reliability across waves (reported below). Additionally, principal components analysis of the PANAS at each wave of measurement revealed the same two-factor structure corresponding to the positive affect and negative affect subscales. Correlations between the factors across waves were similar in direction and magnitude, ranging from $-.17$ to $-.30$. Thus, the changes in survey mode across waves in the current study likely had a minimal impact on the validity of our measures of positive and negative affect.

Eleven students had missing data on study predictor variables at every wave and were dropped from the analyses, reducing our final analytic sample to $n=187$. In the final sample, study retention was good, with 60% ($n=112$) of students participating at four, five, or all six waves of assessment. Twenty-seven percent participated at three waves ($n=51$), and 13% participated once or twice ($n=24$). We used full-information maximum likelihood estimation to perform our analyses. This procedure computes an individual likelihood function for each participant based on his/her available data, provided that complete predictor data are present (positive and negative affect) for each wave of available outcome data (GPA). Importantly, cases contributing partial outcome data are retained and leveraged to improve the accuracy of the model estimates.

HAPPY STUDENTS' ACADEMIC SUCCESS

Measures

Positive and negative affect were measured with the Positive and Negative Affect Schedule in the December 2005, April 2006, and the 2007, 2008, and 2009 surveys (Watson, Clark, & Tellegen, 1988). The response time frame was adapted to assess students' affect over a two-week period. Participants were asked: "Over the last 14 days, on how many days did you feel...?" followed by 10 items assessing positive affect (e.g., interested, proud) and 10 items assessing negative affect (e.g., distressed, hostile). Two-week retrospective reports of emotional experience corresponded well with actual daily diary reports of emotional experience collected across the same two-week period (Brown, Williams, Barker, & Galambos, 2007). Across waves of assessment, Cronbach's coefficient alpha estimates ranged from .92 to .95 for positive affect and from .87 to .93 for negative affect. On average, students reported positive affect on 5.66 ($SD=2.93$) to 6.31 ($SD=3.06$) days out of 14 days across waves, with correlations ranging from .39 to .82. On average, students reported negative affect on 2.94 ($SD=2.66$) to 3.71 ($SD=2.41$) days out of 14 days across waves, with correlations ranging from .44 to .79. For positive and negative affect, correlations between repeated measures were generally strongest for adjacent assessments and weakest for assessments spaced further apart.

Academic performance was measured with students' official grade point averages (GPA), supplied by the Registrar's office. GPAs were on a four-point scale, ranging from 0 (*letter grade of F*) to 4 (*letter grade of A or A+*). Baseline GPA was based on students' admission averages ($M=3.52$, $SD=.36$). GPAs for the Fall and Winter semesters of the first year and Winter semesters of second through fourth years were calculated for each student as the average of grades in all classes taken each semester, weighted by course credit value. GPAs ranged from 2.84 ($SD=.76$) in the Fall semester of first year to 3.29 ($SD=.55$) in the Winter semester of fourth year.

Analysis Strategy

Analyses for the current study were performed using multilevel linear modeling in SAS PROC MIXED. We modeled change over time in students' GPAs as a cubic trend, following

HAPPY STUDENTS' ACADEMIC SUCCESS

preliminary tests to establish the optimal function of change in the outcome variable. Positive and negative affect were included as person-mean centered time-varying covariates (states), and the means of these variables across all waves of assessment were included as person-level covariates (traits). Time-varying effects of positive and negative affect represent students' affective states or "bouts" of affect. These effects indicate, for a given time of assessment, whether reporting higher or lower affect than one's own average is associated with GPA that semester. Person-level effects of positive and negative affect represent students' overall or average levels of positive affect and negative affect (i.e., traits). These effects indicate that students who feel more positive affect (happy students) or negative affect (unhappy students) compared to other students tend to achieve higher or lower GPAs across the study period. Repeated measures of positive and negative affect are thus separated into distinct and uncorrelated within-person (bouts or affective states) and between-person (affective trait) components¹ (Curran & Bauer, 2011; Hoffman & Stawski, 2009).

We built our models in stages. First, we tested a model containing time trends and time-varying (state) and person-level (trait) measures of positive and negative affect. Second, we added interactions between positive and negative affect and linear time to assess whether associations between affect and GPA became stronger or weaker over time (interactions between affect and polynomials of time were considered, but none were significant). Third, we added interactions between positive and negative affect (e.g., time-varying negative affect x person-level positive affect) to assess whether specific combinations of jointly-experienced levels of positive and negative affect predicted changes in GPA.

Results

Table 1 shows the results of our multilevel model predicting students' GPAs over time from time-varying positive and negative affect (states; *PA*, *NA*), average levels of positive and negative affect across all years (traits; *Mean PA*, *Mean NA*), and their interactions (e.g., *Mean PA*

¹ Person-mean centering is a valid strategy for separating within- and between-person components of a time-varying covariate, provided the TVC itself does not change over time (the within-person effect of a TVC is underestimated if it exhibits a time trend). Negative affect showed modest change over time, thus we applied Curran and Bauer's (2011) *detrending* procedure to remove the influence of time.

HAPPY STUDENTS' ACADEMIC SUCCESS

$\times NA$). Results show that students' GPAs declined through the first year of university, rebounded by the end of second year, and stabilized in third and fourth years. This cubic trend is shown in Table 1 as effects for linear, quadratic, and cubic rates of change in GPA over time ($Time$, $Time^2$, and $Time^3$). Table 1 also shows a main effect of average negative affect. Students who reported higher levels of negative affect on average over all years generally achieved lower GPAs ($\gamma = -.043$, $95\% CI = -.079$ to $-.006$). There were no effects of time-varying positive affect. Significant effects of time-varying negative affect and average positive affect manifested through interactions, as described below.

Table 1 and Figure 1 show a significant effect of average positive affect on changes in GPA over time ($Mean PA \times Time$). Students who reported higher positive affect on average across all semesters began their studies with slightly lower GPAs, but increased their GPAs at a faster rate compared to students with lower average positive affect ($\gamma = .018$, $95\% CI = .006$ to $.031$). Significant differences favoring students with higher average positive affect ("happier" students) begin in 3rd year, and by the end of fourth year, the difference between the GPAs of students reporting higher versus lower average positive affect is about equal to achieving a GPA of B+ versus B ($simple\ effect = .263$, $SE = .098$, $p = .008$).

Table 1 and Figure 2 further show a significant interaction effect, indicating that the association between average positive affect and GPA also depends on the extent to which students experienced bouts of negative affect during a given semester ($Mean PA \times NA$). For students reporting higher positive affect on average, GPAs were higher during times of heightened negative affect and lower during times of reduced negative affect.

Follow-up analyses of the simple slopes (see Preacher, Curran, & Bauer, 2006) showed that this effect only occurs for students whose average positive affect is at least 2/3 of a standard deviation higher than the grand mean—specifically, only "happy" students' GPAs varied during times of heightened or reduced negative affect. At or above this threshold, happy students had better grades during semesters in which they experienced bouts of heightened negative affect. For students who report average positive affect below this threshold, bouts of heightened or

HAPPY STUDENTS' ACADEMIC SUCCESS

reduced negative affect were unrelated to GPA in the same semester. In addition, happy students' GPAs were lower during semesters in which they experienced bouts of reduced negative affect.

Follow-up analyses indicated that happier students' GPAs were significantly higher than less happy students' GPAs (1 *SD* above and below the mean of average positive affect) at times when they experience bouts of negative affect at least half a standard deviation above their own average (*simple effect* = .105, *SE* = .047, *p* = .026; at least 1.25 additional days of negative affect in a 2-week period). Further, negative affect exceeding a person's own average by this amount or greater should have occurred 30.8% of the time—about 5 weeks per 16-week semester, or about 2.5 semesters over the course of a four-year university career. By contrast, happier students' GPAs were significantly lower than less happy students' GPAs only when negative affect was at least 1.5 standard deviations below their own average (*simple effect* = -.161, *SE* = .079, *p* = .042). Negative affect at these low levels should have occurred 6.7% of the time—about 1 week per 16-week semester, or about half a semester over the course of a four-year university career.

We included several covariates in our model that are not shown in Table 1. Weighted effects codes for students' biological sex (women, men), parent education (whether or not students reported at least one university-educated parent), and ethnicity (White, Asian, other ethnicity) showed no associations with GPA. We also included measures of the numbers of courses taken each semester. There were no time-varying effects of number of courses (i.e., students' GPAs did not vary in semesters when they took more courses than usual), but students who took more courses on average reported slightly higher GPAs on average ($\gamma = .132$, 95% *CI* = .001 to .262)

Discussion

The aim of the current study was to identify patterns of emotional experience indicative of adaptive emotion regulation capacity with respect to achieving academic success during the transition to adulthood. We tested the hypothesis that students who are able to manage their emotions to experience both general positive affect and occasional negative affect in tandem

HAPPY STUDENTS' ACADEMIC SUCCESS

over the long term, across their university years, may be particularly able to achieve the greatest levels of academic success.

First, we found that students in the current sample whose pattern of emotional experience was characterized by high average positive affect across their university years earned the highest GPAs by the end of the 4-year period. That is, generally happy students showed the greatest improvements in academic success over time. This finding supports Lyubomirsky, King, and Diener's (2005) conclusion that "chronic happiness" can be cast as a psychological strength that supports goal-oriented success. That said, two other findings qualify our "happy student" finding. First, this effect was not evident in the first year; rather it emerged later across the four-year period. This finding corresponds with increases in emotion regulation capacity afforded by maturation of the prefrontal cortex and related to gains in cognitive control, emotional intelligence, and related personality development (Parker et al., 2005; Riediger & Klipker, 2014; Soto et al., 2011).

Second, the association of high average positive affect with high GPA was further qualified by the within-person effect of negative affect. Particularly happy students (those 2/3rds of a standard deviation or higher on average positive affect) experienced the greatest academic success (i.e., highest GPA) in semesters when within-person negative affect was elevated. In fact, happy students benefited *only* when within-person negative affect was high. In semesters when negative affect was much lower than average, happy students had lower GPAs than students with lower average levels of positive affect. For happy students, time-limited periods of elevated negative affect may reflect stressful, but productive periods of investment in academic pursuits, whereas time-limited periods of relative low negative affect may reflect coasting (Carver & Scheier, 1990).

More generally, these results suggest that happy students' academic success could be derived from their ability to adaptively manage motivational benefits of time-limited periods – or *bouts* – of heightened negative affect. This finding supports the view that negative affect is a necessary component of effective self-regulation (Carver & Scheier, 1990; Diener & Seligman,

HAPPY STUDENTS' ACADEMIC SUCCESS

2002; Harmon-Jones et al., 2013; Heckhausen et al., 2010). We also found that “unhappy students” – those with high average negative affect across four years of university – earned the lowest GPAs across that period. These students did not appear to adaptively manage either negative or positive affect, a profile consistent with depressive disorders, symptoms of which are associated with lower GPA (Eisenberg et al., 2007; Wintre & Yaffe, 2000). In sum, our analysis of long-term temporal patterns of state and trait positive and negative affect identifies a pattern indicative of adaptive emotion regulation capacity characterized by the long-term achievement of “chronic happiness” *and* time-limited bouts of negative affect.

The current study has several methodological strengths. The prospective longitudinal design adds a novel perspective on emotion regulation capacity by treating repeated measures of affective states as a reflection of long-term management of emotions and relating these patterns to a developmentally salient goal as the outcome. This approach provides an indirect or implicit evaluation of emotion regulation capacity. Further, using repeated measurement of emotional states collected over long periods of time avoids pitfalls associated with common method variance and collecting general ratings of typical or usual ways of regulating emotions and subjective assessments of current or past success. Often, strategies for measuring the components of emotion regulation capacity confound emotional experience and regulatory predictors with emotional competence outcomes (e.g., asking someone how they cope with negative emotions to relieve stress when they feel badly; John & Eng, 2014).

A further strength of the current study is the fact that the measure of success, GPA, was obtained directly from the university Registrar, providing an objective and official assessment of progress with a relevant developmental task. Thus, the current analysis tested an ecologically and developmentally valid model of emotional competence (Aldao, 2013; Diamond & Aspinwall, 2013). The results contribute to the literature on self-regulation across the life course, and specifically the growing literature on psychological experiences that propel average gains in well-being across the transition to adulthood, a literature that until recently has been mainly descriptive in nature (Shulman & Nurmi, 2010).

HAPPY STUDENTS' ACADEMIC SUCCESS

The main limitations of the current study were, first, that we did not measure the self-regulatory mechanisms, personality dimensions, or contextual factors that could underlie participants' emotional experiences and mediate or moderate the obtained associations between affective patterns and success (e.g., goal regulation processes, Heckhausen et al., 2010; reappraisal vs. suppression strategies, Gross & John, 2003; trait consistent affect, Tamir, Robinson, Clore, 2002). For example, circumstances unrelated to academic development may have elicited the affective states reported at each wave and could account for the associations between affect and GPA. Certainly, across the transition to adulthood, there are many challenges to navigate that will elicit different emotional responses. Although our results suggest that the association between academic success and the adaptive pattern of emotional experience identified in the current study may reflect an ability to manage one's emotions such that individuals may be able derive motivational benefits from the co-occurrence of positive and negative affect, we were not able to test these specific pathways.

In sum, the results of the current study illustrate a promising approach for understanding the complex interplay between emotional experience and competence in the transition to adulthood. They further provide direction for future research on adaptive emotion regulation capacity in relation to other important life goals at other points in the life course. Thus, future research should 1) employ this approach with respect to other life course goals and stages; 2) explore which specific affects in which particular combinations motivate one toward or away from particular life course goals; and 3) examine the specific self-regulatory mechanisms, personality correlates, and contextual demands (e.g., specific academic challenges, relationship challenges) that mediate or moderate associations between affective states and success at different points across the life course.

References

- Aldao, A. (2013). The future of emotion regulation research capturing context. *Perspectives on Psychological Science*, 8, 155-172. doi: 10.1177/1745691612459518
- Bauer, I. M., & Baumeister, R. F. (2011). Self-regulatory strength. In K. D. Vohs & R. R. Baumeister (Eds.) *Handbook of self-regulation: Research, theory, and applications* (pp. 64-82). New York, NY: Guilford Press.
- Brown, N. R., Williams, R. L., Barker, E. T., & Galambos, N. L. (2007). Estimating frequencies of emotions and actions: A web-based diary study. *Applied Cognitive Psychology*, 21, 259-276. doi: 10.1002/acp.1303
- Bureau of Labor Statistics U.S. Department of Labor (April 22, 2014). College Enrollment and Work Activity of 2013 High School Graduates. Economic News Release.
<http://www.bls.gov/news.release/hsgec.nr0.htm>
- Burwell, R. A., & Shirk, S. R. (2007). Subtypes of rumination in adolescence: Associations between brooding, reflection, depressive symptoms, and coping. *Journal of Clinical Child and Adolescent Psychology*, 36, 56-65. DOI:10.1080/15374410709336568
- Carstensen, L. L., Isaacowitz, D. M., & Charles, S. T. (1999). Taking time seriously: A theory of socioemotional selectivity. *American psychologist*, 54, 165.
<http://dx.doi.org/10.1037/0003-066X.54.3.165>
- Carver, C. S., & Scheier, M. F. (1990). Origins and functions of positive and negative affect: a control-process view. *Psychological Review*, 97, 19. doi: <http://dx.doi.org/10.1037/0033-295X.97.1.19>
- Charles, S. T., Piazza, J. R., Luong, G., & Almeida, D. M. (2009). Now you see it, now you don't: Age differences in affective reactivity to social tensions. *Psychology and Aging*, 24, 645. doi: <http://dx.doi.org/10.1037/a0016673>
- Curran, P. J., & Bauer, D. J. (2011). The disaggregation of within-person and between-person effects in longitudinal models of change. *Annual Review of Psychology*, 62, 583-619. doi: 10.1146/annurev.psych.093008.100356

HAPPY STUDENTS' ACADEMIC SUCCESS

- Diamond, L. M., & Aspinwall, L. G. (2003). Emotion regulation across the life span: An integrative perspective emphasizing self-regulation, positive affect, and dyadic processes. *Motivation and Emotion, 27*, 125-156. doi: 10.1023/A:1024521920068
- Diener, E., & Seligman, M. E. (2002). Very happy people. *Psychological Science, 13*, 81-84. doi: 10.1111/1467-9280.00415
- Eisenberg, D., Gollust, S. E., Golberstein, E., & Hefner, J. L. (2007). Prevalence and correlates of depression, anxiety, and suicidality among university students. *American Journal of Orthopsychiatry, 77*, 534-542. doi:10.1037/0002-9432.77.4.534
- Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist, 56*, 218-226. doi:10.1037/0003-066X.56.3.218
- Fredrickson, B. L. & Losada, M. F. (2005). Positive affect and the complex dynamics of human flourishing. *American Psychologist, 60*, 678-686. doi:10.1037/0003-066X.60.7.678
- Frijda, N. H. (1988). The laws of emotion. *American Psychologist, 43*(5), 349-358. doi:10.1037/0003-066X.43.5.349
- Galambos, N. L., Barker, E. T., & Krahn, H. J. (2006). Depression, self-esteem, and anger in emerging adulthood: Seven-year trajectories. *Developmental Psychology, 42*(2), 350-365. doi:10.1037/0012-1649.42.2.350
- Galarneau, D., Marisette, R., & Usalcas, J. (2013). What has changed for young people in Canada? Statistics Canada Catalogue no. 75-006-X
- Goetz, T., Frenzel, A. C., Stoeger, H., & Hall, N. C. (2010). Antecedents of everyday positive emotions: An experience sampling analysis. *Motivation and Emotion, 34*, 49-62. doi: 10.1007/s11031-009-9152-2
- Gross, J. J., & John, O. P. (2003). Individual differences in two emotion regulation processes: implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology, 85*, 348-362. doi: <http://dx.doi.org/10.1037/0022-3514.85.2.348>

HAPPY STUDENTS' ACADEMIC SUCCESS

- Harmon-Jones, E., Gable, P. A., & Price, T. F. (2013). Does negative affect always narrow and positive affect always broaden the mind? Considering the influence of motivational intensity on cognitive scope. *Current Directions in Psychological Science*, 22, 301-307. doi: 10.1177/0963721413481353
- Heckhausen, J., Wrosch, C., & Schulz, R. (2010). A motivational theory of life-span development. *Psychological Review*, 117, 32-60. doi:10.1037/a0017668
- Hoffman, L., & Stawski, R. S. (2009). Persons as contexts: Evaluating between-person and within-person effects in longitudinal analysis. *Research in Human Development*, 6, 97-120. doi:10.1080/15427600902911189
- John, O. P., & Eng, J. (2014). Three approaches to individual differences in affect regulation: Conceptualizations, measures, and findings. In J.J. Gross (Ed.) *Handbook of emotion regulation* (pp. 321-345). New York, NY: Guilford Press.
- Kunzmann, U., Kappes, C., & Wrosch, C. (2014). Emotional aging: A discrete emotion perspective. *Frontiers in Psychology*, 5, 380. doi: 10.3389/fpsyg.2014.00380
- Lyubomirsky, S., King, L., & Diener, E. (2005). The benefits of frequent positive affect: does happiness lead to success? *Psychological Bulletin*, 131, 803-855. doi: <http://dx.doi.org/10.1037/0033-2909.131.6.803>
- Nesse, R. M. (2000). Is depression an adaptation? *Archives of General Psychiatry*, 57(1), 14-20.
- Oishi, S., Diener, E., & Lucas, R. E. (2007). The optimum level of well-being: Can people be too happy. *Perspectives on Psychological Science*, 2, 346-360. doi: 10.1111/j.1745-6916.2007.00048.x
- Ouweneel, E., Le Blanc, P. M., & Schaufeli, W. B. (2011). Flourishing students: A longitudinal study on positive emotions, personal resources, and study engagement. *The Journal of Positive Psychology*, 6, 142-153. doi:10.1080/17439760.2011.558847
- Parker, J. D., Hogan, M. J., Eastabrook, J. M., Oke, A., & Wood, L. M. (2006). Emotional intelligence and student retention: Predicting the successful transition from high school to university. *Personality and Individual Differences*, 41, 1329-1336.

HAPPY STUDENTS' ACADEMIC SUCCESS

- Parker, J. D., Saklofske, D. H., Wood, L. M., Eastabrook, J. M., & Taylor, R. N. (2005). Stability and change in emotional intelligence: Exploring the transition to young adulthood. *Journal of Individual Differences, 26*, 100-106. doi: <http://dx.doi.org/10.1027/1614-0001.26.2.100>
- Parker, J. D., Summerfeldt, L. J., Hogan, M. J., & Majeski, S. A. (2004). Emotional intelligence and academic success: Examining the transition from high school to university. *Personality and individual differences, 36*, 163-172.
- Pekrun, R., Elliot, A. J., & Maier, M. A. (2009). Achievement goals and achievement emotions: Testing a model of their joint relations with academic performance. *Journal of educational Psychology, 101*, 115-135. doi: <http://dx.doi.org/10.1037/a0013383>
- Preacher, K. J., Curran, P. J., & Bauer, D. J. (2006). Computational tools for probing interactions in multiple linear regression, multilevel modeling, and latent curve analysis. *Journal of Educational and Behavioral Statistics, 31*, 437-448. doi: [10.3102/10769986031004437](https://doi.org/10.3102/10769986031004437)
- Richardson, M., Abraham, C., & Bond, R. (2012). Psychological correlates of university students' academic performance: a systematic review and meta-analysis. *Psychological Bulletin, 138*, 353-387. doi: <http://dx.doi.org/10.1037/a0026838>
- Riediger, M., & Klipker, K. (2014). Emotion regulation in adolescence. In J.J. Gross (Ed.) *Handbook of emotion regulation* (pp. 187-202). New York, NY: Guilford Press.
- Ross, C. E., & Mirowsky, J. (2008). Age and the balance of emotions. *Social Science & Medicine, 66*, 2391-2400. doi:[10.1016/j.socscimed.2008.01.048](https://doi.org/10.1016/j.socscimed.2008.01.048)
- Schaufeli, W. B., Martínez, I. M., Pinto, A. M., Salanova, M., & Bakker, A. B. (2002). Burnout and engagement in university students a cross-national study. *Journal of Cross-Cultural Psychology, 33*, 464-481. doi: [10.1177/0022022102033005003](https://doi.org/10.1177/0022022102033005003)
- Shell, D. F., & Husman, J. (2008). Control, motivation, affect, and strategic self-regulation in the college classroom: A multidimensional phenomenon. *Journal of Educational Psychology, 100*, 443-459. doi: <http://dx.doi.org/10.1037/0022-0663.100.2.443>

HAPPY STUDENTS' ACADEMIC SUCCESS

- Shulman, S., & Nurmi, J-E. (2010). Understanding emerging adulthood from a goal-setting perspective. *New Directions for Child and Adolescent Development, 130*, 1-11. doi: L 10.1002/cd.277
- Silk, J. S., Steinberg, L., & Morris, A. S. (2003). Adolescents' emotion regulation in daily life: Links to depressive symptoms and problem behavior. *Child development, 1869-1880*. doi: <http://www.jstor.org/stable/3696309>
- Soto, C. J., John, O. P., Gosling, S. D., & Potter, J. (2011). Age differences in personality traits from 10 to 65: Big Five domains and facets in a large cross-sectional sample. *Journal of personality and social psychology, 100*, 330.
- Spinrad, T. L., Eisenberg, N., Cumberland, A., Fabes, R. A., Valiente, C., Shepard, S. A., ... & Guthrie, I. K. (2006). Relation of emotion-related regulation to children's social competence: a longitudinal study. *Emotion, 6*, 498-510. doi: <http://dx.doi.org/10.1037/1528-3542.6.3.498>
- Tamir, M., Robinson, M. D., & Clore, G. L. (2002). The epistemic benefits of trait-consistent mood states: an analysis of extraversion and mood. *Journal of Personality and Social Psychology, 83*, 663-677. doi: <http://dx.doi.org/10.1037/0022-3514.83.3.663>
- Tanner, J. L. (2006). Recentering during emerging adulthood: A critical turning point in life span human development. In J.J. Arnett & J. L. Tanner (Eds.), *Emerging Adults in America: Coming of age in the 21st Century* (pp. 21-55). Washington, DC: American Psychological Association.
- Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*, 1063-1070. doi:10.1037/0022-3514.54.6.1063
- Wintre, M., & Yaffe, M. (2000). First-year students' adjustment to university life as a function of relationships with parents. *Journal of Adolescent Research, 15*(1), 9-37. doi:10.1177/0743558400151002

HAPPY STUDENTS' ACADEMIC SUCCESS

Wrosch, C., & Miller, G. E. (2009). Depressive symptoms can be useful: Self-regulatory and emotional benefits of dysphoric mood in adolescence. *Journal of Personality and Social Psychology, 96*, 1181-1190. doi: <http://dx.doi.org/10.1037/a0015172>

Zimmermann, P., & Iwanski, A. (2014). Emotion regulation from early adolescence to emerging adulthood and middle adulthood Age differences, gender differences, and emotion-specific developmental variations. *International journal of behavioral development, 38*, 182-194. doi: 10.1177/0165025413515405

HAPPY STUDENTS' ACADEMIC SUCCESS

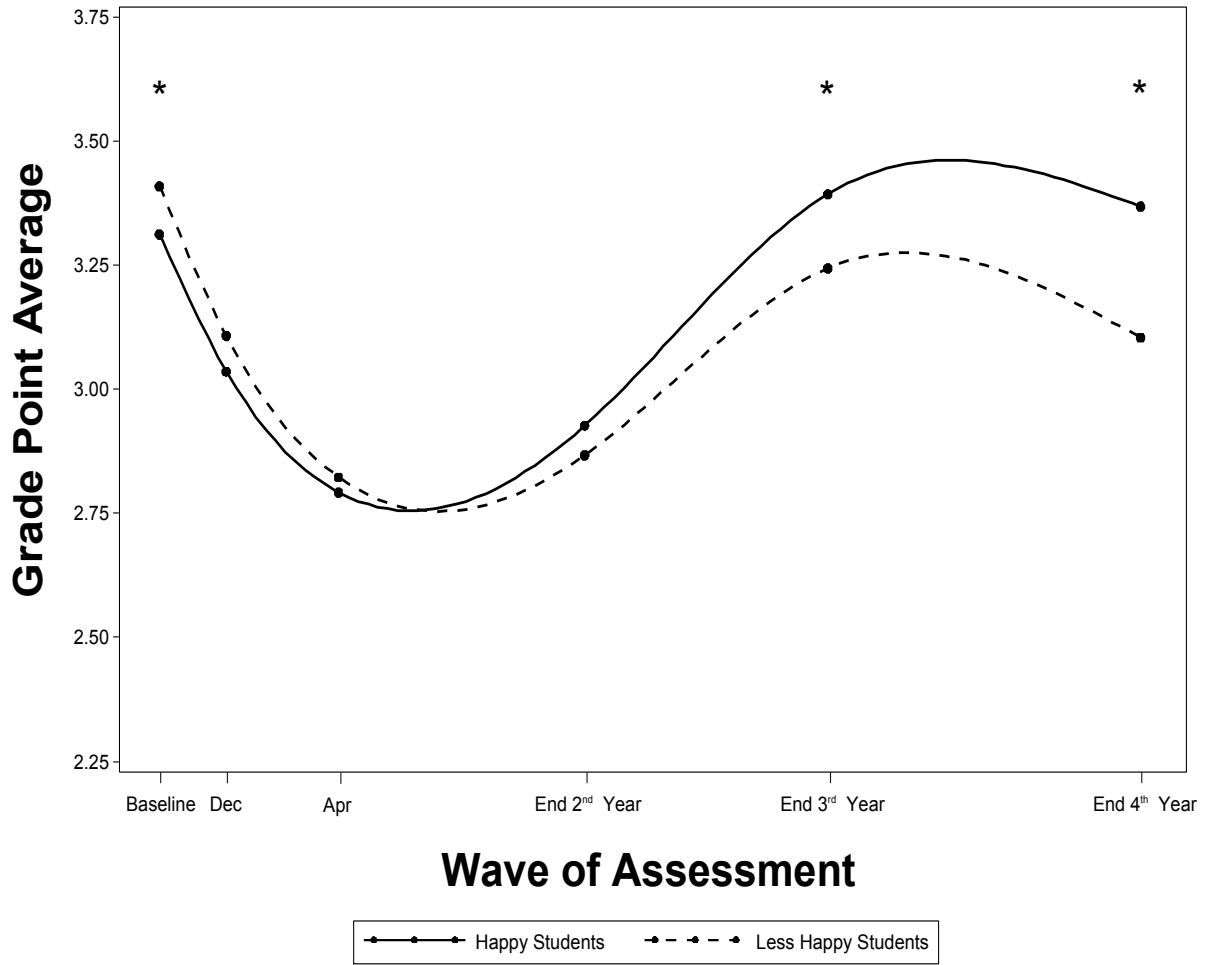
Table 1

Multilevel Model Results Predicting GPA over Four Years of University from Time-Varying (State) and Person-Level (Trait) Positive and Negative Affect

Fixed Effects	γ (SE)	95% CI LL, UL	P
Intercept (Baseline GPA)	3.369 (.048)	3.275, 3.464	
Rate of change in GPA over time:			
Linear (<i>Time</i>)	-1.387 (.114)	-1.611, -1.162	<.001
Quadratic (<i>Time</i> ²)	.924 (.082)	.763, 1.086	<.001
Cubic (<i>Time</i> ³)	-.152 (.015)	-.182, -.122	<.001
Positive Affect			
Time-varying (<i>PA</i>)	.008 (.018)	-.028, .044	.659
Average (<i>Mean PA</i>)	-.011 (.017)	-.044, .023	.536
Negative Affect			
Time-varying (<i>NA</i>)	.040 (.038)	-.034, .114	.293
Average (<i>Mean NA</i>)	-.042 (.018)	-.078, -.006	.022
Affect x Time Interactions			
PA x Time	-.000 (.010)	-.019, .019	.983
Mean PA x Time	.020 (.006)	.007, .032	.002
NA x Time	-.028 (.026)	-.080, .023	.276
Mean NA x Time	.006 (.007)	-.008, .019	.412
Positive x Negative Affect Interactions			
PA x NA	-.006 (.015)	-.035, .024	.703
PA x Mean NA	-.008 (.005)	-.017, .001	.099
Mean PA x NA	.029 (.011)	.008, .050	.007
Mean PA x Mean NA	-.004 (.007)	-.019, .010	.546
Random Effects			
Between-person residual (τ_{00})	.215 (.029)	.168, .285	<.001
Within-person residual (σ^2)	.207 (.012)	.185, .233	<.001

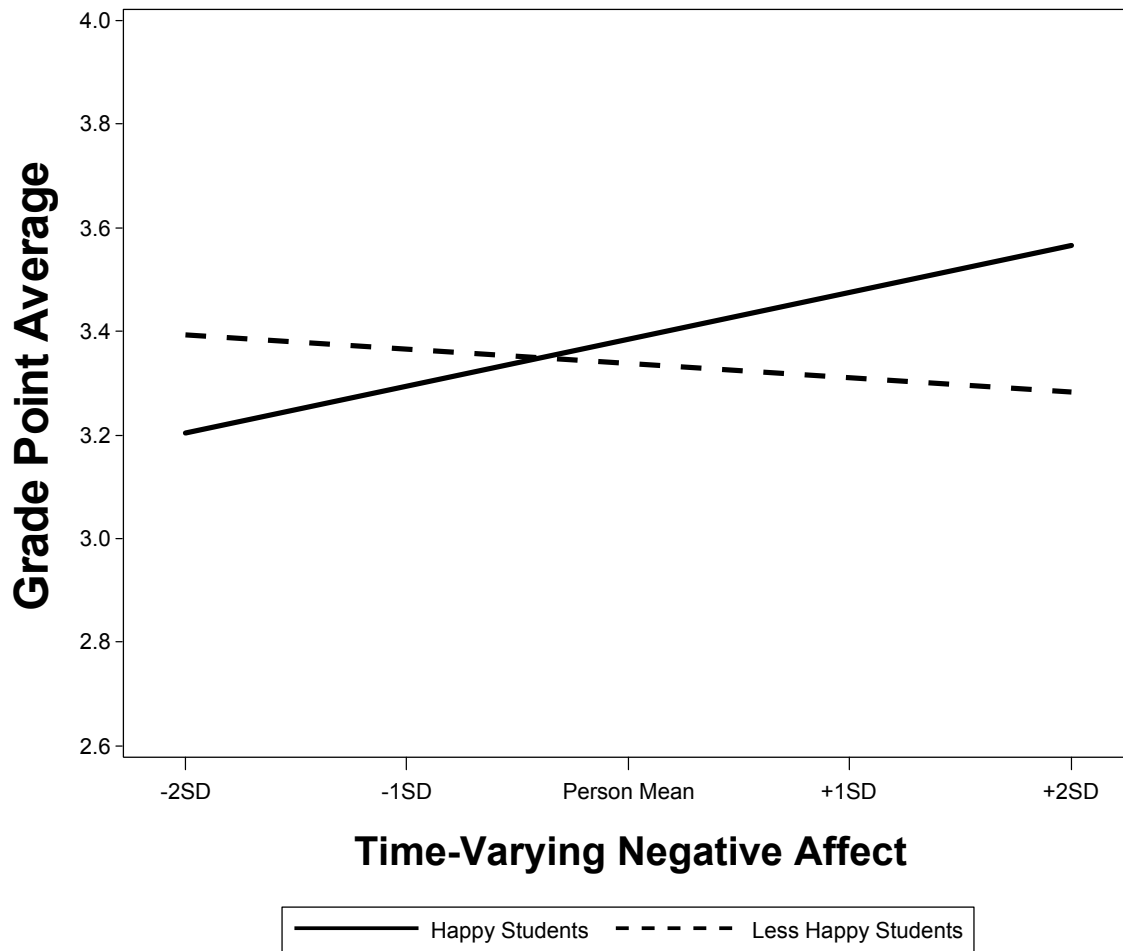
Note. γ =Unstandardized multilevel regression coefficient. *SE*=Standard error of estimate. *CI*=Confidence interval. *LL*=Lower limit. *UL*=Upper limit. Coefficients reported in this Table adjust for demographic covariates (sex, ethnicity, parent education) and students' average and per-semester courseloads.

Figure 1.



Interaction between average positive affect (Mean PA) and time predicting GPA. Dotted line shows trajectory for students who, on average, reported Mean PA at levels one standard deviation below the mean of all students. Solid line shows trajectory for students who, on average, reported Mean PA at levels one standard deviation above the mean of all students. Asterisk* marks significant differences ($p < .05$) between students reporting high and low PA at baseline, end of 3rd year, and end of 4th year.

Figure 2.



Interaction between average positive affect (Mean PA) and time-varying negative affect (NA) shows GPAs for happy and less happy students when they experience varying levels of negative affect. X-axis shows NA when students are at their own average (person mean) and when they are up to two SD above or below their own average. Solid line shows the relation between NA and GPA for students who report Mean PA at levels one standard deviation above the mean of all students (“happy” students). Dotted line shows the relation between NA and GPA for students who reported Mean PA at levels one standard deviation below the mean of all students (“less happy” students).