



Adjustment and acceptance beliefs in achievement settings: Implications for student wellbeing

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Abstract

Research suggests that when dealing with personal setbacks, secondary control (SC) adjustment and acceptance beliefs can foster psychological wellbeing. However, little research has examined these beliefs, in combination, and how they impact students in their academic development. We conducted secondary analysis using an eight-month longitudinal study design over a two-semester introductory course on a sample of university students ($n=237$; 64% female; $M_{\text{age}} = 19$ years old). Multiple regression analyses assessed whether the students' Semester 1 adjustment and acceptance SC beliefs influenced Semester 2 learning-related emotions, perceived stress, and perceived course success, and whether Adjustment x Acceptance interactions emerged involving these outcomes. Adjustment beliefs promoted learning-related positive emotions (hope, pride), perceived course success, and reduced perceived stress; acceptance predicted higher shame and perceived stress. Students' adjustment predicted lower helplessness for students with high acceptance beliefs. These findings are discussed in light of the role that SC beliefs might play in curbing psychological distress reported by students on postsecondary campuses.

Keywords Perceived control · Secondary control · Perceived stress · Learning-related emotions · Achievement

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1 Background

As students embark on their postsecondary journeys, they encounter many achievement setbacks that are difficult and stressful, including overwhelming course loads, poor performance, or social conflict (Conley et al., 2020; Perry et al., 2008). Such setbacks can take a toll and contribute to the growing concern for students' mental health (Evans et al., 2018; le Couteur, 2019; Porter 2018). Although some of this concern is at a clinical level with 26% of undergraduate students reporting feeling "so depressed" and 43% indicating in the last month they felt "so overwhelmed by anxiety it was hard to function" (ACHA, 2019), the subclinical impact on emotions, stress, and feelings of success is important to understand to avoid worsening symptoms.

It is particularly important to study how students in a postsecondary context cognitively cope with setbacks because, developmentally, the majority of these students are in a transitional period from adolescence to adulthood that is characterized by instability, increased decision making, and identity development (Willoughby et al., 2021) that is known as "emerging adulthood" (Arnett, 2000). At this time, although young people may encounter achievement setbacks, they do so with lots of time and opportunities to persist in their ambitions. This unique developmental period means that young adults have many options to manage setbacks that include not only choosing to persist or give up on certain goals but integrating any number of cognitive beliefs in a way that is most beneficial to manage the setbacks.

From Heckhausen's lifespan perspective (Heckhausen, 2003, 2010), young adulthood involves a period when there is a peak in perceived control capacity that begins to decline after middle age, which suggests it is an important developmental period to study such cognitive beliefs. Furthermore, in achievement settings, Perry and colleagues (2003, 2005; Haynes et al., 2009b) reference the unpredictable learning environments, increased competition, social and financial pressures that may impact young adults' perceptions of control amidst critical transitions such as entering college or university. This perspective has been supported with a number of empirical studies (e.g., Daniels et al., 2011; Dryden et al., 2021; Parker et al., 2018; Hamm et al., 2016).

Secondary control (SC) may represent one set of control beliefs that allow emerging adults to adapt to the unique challenges of diverse learning environments. SC can be defined as the process of adjusting some component of the self and accepting one's circumstance (Morling & Evered, 2006, 2007). For example, some students "bounce back" quicker from achievement setbacks than others perhaps indicating a proclivity to cognitively *adjust* in certain ways to mitigate the aversiveness of these experiences (e.g., reinterpret the meaning or downplay the importance of a negative event; Morling & Evered 2006, 2007). Students may also be able to quickly *accept* the setback and either re-engage their efforts or find themselves feeling helpless (Perry, 2003; Perry et al., 2008; Tobin & Raymundo, 2010). The purpose of the current study is to examine how adjustment and acceptance, two SC beliefs, impact university students' learning-related emotions, perceived stress, and perceived success over a two-semester course.

1.1 Conceptual Origins of secondary control

Lacking a sense of control has devastating outcomes for people who naturally seek to exert control over their lives (Skinner, 1996). In part recognizing this centrality to human functioning, Rothbaum and colleagues (1982) proposed a dual-process model of perceived control that can take two forms: primary control and secondary control. An individual's beliefs about actively influencing their external environment represents primary control (PC). Heckhausen et al.'s (1995) lifespan theory of control similarly identifies PC as strategies to influence the environment (e.g., increasing effort). Developmentally, Heckhausen (2003) documents that PC is the main form of control striving during childhood and adolescence and that although children begin to use SC it becomes more salient later in life.

According to Rothbaum et al. (1982), an individual's internal aligning of beliefs, cognitions, and self with the environment represents SC. For example, in an academic context, following an important negative achievement outcome (e.g., low test grade), instead of exerting PC (i.e., putting forth more effort to prepare for a future exam), students can apply SC. This might include students predicting the lower performance to "soften the blow", calling themselves unlucky, blaming the test or teacher, and devaluing the importance of the grade in relation to the "big picture". Heckhausen et al. (1995) suggest that SC can help individuals maintain PC or reduce losses through alternative cognitive strategies, such as aligning the self to the environment instead of acting to alter it. The premise is that, by employing SC, students benefit from retaining a psychological perception of control that allows continued engagement in some fashion rather than feeling helpless and giving up. In their chapter on perceived control, Chipperfield et al. (2017) provide a detailed summary of empirical work studying the SC construct based on Rothbaum's model and highlight its benefits for wellbeing.

1.2 Secondary control: Adjustment and Acceptance

Morling and Evered (2006) suggest the dual-process model identifies the beginning of a divide in the conceptualizing of SC as functioning either to help individuals "fit" with their environment or to motivate individuals to feel control in their environment. They proposed an integrated construct whereby SC involves going with the flow and fitting in with the environment and refer to it as fit-focused. In their perspective, fit-focused SC involves two components: adjusting the self and accepting the environment unchanged. Fit-focused SC comprises both adjustment (modifying self-processes/interpreting events to align with the outcome) and acceptance (appraising external outcomes as uncontrollable). For example, a student using fit-focused SC beliefs may accept that they cannot achieve a top grade in a challenging course and adjust their expectations to recognize that attaining top grades in every course is unrealistic. Morling and Evered (2006) posit that a combination of adjustment and acceptance will lead to optimal outcomes in stressful or challenging environments. Given the unique set of simultaneously controllable and uncontrollable elements in academic achievement settings, fit-focused secondary control may be particularly relevant for adaptation. For example, although students have many options for the

courses that they choose to take, such controllable elements are constrained by program requirements and calendar offerings. Even within a class a student chooses, they can encounter uncontrollable stressors like difficult tests, poor quality instruction, among others. Hence, there are likely elements of challenging learning conditions that may benefit from acceptance and adjustment processes.

The fit-focused SC perspective has received some criticism. For example, Skinner (2007) argued control and fit should be kept separate with accommodative processes being linked more to fit-focused conceptualizations. Skinner's argument that "fit" should be considered as an accommodative process aligns with the view that "accommodation" as a coping strategy can lessen the harmful impact of setbacks on wellbeing when exerting PC is limited. In response, Morling and Evered (2007) recommended researchers acknowledge both terms to keep the existing literature on SC intact. Research by Tobin and Raymundo (2010) followed suit and examined fit-focused SC as synonymous with "accommodation", both encompassing the notion that individuals must accept outcomes and adapt to them. They provided empirical support for the idea that SC acted as a cognitive buffer for individuals with causal uncertainty, helping lower negative affect and depressive symptoms. Hence, for the present study we chose to use the term fit-focused SC in a similar fashion, acknowledging it is synonymous with accommodative processes as described in a number of educational and developmental theories.

Theoretical Approach: Assimilation and Accommodation.

Accommodation is a main facet of Piaget's (1957) Theory of Cognitive Development. It is described as the process by which children and adults develop or change their mental representations to "fit" new information (APA Dictionary, n.d.). Assimilation and accommodation are two processes that involve goal pursuit and goal adjustment that help people limit discrepancies between desired and actual life outcomes (Brandtstädter & Renner, 1990; Brandtstädter & Rothermund, 2002). Akin to PC, assimilative processes involve "efforts and intentional activities to modify the actual situation to attain a closer fit with personal goals and projects" while accommodative processes, akin to SC, involve "mechanisms and processes by which goals and projects are adjusted to available resources of action" (p. 119; Brandtstädter & Rothermund 2002). Relevant to our study, accommodation is integral to disengaging and adjusting to goals to dampen the harmful effects of setbacks on wellbeing (Brandtstädter & Rothermund, 2002).

Accommodation processes such as fit-focused SC (Rothbaum et al., 1982; Morling & Evered, 2006; Tobin et al., 2010), are important for adjusting goals, positive reappraisal, meaning making, and saving energy and time for new resources (Brandtstädter & Rothermund, 2002; Wrosch et al., 2003). Engaging such accommodation processes when goals are challenged has been linked to viewing existing circumstances more positively and found to be psychologically protective (Brandtstädter & Rothermund, 2002).

The adaptive functionality of individuals' acceptance and adjustment in response to adversity is fairly robust across many domains. For example, fit-focused SC have been linked to promoting an overall sense of control, which predicts higher self-reported health, life satisfaction, positive emotions, and lower hospital admissions and all-cause mortality in older adults (Chipperfield et al., 2012; Swift & Chipper-

field, 2013). Fit-focused SC as an accommodative process is also supported in Chen et al.'s (2012a, 2012b) research revealing “acceptance” of uncontrollable stressors and “adjustment” of the self through reappraisals was a key component in protecting against negative health outcomes in adverse circumstances. In achievement settings, SC adjustment beliefs alone are shown to be adaptive in achievement settings (Crede & Niehorster, 2012; Helzer & Jayawickreme, 2015; Rodríguez et al., 2017). In contrast SC acceptance, or disengaging from a difficult goal, appears to be beneficial for psychological wellbeing in some circumstances (e.g., Keng et al., 2016), but detrimental when it reflects a resignation without some form of adjustment, akin to learned helplessness (e.g., Nakamura & Orth 2005; Thompson et al., 1996). Based on these investigations supporting fit-focused SC as potentially protective for psychosocial wellbeing, this prompted us to explore the construct’s benefits to academic-related indicators of wellbeing (emotions, stress, and perceived success) in a postsecondary student sample where many obstacles to academic-related goals can occur—even in a single semester.

1.3 Study objectives and hypotheses

The present study examines the influence of postsecondary students’ adjustment and acceptance beliefs on learning-related emotions (hope, pride, helplessness, shame), perceived stress, and perceived course success. Drawing from Brandtstädter and Rothermund’s (2002) theoretical framework involving accommodation, we (a) hypothesized that adjustment beliefs would be adaptive for students’ learning-related emotions, perceived stress, and perceived course success. The idea is adjustment beliefs will foster better academic adaptation thus having an impact on increasing learning-related pride and hope, lowering helplessness, shame, and perceived stress, and helping students feel more successful. Empirical evidence supports the hypothesis that these accommodation processes are an adaptive response to setbacks and adjusting to goals (Brandtstädter & Rothermund, 2002). In line with Morling and Evered’s (2006) fit-focused SC conceptualization, we (b) hypothesized that adjustment beliefs would be adaptive for students’ learning-related emotions, perceived stress, and perceived course success when their acceptance beliefs were high—suggesting these students are able to adjust to their environments and exhibit optimal “fit” compared to those with low adjustment (Morling & Evered, 2006). Finally, we (c) explored the impact of acceptance beliefs on these learning-related emotions, perceived stress, and perceived course success since there is conflicting empirical evidence on the adaptiveness of acceptance beliefs alone (Keng et al., 2016; Nakamura & Orth, 2005).

Method.

1.4 Participants

Participants were 237 students enrolled in a two-semester introductory psychology course at a Canadian research-intensive university. The university that is located in a Western province in Canada in an urban area offers a psychology course to students pursuing a number of different degree programs including Arts, Sciences, Kinesiol-

ogy, Nursing, etc. The course was offered in a blended learning environment where students access lectures and course material online mixed with in-person class meetings and comprised six course-based tests, three per semester. Of the students in our sample, 64% were female; 82% spoke English as their first language; 89% were between the ages 17 to 20; and 83% of students were in their first year, the majority being in the first or second year (95%).

1.5 Procedure

We extracted our data from the Motivation and Academic Achievement (MAACH) archival database (e.g., Hamm et al., 2020; Parker et al., 2021). This database houses demographic, psychosocial, and achievement data for postsecondary students in cohorts from 1992 to 2018 at a Canadian institution. The MAACH database was created to investigate longitudinal effects of a multitude of demographic factors (e.g., age, sex), psychosocial variables (e.g., control beliefs, stress), and a motivation treatment. Annually, students from a large two-semester introductory psychology course were invited to participate in the study and offered partial course credit for their engagement. Data collection involved three time points spanning eight months.

In October of their first semester (Time 1), students completed a questionnaire as part of a course assignment. The one-hour questionnaire consisted of a battery of self-report questions involving demographic and psychosocial measures (e.g., SC belief scales). Time 2 comprised a measure of students' three exams averaged over the first semester (October to December). In March of their second semester (Time 3), students completed a second in-class questionnaire that measured psychosocial (e.g., emotions, perceived stress) and subjective success outcomes (e.g., perceived course success). Additionally, students were randomly assigned to a motivation treatment or control group. We received ethics approval to access participants from the control group of the MAACH 2011–2012 cohort ($N=1,861$) because it included all relevant variables for the current examination, specifically students' SC beliefs, learning-related emotions, perceived stress, and perceived course success.¹

1.6 Independent variables

Secondary Control (SC): Acceptance and Adjustment Beliefs (Time 1). We extracted 10-items from the database reflecting SC adjustment and acceptance. The six acceptance items focused on general acceptance beliefs (e.g., "I believe it is better to take 'one day at a time' rather than to plan ahead") and the four adjustment items

¹Attrition from the Time 1 questionnaire to the Time 2 questionnaire was almost 25%. We conducted all regression analyses with Hayes' PROCESS macro which employs listwise deletion to deal with missing data. In line with recommendations for attrition in survey research (Goodman & Blum, 1996), we tested mean differences on important variables at Time 1 between students who responded and did not respond to the second questionnaire (no differences detected in: age, sex, English as a first language, year in university, acceptance beliefs, and adjustment beliefs: $t_s=0.12$ to 1.48, all $p_s>0.05$). Notably, the responders and non-responders differed in Semester 1 average grades with those who dropped out having lower grades ($M_s=74\%$ and 61%, respectively, $t=6.37$, $p<.001$). This is an important consideration for the interpretation of our findings which we address in the discussion.

were more connected to school (“No matter how well I do on a test or in a course, I try to see beyond my grades to how my experience at university helps me learn about myself”; See Table 1 for items). Participants responded to items using a 1 (*strongly disagree*) to 5 (*strongly agree*) Likert scale. Because the ten items have not been used together from a pre-existing scale with robust psychometric properties, we undertook a series of exploratory analyses to identify the potential structures underlying the items.² A PCA with oblique (non-orthogonal) rotation was conducted for each EFA. Kaiser-Meyer-Olkin (KMO), Bartlett’s test of sphericity, eigenvalue criterion (greater than 1), and scree plots were used to make decisions about the SC measure (Costello & Osborne, 2005). Based on the initial EFA results, three weakly loading items were deleted³ revealing an improved two-factor solution (Costello & Osborne, 2005). The two-factor solution had a first component (adjustment) comprising three items with good item loadings (0.67 to 0.86) and a second component (acceptance) comprising four items with adequate loadings (0.65 to 0.69; Comrey & Lee 1992). The results of this Principal Components Analyses (PCA) using Oblique Rotation for the SC constructs are presented in Table 1. The EFA revealed both components had eigenvalues larger than 1, explained 53.58% of the total variance, yielded a KMO of 0.64, with a scree plot levelling off after the second component, and a significant Bartlett’s test of ($p < .001$). The communalities ranged from 0.43 to 0.75 which is considered acceptable (Osborne et al., 2008). The result was a 3-item adjustment subscale ($M = 10.00$, $SD = 2.81$, range = 3–17, Skewness = 0.05, Kurtosis = -0.26) and 4-item acceptance subscale ($M = 9.74$, $SD = 2.83$, range = 4–20, Skewness = 0.60, Kurtosis = 0.76) with internal consistency (Cronbach’s $\alpha = 0.71$ and 0.60, respectively) considered adequate (Gliem & Gliem, 2003).

Covariates (Time 2). Three background variables were measured as covariates. First semester grade was determined by averaging students’ first semester exam scores ($M = 71.54$, $SD = 14.21$, range = 25–97, Skewness = 0.16, Kurtosis = 0.05). Participants were also asked to report their sex (female = 1, male = 2) and year in university (1 = first, 2 = second, 3 = third, 4 = fourth, 5 = fifth or more).

1.7 Outcome variables

1. **Learning-related Academic Emotions (Time 3).** In Semester 2, participants were asked to indicate to what extent each of four learning-related emotions (hopeful, proud, helpless, shame; Weiner 1985) described how they felt about their academic performance in their Introductory Psychology course from 1 (*not at all*) to 10 (*very much so*). These single-item learning-related emotions are commonly used in the education literature (Hamm et al., 2016; Tze et al., 2020) and are linked to performance and motivation measures (hopeful, $M = 6.26$,

² Some studies have used four items from this SC belief scale reflecting Rothbaum et al.’s (1982) interpretive control (Hall et al., 2006a), and in combination with emplotment SC items (Hall et al., 2006b); however, this work did not consider all ten SC beliefs derived from Hladkyj et al.’s (2003) proposed scale that reflect acceptance and adjustment.

³ Two items were removed based on weak item loadings and a third item was removed since it conceptually and statistically overlapped considerably in terms of reflecting the adjustment and acceptance components.

Table 1 Secondary Control Beliefs Principal Components Analysis with Oblique Rotation

Item Wording	Factor 1 Adjustment	Factor 2 Acceptance	h^2
Regardless of what my grades are, I try to appreciate how my university experience can make me a stronger person overall.	0.85	0.08	0.75
No matter how well I do on a test or in a course, I try to see beyond my grades to how my experience at university helps me learn about myself.	0.84	0.06	0.71
Whenever I have a bad experience at university I try to see how I can turn it around and benefit from it.	0.68	-0.10	0.46
I believe it is better to take "one day at a time" rather than to plan ahead.	0.05	0.68	0.46
Much of what happens in our lives is a part of the way nature works.	0.13	0.65	0.45
There is no point in thinking about what the future will bring.	-0.08	0.66	0.43
I believe that much in life is determined by fate or chance.	-0.07	0.69	0.47
Eigenvalue	2.11	1.62	
% Variance Explained	30.19%	23.19%	

$SD=2.63$; Pride: $M=5.24$, $SD=2.43$; helpless: $M=2.96$, $SD=1.97$; shame: $M=2.94$, $SD=2.17$; all emotions ranged 1–10, Skewness = -0.27 to 1.21, Kurtosis = -1.09 to 0.78).

- Perceived Stress (Time 3).** Participants rated seven items measuring their current state of stress from Cohen et al.'s (1983) Perceived Stress Scale in response to questions such as, "In the last month, how often have you felt nervous and "stressed?"; "In the last month, how often have you found yourself thinking about things that you would have to accomplish" from 1(*never*) to 5(*very often*). Participants' stress ratings were summed so that higher scores reflected higher perceived stress ($M=24.04$, $SD=5.05$, range 10–35; Skewness = .28, Kurtosis = -.35, Cronbach's $\alpha = .80$).
- Perceived Course Success (Time 3).** Participants rated how successful they felt in their introductory psychology course from 1 (*very unsuccessful*) to 10 (*very successful*; $M=6.13$, $SD=2.07$, range = 1–10, Skewness = -0.37, Kurtosis = -0.75). Students' perceived success is strongly associated with objective achievement outcomes (e.g., final grades, GPA; Daniels et al., 2008; Parker et al., 2016).

Table 2 Zero-Order Correlation Matrix

	1	2	3	4	5	6	7	8	9	10	11
1. Adjustment ^a	–										
2. Acceptance ^a	.04	–									
3. Semester1 test average ^b	-.09	-.15*	–								
4. Sex ^a	.06	-.07	-.08	–							
5. Year of university ^a	-.05	.04	-.12	-.03	–						
6. Hope ^c	.15*	-.16*	.38**	-.07	-.16*	–					
7. Pride ^c	.11	-.18*	.50**	-.09	-.09	.71**	–				
8. Helpless ^c	-.05	.17*	-.26**	-.02	<.01	-.27**	-.36**	–			
9. Shame ^c	-.01	.19*	-.34**	.04	<-.01	-.31**	-.39**	.59**	–		
10. Perceived stress ^c	-.18*	.23**	-.14*	-.22**	-.05	-.23*	-.27**	.36**	.32**	–	
11. Perceived course success ^c	.15*	-.19*	.42*	-.04	-.24**	.57**	.53**	-.42**	-.36**	-.31**	–

Note. Correlations were calculated using pairwise deletion. ^aTime 1. ^bTime 2. ^cTime 3.

* $p < .05$, ** $p < .01$ (two-tailed tests). The sex variable was dummy-coded (female = 1, male = 2)

1.8 Analytic plan

First, zero-order correlations were employed to test associations between the main study variables as a preliminary analytic step (see Table 2). Second, using Hayes (2017) PROCESS macro for SPSS, we regressed adjustment beliefs, acceptance beliefs, an Adjustment x Acceptance interaction term, and three control variables (previous grade, sex, year of university) onto each of the six outcomes separately (see Table 3). Next, using simple slopes analyses we probed significant interactions to test the relationship between adjustment and the outcome variables at low (-1 SD below the mean), and high (+1 SD above the mean) levels of acceptance beliefs (at $p < .05$). Standardized regression coefficients are reported. Of note, when age, sex, and high school grade were entered into all models as control variables, the findings remained consistent. We conducted a post-hoc power analysis using G*Power for our regression analyses (i.e., regression model with the six predictors and sample size with complete data = 178), which indicated our study had good statistical power (95%).⁴

⁴Assumptions of our regression analyses were met. VIF coefficients (all < 1.02) and the correlation coefficients between predictors and outcomes (all < 0.50) revealed multicollinearity values that did not merit further investigation (Tabachnick & Fidell, 2013). Assumptions of normality, linearity and homoscedasticity of residuals were met (all standardized residuals fell within -3 and +3 (Pardoe, 2020); acceptable Durbin-Watson statistics ranged from 1.74 to 2.23. All regression analyses used robust standard errors for heteroscedasticity to account for any bias (Hayes, 2017).

Table 3 Regression Analyses: Relationship of SC beliefs with Psychosocial and Achievement Variables

Predictors	Outcomes					
	Hope (T3) <i>n</i> =179	Pride (T3) <i>n</i> =181	Helpless (T3) <i>n</i> =178	Shame (T3) <i>n</i> =181	Stress (T3) <i>n</i> =182	Course suc- cess (T3) <i>n</i> =182
Adjustment (T1)	0.16* (0.07)	0.15* (0.06)	-0.08 (0.08)	-0.04 (0.08)	-0.19* (0.07)	0.16* (0.07)
Acceptance (T1)	-0.11 (0.07)	-0.11 (0.07)	0.12 (0.08)	0.14* (0.07)	0.20* (0.07)	-0.12 (0.07)
Adjustment x Acceptance	-0.03 (0.07)	0.04 (0.06)	-0.13* (0.06)	-0.06 (0.06)	-0.04 (0.06)	<-0.01(0.06)
Sex (T1)	-0.09 (0.15)	-0.07 (0.15)	-0.10 (0.15)	0.001 (0.16)	-0.50* (0.14)	-0.03 (0.14)
Year of university (T1)	-0.08 (0.09)	0.02 (0.10)	-0.07 (0.09)	-0.10 (0.07)	-0.15 (0.11)	-0.17 (0.08)
Semester 1 grades (T2)	0.43* (0.08)	0.62* (0.08)	-0.34* (0.09)	-0.43* (0.01)	-0.21* (0.09)	0.46* (0.09)
<i>R</i> ²	0.19	0.28	0.12	0.14	0.16	0.24

Note. Standardized regression coefficients (β) are provided. Standard errors are reported in brackets.

T1=Time 1. T2=Time 2. T3=Time 3. * p <.05

2 Results

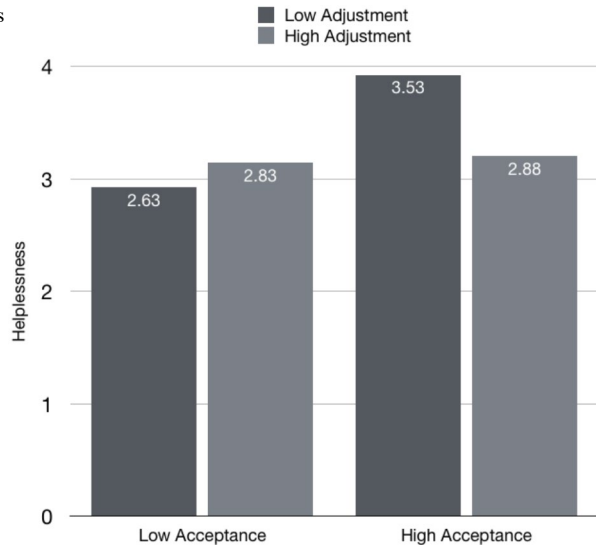
2.1 Preliminary analyses

Coinciding with Morling and Evered's (2006) conception of SC, adjustment and acceptance beliefs were not significantly correlated providing some validity evidence for the scales. Adjustment beliefs positively correlated with feeling hopeful and with perceived course success; and negatively to perceived stress. Acceptance beliefs were positively related to feeling helpless, shame, and perceived stress, and negatively related to feeling hopeful, proud, and to perceived course success. Notably, sex was correlated with perceived stress indicating females reported higher levels of stress, and year of university was negatively related to hope and course success. Additionally, all emotions and psychological outcomes were correlated in expected directions (all ps <0.05; see Table 2 for correlation matrix).

2.2 Main analyses

Multiple Regression Analyses for Learning-related Emotions. A multiple regression analysis revealed Time 1 adjustment beliefs positively predicted Time 3 hope measured in Semester 2 (β =0.16, SE =0.07, p =.022, CI =0.023 to 0.295), but acceptance beliefs did not. We found higher Semester 1 grades positively related to hope (β =0.43, SE =0.08, p <.001, CI =0.276 to 0.588). For this model, no significant Adjustment x Acceptance interaction was found (β =-0.03, p =.627), nor was sex or year of university related to hope. A similar trend emerged in the analysis of pride. Adjustment beliefs were again positively related to Time 3 pride (β =0.15, SE =0.06, p =.022, CI =0.022 to 0.277). Again, higher Semester 1 grades were positively and significantly related to Time 3 pride (β =0.62, SE =0.08, p <.001, CI =0.458 to 0.783),

Fig. 1 Note. Estimates of the effects of adjustment and acceptance beliefs on helplessness are displayed at low ($-1 SD$) and high ($+1 SD$) levels of acceptance and adjustment (based on unstandardized estimates).



and no Adjustment \times Acceptance interaction effect on pride emerged ($\beta=0.04$, $p=.450$). There was no significant influence of sex or year of university on the model.

In terms of negative emotions, neither Time 1 SC beliefs, adjustment or acceptance, separately predicted helplessness ($\beta_s=-0.08$ and 0.12 , $p_s=0.321$ and 0.115 , respectively) but Semester 1 grades did ($\beta=-0.34$, $SE=0.09$, $p<.001$, $CI=-0.518$ to -0.162); sex and year of university did not. An Adjustment \times Acceptance interaction emerged ($\beta=-0.13$, $SE=0.06$, $p=.038$, $CI=-0.260$ to -0.008). We probed the interaction with tests of simple slopes at low and high levels ($-/+ 1 SD$ from the mean) of adjustment and acceptance beliefs on helplessness. Notably, adjustment beliefs helped lower students' helplessness when acceptance beliefs were high ($\beta=-0.19$, $SE=0.09$, $p=.044$, $CI=-0.370$ to -0.005 ; see Fig. 1 for estimates) but not when acceptance beliefs were low ($\beta=0.05$, $p=.620$).

Adjustment SC did not have a statistically significant impact on Time 3 shame, but an acceptance SC effect was found ($\beta=0.14$, $SE=0.07$, $p=.042$, $CI=0.005$ to 0.269). Semester 1 grades predicted lower shame ($\beta=-0.43$, $SE=0.09$, $p<.001$, $CI=-0.610$ to -0.243). Further, no Adjustment \times Acceptance interaction effect, nor effect of sex or year of university reached statistical significance.

Perceived Stress. A multiple regression analysis revealed that both T1 adjustment and acceptance beliefs predicted students' T3 perceived stress. Higher adjustment beliefs predicted lower perceived stress ($\beta=-0.19$, $SE=0.07$, $p=.010$, $CI=-0.339$ to -0.048) and higher acceptance beliefs predicted higher perceived stress ($\beta=0.20$, $SE=0.07$, $p=.006$, $CI=0.057$ to 0.335). Year of university was unrelated to T3 perceived stress but Semester 1 grades ($\beta=-0.21$, $SE=0.08$, $p=.018$, $CI=-0.386$ to -0.038) and sex were ($\beta=-0.50$, $SE=0.14$, $p<.001$, $CI=-0.772$ to -0.222)—meaning females reported higher stress. No significant Adjustment \times Acceptance interaction resulted ($\beta=-0.04$, $p=.541$).

Perceived Course Success. Regarding subjective success, our findings revealed that T1 adjustment beliefs positively predicted T3 perceived course success ($\beta=0.16$,

$SE=0.07$, $p=.019$, $CI=0.027$ to 0.290) and T1 acceptance beliefs were not related to perceived course success. Further, no Adjustment x Acceptance interaction was revealed ($\beta<0.01$, $p=.957$). Both Semester 1 grades ($\beta=0.46$, $SE=0.09$, $p<.001$, $CI=0.288$ to 0.626) and year in university ($\beta=-0.17$, $SE=0.08$, $p=.034$, $CI=-0.328$ to -0.013) significantly predicted T3 perceived course success, but sex did not.

3 Discussion

The present study addressed two central questions: (a) how do students' adjustment and acceptance SC beliefs early in the semester predict academic outcomes of emotions, perceived stress, and perceived course success in Semester 2 in a large introductory-level university course; and (b) are there moderating effects whereby students' adjustment beliefs benefit adaptive learning-related emotions, stress, and perceptions of success when students endorse high acceptance beliefs? Our findings yielded novel results concerning relationships with SC beliefs and psychological wellbeing outcomes but also sparked new questions and research directions regarding SC in achievement settings.

Adjustment beliefs were adaptive for students in terms of enhancing learning-related positive emotions and perceived course success. Students reporting greater adjustment beliefs indicated feeling more hope and pride and lower perceived stress later in the second semester. We found adjustment beliefs also predicted greater perceived course success. These findings support the notion that engaging in accommodation processes (Brandstadter & Rothermund, 2002) can help students manage university challenges which may help them navigate stressful events, experience more positive emotions, and even perceive their performance as more successful. This may indeed reflect students "adjusting" to their new learning environment, its expectations, and standards. This finding also confirms existing research that shows benefits of SC adjustment for university students without considering acceptance (Crede & Niehorster, 2012; Helzer & Jayawickreme, 2015; Rodríguez et al., 2017).

Overall, we found students' acceptance beliefs in Semester 1 contributed to higher perceived stress scores in Semester 2. Of note, the bivariate correlations indicated acceptance shared a negative relationship with all adaptive wellbeing outcomes and a positive relationship with maladaptive wellbeing outcomes. Such findings coincide with other SC research that suggests a potentially maladaptive role of acceptance when it occurs without some form of adjustment, perhaps because it reflects disengagement as a form of resignation (Nakamura & Orth, 2005). Again, it is possible that acceptance alone may only be beneficial for individuals' psychological wellbeing when they are encountering insurmountable or major obstacles to goals (Wrosch et al., 2003a, 2003b), to tasks, or goal-directed engagement which is somewhat contrary to the optimism associated with emerging adulthood (Arnett, 2000).

A notable finding in our preliminary analysis revealed female students indicated higher levels of perceived stress. Although we controlled for sex in our analyses, it is useful for understanding females' interpretation of their university experiences that have been shown to involve higher levels of stress (Hall et al., 2006a; Rahimi et al., 2014; Parker et al., 2021). Promoting the benefits of adjustment SC, such as through

teaching positive reappraisal techniques for managing stress, could be used as an approach to support females in their university programs.

3.1 Acceptance *with* Adjustment

We had anticipated students' adjustment beliefs would be adaptive for psychological wellbeing and achievement when their acceptance beliefs were high according to Morling and Evered's (2006) fit-focused conceptualization of SC. Instead, we found this was only the case for helplessness. We found students' adjustment beliefs helped lower helplessness but only for students with high acceptance beliefs. Notably, Fig. 1 conveys that the group with the highest helplessness were students with high acceptance and low adjustment—but high acceptance individuals with high adjustment beliefs had significantly lower helplessness. Evidently, our findings may support that at-risk individuals with high acceptance can buffer against helplessness by applying adjustment beliefs. This potentially challenges the position that acceptance is an equally adaptive component of the fit-focused SC construct, at least in the context of students' general university experiences; as it may be in other contexts such as for community-dwelling older adults and children with depression (e.g., Chipperfield et al., 2012; Weisz et al., 2010).

Extrapolating from our findings, for students with high acceptance beliefs, adjustment may be an important cognitive belief for reducing feelings of helplessness in learning environments. This could be conveying students' accommodation skills to deal with a negative outcome, such as when students are easily accepting of a poor grade but are able to reflect on how they can learn or benefit from the outcome. This may be valuable given the toxic role of helplessness in achievement settings that can lead to academic procrastination and lower performance in domain-specific courses (Krejtz & Nezelek, 2016; Prihadi et al., 2018), but also given the pressures and unpredictability experienced by emerging adults during this critical time point in development (Arnett, 2000). These findings may also point to the relevance of targeting or promoting these SC beliefs for individuals who may be susceptible to helplessness.

We did not find this moderating effect for the three other learning-related emotions, perceived stress, or course success. Consequently, this may have to do with SC not being as relevant for individuals in this developmental period or university context as other cognitive beliefs. As mentioned, most setbacks in emerging adulthood and university are amenable to PC, such as efficacy beliefs, commitment to tasks, or goal-directed engagement (Bandura, 1994; Dweck, 2008; Hamm et al., 2019; Heckhausen & Heckhausen, 2018; Perry et al., 2014). In other words, the paucity of a moderation effect may have to do with the study not being situated in a strictly low or uncontrollable environment. The participants were partaking in an introductory psychology assignment and considered SC beliefs concerning university experiences that likely had varying levels of control. It is plausible, adjustment for individuals with high acceptance beliefs may be more adaptive in a low control environment. This aligns with the position of SC researchers who suggest SC is beneficial when an individual's opportunity to actually control, or exhibit influence on, an outcome is low or perceived as low (Heckhausen & Schulz, 1995; Morling & Evered, 2006).

3.2 Limitations

The results presented herein need to be considered in light of the following limitations. First, although our measure of SC had adequate psychometric properties, further validity work should be conducted on the scale. In particular, it will be important to ascertain the theoretical and empirical advantages and limitations of combining items that target adjustment and acceptance in the specific university and general life domains. Although the construct is based off a conceptual model of perceived control (Rothbaum et al., 1982) that has received some empirical support (e.g., Chipperfield et al., 2012; Tobin et al., 2010), the construct has not been empirically tested in a theoretically meaningful way. In addition to this, our findings suggest that the combination of acceptance and adjustment SC beliefs in certain contexts may not be as straightforward as Morling and Evered's (2006) conceptual position would suggest and that further empirical investigation is warranted.

Another limitation concerned the attrition of students from the Semester 1 to Semester 2 questionnaire. There were no differences in key variables (background and SC beliefs) between students who responded to the Semester 2 questionnaire and those who did not. However, as might be expected, the non-responders had significantly lower Semester 1 grades that are important to keep in mind when interpreting the results. Finally, although the MAACH dataset is a valuable resource, using data from 2011 to 2012 means that our findings are based on students' perceptions before the COVID-19 pandemic, which has increased the uncertainty and uncontrollability of learning. As the effects of the ongoing pandemic are still being realized (Sahu, 2020), students' experiences coming out of lockdown as they juggle between in-person and online courses, and face complexities with social distancing and vaccine mandates, are undoubtedly full of unpredictability. Employing adjustment SC during such times may be advantageous in preventing students from feeling helpless as they navigate the changes resulting from the pandemic. It may serve as a "stepping stone" to preserve a sense of control until opportunities for PC are optimal again.

3.3 Implications for Theory & Future directions

The implications of our findings are important for several reasons. First, we study individuals' cognitive beliefs during a critical developmental period of emerging adulthood to consider how they interpret and adapt to their experiences. This is a novel contribution extending beyond the existing SC research that has focused on children or older adults (Haynes et al., 2009a; Marriage & Cummins, 2004; Take-mura & Naka, 2013; Weisz et al., 2010). Our results indicate that adjustment beliefs in university-specific experiences are adaptive for these students' achievement well-being factors, and acceptance beliefs—at least in the sense of general-life experiences in university—are not. This finding suggests that acceptance beliefs may not be as essential as adjustment beliefs for adapting in university settings.

Our findings also provide insights into the role of acceptance for university students on achievement-related outcomes. The extent to which acceptance beliefs can be beneficial in this context is unknown. Our findings seem to suggest that encouraging general acceptance beliefs may not be an optimal strategy. Further research is

needed to uncover the boundaries for which acceptance beliefs have adaptive value. In addition, we propose the need for a careful decomposing of adjustment and acceptance and their differential roles. A deeper understanding of SC as a construct is warranted in and of itself, particularly in emerging adulthood when adjustment to new roles and opportunities is needed and SC beliefs as such seem helpful.

As students continue to be challenged by the pressures and uncertainty that arise in university, our study findings offer some practical clues to how students can be encouraged to adapt to their university experiences. For example, instructors could use the knowledge to assist students in managing negative emotions, such as anxiety, helplessness, and shame, that are commonly reported (Parker et al., 2021; Pekrun et al., 2011; Tze et al., 2022). Instructors could support students by having them reflect on some of the benefits of cognitive adjustment in the face of achievement setbacks, by incorporating it in a lecture or during one-on-one meetings with students. Other practical approaches could involve education programmers or student services personnel putting on workshops or creating learning opportunities for instructors and students about the benefits of SC. A goal of these approaches would be to prevent the experience of harmful emotions or academic distress from worsening and becoming more serious.

SC is a promising area for future research since perceived control is a universal cognitive resource that can be studied in a variety of contexts and settings. Particularly with achievement striving, employing SC beliefs may be adaptive when facing setbacks in domains beyond education, such as in sport or occupational settings. In sport, for example, setbacks can be a common part of the athlete experience including injury, burnout, or illness, that can interrupt their seasons and negatively impact their physical and mental health. Hence, sport settings may serve an optimal place to study how athletes effectively cope with their sport setbacks. Furthermore, in considering SC's implications for mental health, we recommend continued research on SC in health settings for individuals facing adversity, declining perceived control, and physical functioning (Chipperfield et al., 2012; Monti et al., 2018).

3.4 Conclusions

In conclusion, our findings provide insights into the role of university students' adjustment SC beliefs about academic experiences involving diverse learning-related outcomes. However, our findings also suggest general acceptance beliefs can play a maladaptive role for these outcomes. Yet for individuals with high acceptance, adjustment beliefs can help buffer against feelings of helplessness that may arise from challenging achievement settings. Further testing of these accommodation processes would benefit from prioritizing both developmental trajectories and contexts. In this way the function of SC beliefs could be tailored to the unique control-related opportunities encountered during critical life transitions and in specific contexts. For emerging adults, these developments are characterized by a complex pairing of opportunities to foster optimism and perceived control, while managing new contextual constraints.

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Data Availability Data for this study are not available due to institutional restrictions.

Compliance and Ethical Standards

Competing interests The authors have no relevant financial or non-financial interests to disclose.

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Consent Informed consent was obtained from all study participants.

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