

BRIEF REPORT

Academic Buoyancy and Psychological Risk:

Exploring Reciprocal Relationships

Abstract

Based on hypothesized reciprocal relations between psychological risk and academic buoyancy (dealing with ‘everyday’ academic setback in the ordinary course of school life), the present study used cross-lagged structural equation models to examine the relative salience of (1) prior academic buoyancy in predicting subsequent psychological risk and (2) prior psychological risk in predicting subsequent academic buoyancy. Academic buoyancy and psychological risk (academic anxiety, failure avoidance, uncertain control, emotional instability, neuroticism) measures were administered to 2,971 students (11-19 years) from 21 Australian high schools at two time waves across a one-year interval. Analyses confirmed a reciprocal effects model in which psychological risk impacts academic buoyancy and academic buoyancy impacts psychological risk. The findings hold applied and conceptual implications for practitioners and researchers seeking to help students deal more effectively with adversity in school life.

Keywords: academic buoyancy, psychological risk, resilience, cross-lagged analysis, reciprocal effects model

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Highlights

- Cross-lagged SEM examined prior academic buoyancy predicting psychological risk.
- Cross-lagged SEM also examined prior psychological risk predicting academic buoyancy.
- Analyses confirmed a reciprocal effects model.
- Psychological risk impacts academic buoyancy and academic buoyancy impacts psychological risk.

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1.1 . The Cycle of Risk and Resilience

Influential models of risk and resilience suggest a process in which the two are closely connected. This process perspective emphasizes that individuals have some mobility out of risk and into resilience (and vice versa; Catterall, 1998). According to Waxman, Huang, and Padron (1997), there are “alterable processes or mechanisms that can be developed and fostered for all students” (p. 137) that can enhance resilience and reduce risk. Along these process-oriented lines, Rutter (1987) suggests iterative stages in building a capacity to deal with adversity, including: reducing risk impact or changing the students’ exposure to risk, reducing the negative chain reactions following risk, improving efficacy in dealing with risk, and opening/creating new opportunities that involve less risk. Morales (2000) suggests a resilience cycle in which the student: identifies risk, seeks out protective factors to offset or reduce the risk, sees the value of these protective factors, and continuously refines and/or implements these protective factors to deal with risk. A wide body of recent theory and research has also recognized the iterative and ongoing processes relevant to risk and resilience (e.g., Brooks, 2010; Compas, 2004; Iwaniec, Larkin & Higgins, 2006; Martin & Marsh, 2009; Rutter, 2006)

If we distil the central contentions of these various perspectives on risk and resilience, one thesis that emerges about their inter-relationship is this: the risk-resilience relationship seems to be a reciprocal one such that risk impacts resilience and resilience impacts risk. The present study seeks to extend this line of research to the academic domain with a focus on the recently developed academic buoyancy construct (dealing with ‘everyday’ academic setback in the ordinary course of school life; a construct residing under the broader educational resilience banner, Martin & Marsh, 2009). Specifically, it seeks to explore the generality of the oft-hypothesized risk-resilience cycle by

exploring the extent to which there is a reciprocal relationship between risk and academic buoyancy.

The elemental concept underpinning this relationship is not distinct to risk and resilience studies. Marsh (2007; Marsh & Craven, 2006) has described a parallel reciprocal effects model in relation to academic self-concept and academic achievement seeking to answer the ‘chicken-egg’ problem of whether self-concept impacts achievement or achievement impacts self-concept. In fact, Marsh (2007) provided support for a reciprocal effects model in which each is mutually reinforcing. Of relevance to the present study, Marsh and Craven (2006) advised that many variations of this model are feasible depending on the substantive and empirical aims of a study. Indeed, here we propose a reciprocal effects model in the risk-buoyancy process – each negatively related to the other across time. Marsh and Craven (2006) also provided specific advice as to how to appropriately estimate these models, including the use of structural equation modeling comprising latent variables, correlated uniquenesses of parallel items across time, correlated predictors and correlated outcomes, and a fully-forward model in which there are test-retest parameters and cross-lagged paths in the one model. These essential features are incorporated into the present study to most appropriately estimate reciprocal effects.

1.2. Academic Buoyancy and Risk

Academic buoyancy is defined as students’ capacity to successfully overcome setbacks and challenges that are typical of the ordinary course of everyday academic life (e.g., poor performance, competing deadlines, performance pressure, difficult tasks; Martin & Marsh, 2009; Putwain, Connors, Symes, & Douglas-Osborn, 2012). Academic buoyancy has been described as one factor that assists students to deal with academic risk (Martin & Marsh, 2009), particularly risk that occurs relatively frequently and on an ongoing and ‘everyday’ basis. Hence, academic buoyancy has been suggested to be a factor that practitioners might consider sustaining on an ongoing basis to help students deal with relatively ongoing academic difficulty. Academic buoyancy has been distinguished from resilience in that buoyancy is relevant to ongoing challenges that are typical of

the ordinary course of academic life whereas academic resilience refers to more substantial adversity in academic life. Thus, for example, academic buoyancy is relevant to a poor grade whereas academic resilience is relevant to chronic failure. Similarly, academic buoyancy is relevant to stress that is typical of performance scenarios such as tests whereas academic resilience is relevant to clinical levels of anxiety that disrupt academic (and other) functioning. By implication, academic buoyancy tends to apply to all students whereas academic resilience tends to apply to a relative minority of students (who are nonetheless vital to assist) (Martin & Marsh, 2009).

Prior research has explored motivation and engagement predictors of academic buoyancy (Martin & Marsh, 2006) and educational impacts of academic buoyancy (Martin & Marsh, 2008), and differentiation from coping (Putwain et al., 2012), adaptability (Martin, Nejad, Colmar & Liem, in press), self-regulation (Martin et al., in press), and academic resilience (Martin, in press). However, no research has explored the extent to which reciprocal models proposed in the resilience literature apply to buoyancy in the academic domain. Is it the case that risk reduces buoyancy and buoyancy reduces risk? The implications for theory and practice are important. For theory, findings potentially support a broadening of risk-resilience process models. For practice, findings would suggest an intervention focus on both risk and buoyancy factors – whereas if one is salient over the other, then intervention would be focused on the salient factor.

1.3. Psychological Risk

Research investigating predictors of resilience has identified numerous factors contributing to students' capacity to deal with academic adversity and setback. Work has generally focused on distal factors (e.g., socio-economic status, single parent, ethnicity) or proximal factors (e.g., psychological factors, school-related factors). The proximal factors are considered to be more amenable to intervention (Cappella & Weinstein, 2001). Accordingly, these are the focus of the present study (see also Borman & Rachuba, 2001; Finn & Rock, 1997; Martin & Marsh, 2008). In particular, the study focuses on psychological risk factors and demarcates these into academic and non-academic factors. Consistent with Martin (2007), psychological academic risk factors are

academic anxiety, failure avoidance (or fear of failure), and uncertain control. Prior research indicating their risk status has found these to be associated with higher levels of disengagement and lower levels of class participation, educational aspirations, and enjoyment of school (e.g., Martin, 2007). Harnessing work by Marsh (2007) and McCrae and Costa (1997), psychological non-academic risk factors are emotional instability self-concept and neuroticism, respectively. Research attesting to their risk status shows negative relations with self-esteem and higher levels of depression and anxiety (e.g., Marsh, 2007; Roelofs, Huibers, Peeters, & Arntz, 2008). Although factors such as neuroticism may be considered more distal (given its status as a personality construct; McCrae & Costa, 1997), it does proximally impact individuals' daily lives; furthermore, more recent work (e.g., under free trait theory; Little, 1996; Little & Joseph, 2007) suggests it is as not immutable.

Prior work has found that anxiety and uncertain control negatively predict academic buoyancy (Martin et al., 2010; Martin & Marsh, 2006, 2008). Research has also shown that neuroticism negatively predicts academic buoyancy and that academic buoyancy negatively predicts emotional instability (Martin et al., in press). Other work has found academic buoyancy negatively predicts worry, test-irrelevant thoughts, tension and unpleasant bodily symptoms (Putwain et al., 2012). No work has yet examined a hypothesized reciprocal relationship between psychological risk and buoyancy across time. Hence, of central interest in this study are the following questions: To what extent do these psychological risk factors impact academic buoyancy? To what extent does academic buoyancy impact these psychological risk factors? Taking both these questions into consideration in the one broader conceptual model, the possible reciprocal relationship between psychological risk and academic buoyancy remains an open question.

1.4. The Present Investigation

Prior conceptualizing about the process of resilience suggests a cycle in which risk and resilience are reciprocally related over time, with resilience associated with a reduction in risk and a reduction of risk associated with resilience. The present study seeks to test the generality of this

reciprocal model by extending research into the academic domain and focusing on academic buoyancy and psychological risk. Specifically, it hypothesizes reciprocal relationships between academic buoyancy and academic psychological risk (academic anxiety, failure avoidance, uncertain control) and non-academic psychological risk (emotional instability, neuroticism). We apply the classic cross-lagged panel design (e.g., Huck, Cormier, & Bounds, 1974) to examine the effects of Time 1 academic buoyancy on Time 2 psychological risk and the effects of Time 1 psychological risk on Time 2 academic buoyancy (see Figure 1).

2. Method

2.1. Participants and Procedure

The sample comprised 2,971 students from 21 high schools in major urban areas of Australia. Students completed measures at Time 1 (1st term of the school year) and Time 2 (one year later). Of the overall sample, 16% were in Grade 7 at Time 1 and Grade 8 at Time 2; 24% were in Grade 8 at Time 1 and Grade 9 at Time 2; 27% were in Grade 9 at Time 1 and Grade 10 at Time 2; 19% were in Grade 10 at Time 1 and Grade 11 at Time 2; and 14% were in Grade 11 at Time 1 and Grade 12 at Time 2. Schools were from the independent and systemic Catholic sectors. Participating schools were of mixed levels of achievement (although higher in socio-economic status and achievement than the national average). Ten schools were co-educational, six were single-sex girls' schools, and five were single-sex boys' schools. Just over half of the participants (52%) were male; 48% were female. The average age of the participants was 13.84 years ($SD = 1.29$, range 11-18 years) at Time 1 and 14.88 years ($SD = 1.30$; range 12-19 years) at Time 2. Of the total sample, 90% were of an English speaking background and 10% were of non-English speaking background. At each measurement point, the classroom teacher was responsible for the administration of the instrument in class. The teacher explained the rating scales and presented a sample item. Students were asked to complete the instrument on their own, to ask for help if they required it, and to provide one answer for each item. Students completed the instrument twice, once in first term 2010 and again in first term 2011.

2.2. Measures

2.2.1. Academic buoyancy

The Academic Buoyancy Scale (ABS; Martin & Marsh, 2008) comprises four items (“I’m good at dealing with setbacks at school – eg. negative feedback on my work, poor result”; “I don’t let study stress get on top of me”; “I think I’m good at dealing with schoolwork pressures”; “I don’t let a bad mark affect my confidence”). Respondents rate items from 1 (‘Strongly Disagree’) to 7 (‘Strongly Agree’). Prior research has demonstrated unidimensionality, invariance as a function of age, ethnicity and gender, reliability, approximately normal distribution, and significant associations with educational processes and outcomes (Martin et al., 2010; Martin & Marsh, 2008; Putwain et al., 2012). Table 1 presents factor loadings, reliability coefficients, descriptive data, and distributional properties.

2.2.2.1. Psychological risk

The study assessed two dimensions of psychological risk: academic and non-academic. Academic psychological risk factors were academic anxiety, failure avoidance, and uncertain control. Non-academic psychological risk factors were emotional instability and neuroticism. All five areas of psychological risk were operationalized as independent factors (see Section 2.3).

Academic psychological risk. The three academic psychological risk measures are drawn from the Motivation and Engagement Scale (MES; Martin, 2010), comprise 4 items each, are rated on a 1 (‘Strongly Disagree’) to 7 (‘Strongly Agree’) scale, are psychometrically sound, and shown to be reliable and invariant as a function of gender, ethnicity, age, and ability (Martin, 2007).

Anxiety (e.g., “When exams and assignments are coming up, I worry a lot”) comprises two parts: worrying and feeling nervous. Worrying refers to students’ fear of not doing very well in their schoolwork, exams, or assignments. Feeling nervous refers to the uneasy or sick feeling students get when they think about their schoolwork, exams, or assignments. *Failure avoidance* (e.g., “Often the main reason I work at school is because I don’t want to disappoint my parents”) is evident when students’ main academic impetus and motivation are to avoid doing poorly, avoid being seen to be

‘dumb’, or to avoid being seen to do poorly. *Uncertain control* (e.g., “I’m often unsure how I can avoid doing poorly at school”) measures students’ uncertainty about their capacity to avoid doing poorly or how to do well. These three factors can be modeled as one higher order factor, however, we opted to retain them as separate first order factors because the first order model has typically provided better fit than the higher order model (Martin, 2007). Descriptive, distributional, reliability, and confirmatory factor analytic findings are presented in Table 1.

Non-academic psychological risk. Non-academic psychological risk was assessed via emotional instability and neuroticism. *Emotional instability* (e.g., “I worry more than I need to”) examined respondents’ emotional instability in the forms of general (non-academic) worry and stress. The items are from the SDQ-II and have previously demonstrated sound psychometric properties (Marsh, 2007). *Neuroticism* was assessed with eight items from the International English Big-Five Mini-Markers instrument (IEBM; Thompson, 2008). Participants rated the extent to which the eight trait adjectives were accurate descriptors of themselves. Items for the IEBM are each represented by one word in which the respondent rates themselves 1 (‘Very Inaccurate’) to 7 (‘Very Accurate’). A sample word for neuroticism is ‘moody’. Thompson (2008) has previously demonstrated the reliability and predictive validity of neuroticism amongst adolescents. Based on their correlation here, the two measures share 60% variance. Descriptive, distributional, reliability, and confirmatory factor analytic details are shown in Table 1.

2.3. Statistical Analysis

Descriptive statistics (mean, standard deviation), Cronbach’s alpha reliability, and the factor loadings that gave rise to academic buoyancy and each of the five measures of psychological risk were first assessed. Using *Mplus* version 7 (Muthén & Muthén, 2012), a series of analyses then examined the relative salience of T1 academic buoyancy and T1 psychological risk in predicting psychological risk and academic buoyancy at T2. A ‘cross-lagged panel design’ was used to examine these relationships because it allows researchers to disentangle and differentiate the feasibility and strength of competing ‘directional’ interpretations between two factors that are

measured at two different occasions (Huck et al., 1974). Structural equation modeling (SEM) was used to operationalize this cross-lagged design while representing academic buoyancy and the five areas of psychological risk latent factors purged of unreliability.

Correlated uniquenesses for parallel items at T1 and T2 (e.g., between T1 academic buoyancy item 1 and T2 academic buoyancy item 1) were included in the SEM. This was because it is known that if the same measurements are used on multiple occasions, then corresponding residual error variables will tend to be correlated. Thus, in order to get accurate estimates of relations among the focal constructs, correlations among errors must be included in the statistical model (Marsh, Balla, & Hau, 1996). The root mean square error of approximation (RMSEA) and the comparative fit index (CFI) were considered as indicators of model fit. RMSEAs at or less than .08 and .05 reflect close and excellent fits respectively; CFIs at or greater than .90 and .95 reflect acceptable and excellent fits respectively (McDonald & Marsh, 1990). Maximum likelihood with robustness to non-normality and non-independence of observations (MLR; Muthén & Muthén, 2012) was used to estimate models. Less than five percent of data were missing and this was estimated using the Expectation Maximization Algorithm.

Figure 1 demonstrates that there are six possible relationships among T1 and T2 factors in a cross-lagged design (Huck et al., 1974). Two diagonal single-arrowed lines, labeled, “a” and “b”, represent the paths between T1 academic buoyancy on T2 psychological risk and between T1 psychological risk on T2 academic buoyancy, respectively. These are referred to as *cross-lagged* parameters (with lag referring to the time between two measurements). Two horizontal single-arrowed lines, labeled “c” and “d”, represent the paths between the same factors measured on two occasions (e.g., between T1 academic buoyancy and T2 academic buoyancy). These are referred to as *auto-lagged* parameters. Two double-arrowed lines, labeled “e” and “f”, represent the correlations between factors measured at the same time point (T1 and T2 panels, respectively). These are referred to as *unlagged* parameters. Of particular focus in the present study is the size and significance of cross-lagged predictive paths for T1 academic buoyancy relative to those for T1

psychological risk (“a” and “b” respectively). As discussed above, based on the reciprocal resilience-risk relationship in prior conceptualizing, we hypothesize that both cross-lagged parameters will be statistically significant.

3. Results

The skewness and kurtosis values in Table 1 indicated that the latent factors were approximately normally distributed and Cronbach’s alphas indicated that the factors were reliable at both Times T1 and T2. Factor loading ranges derived from the structural equation modeling are also shown in Table 1; these are generally high and indicate sound measurement bases upon which to conduct cross-lagged analyses – the focus of the study.

Results from the cross-lagged analyses (See Figure 2) suggested that the data fitted the models well, as indicated by acceptable fit indices reported in each figure: CFIs ranging between .95 and .97; RMSEAs ranging between .038 and .050. As shown in Figures 2a to 2e, T1 and T2 auto-lagged parameters are strong and significant – suggesting that any significant unique variance attributable to cross-lagged parameters is notable. Indeed, Figures 2a to 2e show that four of the five cross-lagged relationships between T1 academic buoyancy and T2 psychological risk were statistically significant. That is, beyond the variance explained by T1 psychological risk, T1 academic buoyancy was a significant negative predictor of T2 anxiety ($\beta = -.15, p < .001$), uncertain control ($\beta = -.06, p < .05$), emotional stability ($\beta = -.13, p < .001$), and neuroticism ($\beta = -.10, p < .001$). Also shown in Figures 2a to 2e, all five of the cross-lagged relationships between T1 psychological risk and T2 academic buoyancy were significant. That is, beyond the variance explained by T1 academic buoyancy, the following T1 psychological risk factors were significant negative predictors of T2 academic buoyancy: anxiety ($\beta = -.07, p < .01$), failure avoidance ($\beta = -.09, p < .001$), uncertain control ($\beta = -.05, p < .05$), emotional instability ($\beta = -.09, p < .001$), and neuroticism ($\beta = -.10, p < .001$). In the main, findings confirmed that the relationships between psychological risk and buoyancy are reciprocal. As further evidence of reciprocal status, when constraining models comprising two significant cross-lagged parameters (i.e., all models except

failure avoidance), there was no significant difference in model fit (based on CFI criteria recommended by Cheung & Rensvold, 2002 and on RMSEA criteria recommended by Chen, 2007) when the cross-lagged paths were fixed to be equal.

4. Discussion

The purpose of the present study was to investigate the hypothesized reciprocal relationship between psychological risk and academic buoyancy. After controlling for significant auto-lagged effects, nine of the ten cross-lagged parameters were significant. Indeed, the strength of the auto-lagged effects underscores the significance of the cross-lagged effects. We therefore conclude that the relationship between psychological risk and academic buoyancy appears to be reciprocal: academic buoyancy impacts psychological risk and psychological risk impacts academic buoyancy.

Substantively, our findings support theories that emphasize reciprocal relationships between risk and adversity-related constructs (Morales, 2000; Rutter, 1987, 2006). Our findings align with models that would hold that buoyancy is a construct that is relevant to reducing risk and theorizing that places the reduction of risk as a major part of helping young people effectively negotiate the ups and downs of school life. A contribution of the present study is that it broadens ‘classic’ models of resilience to also encompass risk in the academic domain and also the recently proposed and related buoyancy construct within this domain (Martin & Marsh, 2008). In their conceptual review of buoyancy and resilience, Martin and Marsh (2009) speculated about the relative roles of risk and buoyancy. They cited a number of possible ways buoyancy might operate, including a reciprocal role. Our findings here offer some closure on their speculation by supporting a mutually influential role of risk and buoyancy. Further, our findings also align with seminal reciprocal effects models (see Marsh, 2007; Marsh & Craven, 2006). These powerful models seek to address ‘chicken-egg’ questions and encourage theorists to move beyond static or uni-directional self-system models to more appropriately recognize the dynamic interplay between concepts. Just as resilience researchers have suggested the importance of this dynamic perspective on risk and resilience (e.g., Compas, 2004; Rutter, 2006), the present findings suggest as much for risk and academic buoyancy.

The findings also hold applied implications pertaining to educational interventions aimed at reducing students' psychological risk and enhancing their academic buoyancy. Based on the significant cross-lagged and the auto-lagged parameters, intervention might seek to target both academic buoyancy and psychological risk. In terms of the academic psychological risk factors (academic anxiety, failure avoidance, uncertain control), there is research demonstrating the effectiveness of interventions reducing academic anxiety (Martin, 2008; McInerney, McInerney, & Marsh, 1997), reducing fear of failure (Covington, 1998; Martin, 2008), and developing more adaptive locus of control in attributions (Craven, Marsh, & Debus, 1991; Martin, 2008). In terms of non-academic psychological risk factors (emotional instability, neuroticism), we emphasize the review by Ginns and colleagues (2011) who describe how individuals can be taught to change behavior, cognition and affect in the face of mental health and personality attributes that might otherwise leave them 'stuck'. In terms of academic buoyancy itself, we point to prior work identifying self-efficacy as a key element in resilience (Rutter, 1987) and academic buoyancy (Martin et al., 2010; Martin & Marsh, 2006) and successful interventions that have been conducted in enhancing self-efficacy (e.g., O'Mara, Marsh, & Debus, 2006; Schunk & Ertmer, 2000).

There are some limitations that should be recognized when interpreting the findings. First, the fact that schools in the sample tended to be higher in achievement and socio-economic status may have a bearing on findings of a study focused on psychological risk and academic adversity. Future research should explore the generalizability of our effects in at-risk samples. Second, the study measured general academic buoyancy rather than subject-specific buoyancy and thus future work might focus on academic buoyancy in specific school subjects (e.g., along the lines of Malmberg, Hall, & Martin, in press). Third, our two non-academic measures (emotional stability and neuroticism) are correlated factors and this will manifest in some shared patterns of variance with academic buoyancy. Nevertheless, based on their correlation here, there is 40% of the variance that is not shared between them and so they are not considered the same construct. Fourth, the study is based on self-report, which although defensible given the focus on intra-psychic factors, might be

supplemented by ‘objective’ measures such as ratings by significant others (such as teachers and/or parents; e.g., Goodman, Lamping, & Ploubidis, 2010). Fifth, future work might look to extend the present model by exploring the effects of the identified risk-buoyancy processes on academic achievement. Sixth, another extension would be to add a third (or more) time wave in measurement to assess if, for example, paths between T1 buoyancy and risk to T3 buoyancy and risk are direct and/or are mediated by T2 buoyancy and risk. This would help us to understand the process better than what was possible in the present study. Seventh, an additional future inclusion might be to explore ‘third variables’ (e.g., socio-demographics) that may moderate the effects of the main effects investigated here. Finally, cross-lagged panel designs are powerful quantitative models that can be substantially enriched through qualitative methods that can better understand individual and contextual features relevant to the risk and buoyancy processes under focus.

5. Conclusion

Research has tended to support a close relationship between risk and resilience and that there is a reciprocal process that seems to characterize that relationship. The present study sought to extend this research by examining a similar process in the academic domain with a focus on academic buoyancy and psychological risk. Findings supported a reciprocal relationship between buoyancy and risk and thereby offer some guidance to practitioners and future researchers seeking to understand and address students’ capacity to deal with academic adversity in the everyday course of school life.

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*Table 1.**Descriptive, Reliability, and CFA Statistics*

	Mean (SD)		Skew		Kurtosis		Cronbach's Alpha		CFA Loading Range	
	Time 1	Time 2	Time 1	Time 2	Time 1	Time 2	Time 1	Time 2	Time 1	Time 2
<i>Academic Buoyancy</i>										
- Academic Buoyancy	4.70 (1.23)	4.59 (1.23)	-.39	-.32	-.04	-.09	.80	.79	.65-.78	.64-.78
<i>Academic Psychological Risk</i>										
- Anxiety	4.21 (1.40)	4.21 (1.37)	-.05	-.07	-.65	-.57	.78	.78	.60-.76	.59-.75
- Failure Avoidance	3.12 (1.40)	3.23 (1.41)	.44	.30	-.42	-.59	.80	.80	.57-.83	.52-.86
- Uncertain Control	3.31 (1.30)	3.25 (1.32)	.22	.23	-.54	-.58	.77	.81	.62-.76	.65-.77
<i>Non-academic Psychological Risk</i>										
- Emotional Instability	3.79 (1.37)	3.86 (1.39)	.01	-.04	-.62	-.58	.82	.83	.54-.89	.55-.87
- Neuroticism	3.62 (0.97)	3.74 (1.02)	.03	.05	.04	.07	.73	.75	.78-.83	.74-.85

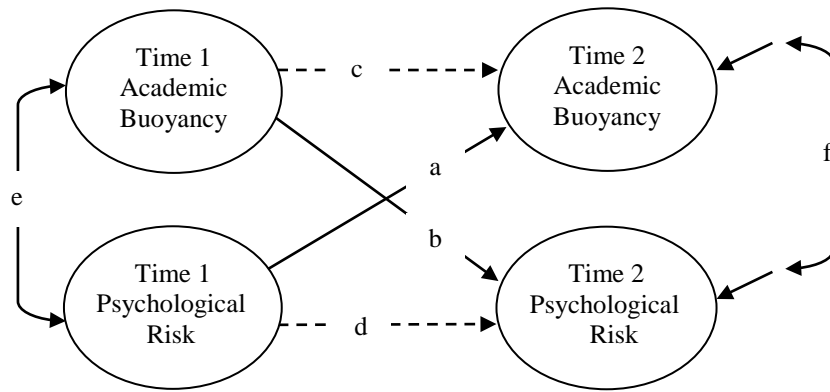


Figure 1. Hypothesized Cross-lagged Relationships between Academic Buoyancy and Psychological Risk

Note: “a” and “b” represent cross-lagged path coefficients between T1 academic buoyancy and a T2 psychological risk factor and between a T1 psychological risk factor and T2 academic buoyancy; “c” and “d” represent auto-lagged path coefficients for academic buoyancy and psychological risk factors, respectively; and “e” and “f” represent unlagged correlation coefficients between T1 academic buoyancy and a T1 psychological risk factor and between T2 academic buoyancy residual and a T2 psychological risk residual, respectively (note that “f” is the T2 correlation after controlling for factors’ auto-lagged and cross-lagged effects in the model).

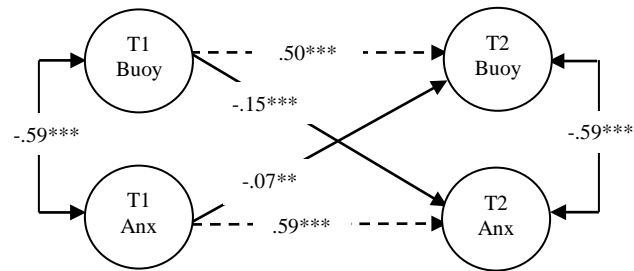


Fig. 2a. Cross-lagged analysis: ACADEMIC BUOYANCY and ANXIETY (Anx) ($\chi^2(90) = 708$; CFI=.96; RMSEA=.048)

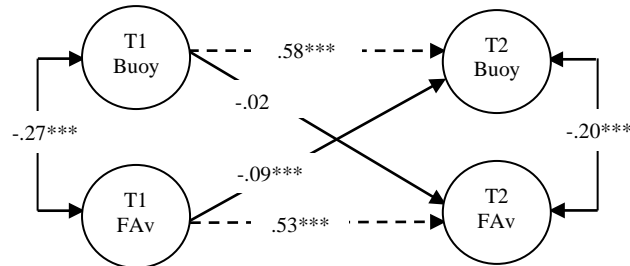


Fig. 2b. Cross-lagged analysis: ACADEMIC BUOYANCY and FAILURE AVOIDANCE (FAv) ($\chi^2(90) = 706$; CFI=.96; RMSEA=.048)

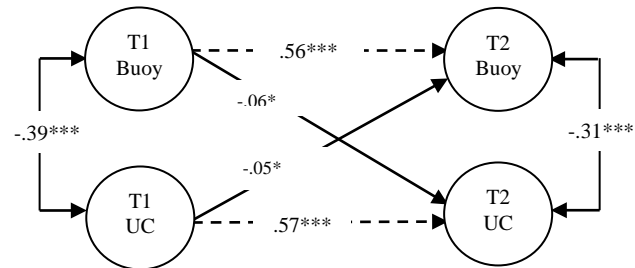


Fig. 2c. Cross-lagged analysis: ACADEMIC BUOYANCY and UNCERTAIN CONTROL (UC) ($\chi^2(90) = 477$; CFI=.97; RMSEA=.038)

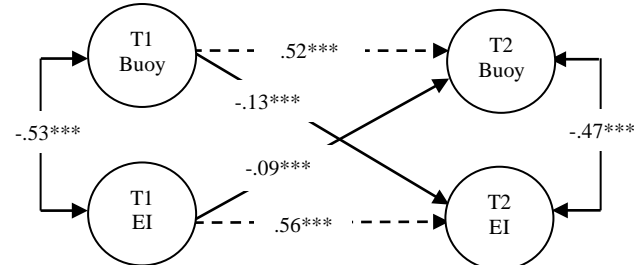


Fig. 2d. Cross-lagged analysis: ACADEMIC BUOYANCY and EMOTIONAL INSTABILITY (EI) ($\chi^2(120) = 977$; CFI=.95; RMSEA=.049)

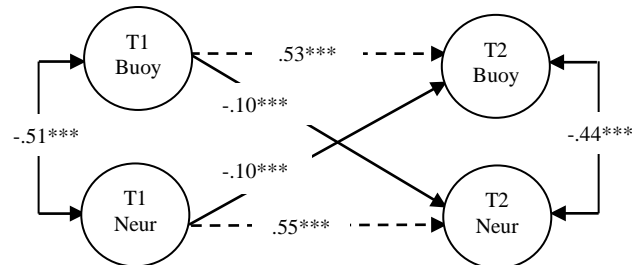


Fig. 2e. Cross-lagged analysis: ACADEMIC BUOYANCY and NEUROTICISM (Neur) ($\chi^2(42) = 360$; CFI=.97; RMSEA=.050)

Figure 2. Empirical Path Analytic Models of the Cross-lagged Relationships between Academic Buoyancy and Psychological Risk Factors

Notes: * $p < .05$, ** $p < .01$, *** $p < .001$ Buoy = Academic Buoyancy