The appraisal of fear appeals as a challenge or a threat influences a subsequent decline or increase in attainment value and academic self-efficacy

Abstract

Fear appeals are persuasive messages that highlight the negative consequences of a particular course of action. Studies have shown that attainment value and academic self-efficacy predict how fear appeals are appraised. In this study we examined how the appraisal of fear appeals might also influence subsequent attainment value and academic self-efficacy. Self-report data were collected from 1433 students in their final two years of secondary education over three waves. Findings revealed that when students saw fear appeals as a challenge attainment value and academic self-efficacy were higher. When students saw fear appeals as a threat, attainment value and academic self-efficacy were lower. These results highlight the functional importance of how fear appeals are appraised. Challenge and threat appraisals were not mere by products of attainment value or academic self-efficacy but impacted on attainment value and academic self-efficacy; variables that are likely to make a critical impact on educational progress and attainment. We conclude that initial teacher education and teacher professional development programs would benefit from enhanced interpersonal and relational-skills training to enable teachers to judge more effectively how fear appeals are appraised.

Keywords: fear appeals, attainment value, academic self-efficacy, high-stakes testing

The appraisal of fear appeals as a challenge or a threat influences a subsequent decline or increase in attainment value and academic self-efficacy

1. Introduction

This study examines how academic self-efficacy and attainment value relate to the appraisal of fear appeals used by secondary school teachers prior to a high-stakes examination. Fear appeals are used by teachers as a motivational strategy; a 'scare tactic' to attempt to persuade and encourage their students to work hard and prepare thoroughly for forthcoming examinations (Putwain, 2009; Putwain & Roberts, 2009). Although these messages may be used with the intention to benefit students, evidence suggests that the use of fear appeals may not always have the desired effect. When appraised as threatening fear appeals result in higher test anxiety, lower motivation, and lower grades (e.g., Putwain & Symes, 2011a, 2011b; Putwain & Remedios, 2014a). However, fear appeals can be appraised as challenging as well as threatening. For example, when attainment value and academic self-efficacy are high, students perceive fear appeals as challenging (Putwain & Symes, 2014; Putwain, Remedios, & Symes, 2014). This finding begs a question about directionality. If attainment value and academic self-efficacy influence the appraisal of fear appeals, does the appraisal of fear appeals also have an impact on attainment value and academic self-efficacy? This study sets out to answer this question in a longitudinal design by examining whether the appraisal of fear appeals predicts subsequent academic self-efficacy and attainment value over and above the variance explained by prior academic self-efficacy and attainment value.

1.1 Fear Appeals: Persuasive Messages Designed to Elicit Adaptive Threat

Fear appeals are persuasive communications that draw attention to the negative and unwanted consequences of a particular course of action in order to elicit a change in behaviour to avoid those consequences (e.g. Ruiter, Abraham, & Kok, 2001; Smerecnik & Ruiter, 2010). Fear Appeals have been researched most often in the health literature to

examine the effectiveness of messages designed to promote, for example, smoking cessation, safe sex practices, and self-examination for breast and testicular cancer (e.g., Anderson, 2000; Cismaru, Nagpal & Krishnamurthy, 2009; Feng & Burleson, 2008; Umphrey, 2004). The extended-parallel process model (Popova, 2012; Witte & Allen, 2000) proposes that the success of fear appeals to change behaviour depends on the beliefs about the likelihood and severity of the negative outcome, whether an alternative course of action is likely to avoid that negative outcome (response efficacy) and whether the message recipient believes that they are capable of performing the alternative course(s) of action (self-efficacy). Meta-analyses based on the health literature have supported these predictions. The evidence suggests that fear appeals will be most successful in changing behaviour when the perceived threat is high (the negative outcome is believed to be likely and severe) and when response and self-efficacy are also high (Maloney, Lapinski, & Witte, 2011; Peter, Ruiter, & Kok, 2013).

1.2 Fear Appeals in the Classroom

A nascent body of work shows that fear appeals are not limited to the health context but are communicated by teachers to their students, prior to high-stakes examinations. For instance, Putwain and Roberts (2012) surveyed 234 secondary school teachers about their use of language prior to high-stakes examinations. Of those teachers surveyed, 81.6% agreed or strongly agreed that students should be reminded that failure would result from inadequate preparation and 67.5% agreed or strongly agreed that students should be told that failure would prevent further study in post-compulsory education. When used in an educational or instructional context prior to high-stakes examinations, Putwain and Symes (2014) define fear appeals as "…messages used by teachers (or other school staff, such as managers) to: (a) elicit fear through highlighting the negative consequences of failure along with (b), those

courses of action are likely to increase the threat of failure and/ or (c), how the threat of failure can be avoided by adopting an alternative course of action" (pp. 230 – 231).

One might reasonably ask, what does it matter if teachers use fear appeals prior to high-stakes examinations, or if students appraise them in different ways? When appraised as threatening, fear appeals result in higher test anxiety, a higher performance-avoidance goal (to avoid performing worse than one's classmates), lower intrinsic motivation, and lower grades on tests and examinations (Putwain & Best, 2011, 2012; Putwain & Roberts, 2009; Putwain & Remedios, 2014b; Putwain & Symes, 2011a,2011b; Sprinkle, Hunt, Simonds, & Comadena, 2006). These findings are broadly consistent with those from adjacent areas of the educational psychology literature. For example, the use of threats, deadlines, pressured evaluations, and imposed goals (see Ryan & Deci, 2000; Reeve, 2009) are associated with reduced engagement and increased learning-related anger and anxiety (Assor & Kaplan, 2001; Assor, Kaplan, Kanat-Maymon & Roth, 2005). Coercive practices that threaten students with punishment and guilt are associated with a decrease in positive learning-related affect, motivation, and cognitive learning (Mainhard, Brenkelmans, & Wubbels, 2011).

1.3 Fear Appeals in the Classroom: How are they Appraised?

Putwain and Symes (2014) propose that fear appeals are appraised on the basis of the personal relevance (primary appraisal) and on the resources or options available for responding to that event (secondary appraisal). A challenge appraisal occurs when the fear appeal is judged as being relevant and the student believes that they can respond effectively to the demands posed in the message. A challenge appraisal will be accompanied by positive emotions (e.g., hope) and result in favourable outcomes (e.g., academic engagement). On the other hand, a threat appraisal occurs when the demands of a personally relevant message are believed to outweigh one's ability to respond effectively. A threat appraisal will be accompanied by negative emotions (e.g., anxiety) and result in unfavourable outcomes (e.g.,

academic disaffection). To examine these claims, research into the appraisal of classroom fear appeals has drawn upon expectancy-value theory (EVT) and control-value theory (CVT) to explain how students judge relevance and response options.

EVT is a theory of academic motivation that proposes achievement-related choices and performance arise from the interaction of task values with the expectancy of success (Eccles, 2007; Eccles, O'Neill & Wigfield, 2005; Wigfield, Tonks, & Klauda, 2009). CTV is a theory of learning and assessment-related emotions (Pekrun, 2006; Pekrun, Goetz, Titz & Perry, 2002; Pekrun, Frenzel, Goetz & Perry, 2007; Pekrun & Perry, 2014). In CVT, discrete emotions (e.g., enjoyment or boredom) arise from differing combinations of control and value appraisals of learning activities or outcomes. Studies have confirmed that relevance is established through attainment value and response options through academic self-efficacy (Putwain & Remedios, 2014a; Putwain & Symes, 2014; Putwain, Remedios, & Symes, 2014).

Attainment value refers to the perceived importance of performance on a particular task or the importance of grade in a school subject to one's sense of self-identity (Eccles et al., 2005; Wigfield & Eccles, 2000; Wigfield et al., 2009). Attainment value can be differentiated from intrinsic value, concerned with task interest and enjoyment, and utility value, where the task is instrumental in achieving an outcome separate from the task itself (e.g., a career goal). In EVT subjective task values are proposed to influence academic engagement and choice. A student would be more likely to choose to engage in a particular task when task participation or performance is seen as central to his or her own sense of themselves (Eccles, 2005, 2007).

Academic self-efficacy refers to the belief that one is capable of learning or performing those actions required to succeed at a particular task (Bandura, 1997; Schunk & Pajares, 2002). These beliefs are domain-specific and arise from differing combinations of

mastery experience, feedback from others, attributions of task performance, and differing frames of reference (Skaalvik, 1997; Bong & Skaalvik, 2003). Academic self-efficacy influences task-specific thought, cognition, and behaviour, and is highly predictive of task-performance (e.g., Parker, Marsh, Ciarrochi, Marshall, & Abduljabbar, 2014; Schunk & Pajares, 2002).

In EVT, beliefs about the expectation of success (conceptually aligned with academic self-efficacy – see Wigfield & Eccles, 2000) combine with subjective-task value to influence academic achievement, effort, motivation, and school dropout (e.g., Chouinard, Karsenti, & Roy, 2007; Fan & Wolters, 2014; Federici & Skaalvik, 2014; Nagengast, Marsh, Scalas, Xu, & Trautwein, 2011). In CVT, action-control expectancy (i.e., academic self-efficacy) combines with subjective values to result in specific and discrete learning, classroom and test-related emotions (Pekrun, Goetz, Frenzel, Barchfeld, & Perry, 2011; Pekrun, Goetz, Perry, Kramer, Hochstadt, & Molfenter, 2004).

1.4 Is the Appraisal of Fear Appeals Related to Subsequent Attainment Value and Academic Self-Efficacy?

Cross-sectional and experimental studies using secondary school students have supported the role of attainment value and academic self-efficacy as antecedents of challenge and threat appraisal of fear appeals made prior to a high-stakes examination. A challenge appraisal follows high attainment value and high academic self-efficacy whereas a threat appraisal follows high attainment value but low academic self-efficacy (Putwain & Remedios, 2014a; Putwain & Symes, 2014; Putwain et al., 2014). However, it is not yet known whether challenge and threat appraisal of fear appeals could also influence subsequent attainment value and academic self-efficacy. That is, whether the linkages between attainment value and academic self-efficacy and challenge and threat appraisal are bidirectional rather than unidirectional. It is of theoretical and practical importance to

establish whether the appraisal of fear appeals is a by-product of attainment value and academic self-efficacy, or whether they can further influence attainment value and academic self-efficacy in a positive or negative way. It would be of considerable benefit to teachers and instructors to know whether the appraisal of fear appeals are likely to result in positive or negative outcomes.

Fear appeals made by a teacher prior to a high-stakes examination are ostensibly a classroom climate variable as they are common to a whole class (see Marsh et al., 2012; Morin et al., 2014). However, the appraisal of fear appeals along with academic self-efficacy and attainment value, as antecedents and possible outcomes, are primarily student-level, self-system, constructs (see Martin, Bobis, Anderson, Way, & Vellar, 2011). Although it is possible that academic self-efficacy, attainment value, and fear appeals appraisals show between as well as within-class effects the focus in this study is of bidirectional relations between appraisals, academic self-efficacy, and attainment value at the student level.

Based partly on the theoretical propositions of CVT and partly on evidence from interventions reported in the positive psychology and positive education literature, we propose that the appraisal of fear appeals would predict changes in subsequent academic self-efficacy and attainment value, beyond that explained by prior academic self-efficacy and attainment value as a function of self-reflection and accompanying emotions. CVT proposes a feedback loop from emotions to control and value appraisals (Pekrun 2006, Pekrun et al., 2007) such that the affective state reinforces motivational values and beliefs. Enjoyment, for example, has been shown to influence subsequent interest, effort, and mastery-approach goals (Ainly & Ainly, 2011; Dettmers et al., 2011; Putwain, Larkin, & Sander, 2013; Senko & Harackiewicz, 2005). Interventions derived from positive psychology and implemented in instructional contexts have shown how seemingly simple exercises, such as asking students to identify and reflect on their strengths can have powerful results on achievement-related

beliefs, motivation, and performance (Green, Oades, & Robinson, 2011; Sin & Lyubomirsky, 2009; Waters, 2011).

Based on the combined nexus of self-reflection and accompanying emotions we propose challenge and threat appraisal of fear appeals to result in different outcomes for attainment value and academic self-efficacy. In a challenge appraisal, a reflection is prompted about the importance of attainment and one's capacity to respond effectively resulting in a subsequent increase in academic self-efficacy and attainment value. These are further reinforced by accompanying anticipatory positive emotions (such as pride and optimism). In threat appraisal, a reflection is prompted about how one is not likely to be able to respond effectively to a valued outcome, accompanied by anticipatory negative emotions (such as anxiety and hopelessness). The result is a subsequence decrease of academic self-efficacy and attainment value (as the valued outcome seems less likely to occur).

1.5 Aims of this study

The aim of this study was to examine how the appraisal of fear appeals related to subsequent attainment value and academic self-efficacy. Academic self-efficacy and attainment are theorised not only as antecedents of how fear appeals are appraised, but also as outcomes of the appraisal process. We set out to test the following hypotheses: Higher attainment value and higher academic self-efficacy result in the appraisal of fear appeals as more challenging (H_1), higher attainment value and lower academic self-efficacy result in the appraisal of fear appeals as more threatening (H_2), a stronger challenge appraisal will result in higher attainment value and higher academic self-efficacy (H_3), and a stronger threat appraisal will result in lower attainment value and lower academic self-efficacy (H_4). Hypotheses were tested in using latent structural equation model modelling (SEM) based on the paths depicted in Figure 1.

[Figure 1 here]

The constructs used in this study (fear appeals appraisals, attainment value, and academic self-efficacy) vary in their degree of domain specificity. They could be defined and operationalised in relation to a specific task or more generally in relation to school (e.g., Bong, 2001; Putwain & Symes, 2014; Wigfield & Eccles, 2000). Although there are various advantages and disadvantages associated with differing levels of domain-specificity it is important to ensure, according to the matching-specificity principle (Swann, Chang-Schneider, & McClarty, 2007), that the different constructs are defined and operationalised at the same level of specificity. In this study, we allowed the educational context to drive the decision over the level of specificity. As participants were students following a programme of study leading to a high-stakes examination in a particular subject, fear appeals appraisals, attainment value, and academic self-efficacy were defined and operationalised in a subject-specific fashion.

2. Method

2.1 Participants and Procedure

Data were collected in three waves over the course of a single academic year from eighteen coeducational, state-funded, English secondary schools. The participants in the first wave of data collection (T_1 sample n = 1433) were students in Year 10, the penultimate year of secondary education in England (n = 519, 36.2%), and Year 11, the final year of secondary schooling (n = 907, 63.8%). The mean age of participants at the first wave of data collection was 14.9 years (SD = .77) and there was an almost even balance of male (n = 721, 50.4%) and female (n = 710, 49.6%) students. The ethnic heritage of students was predominantly Caucasian (n = 1212, 84.8%) with smaller numbers from Asian (n = 92, 6.4%), Black (n = 40, 2.8%), other backgrounds (n = 32, 2.2%) or mixed heritage (n = 54, 3.8%) backgrounds.

Participations were clustered in 57 classes with a mean of 25.1 students per class at the first wave of data collection. A wide variety of different subjects were taught in these

classes. Subjects included English, mathematics, science (either taught as a combined subject or as separate science subjects), humanities (geography, history and media studies), modern foreign languages (German, French, and Spanish), computing, and visual and performing arts. Participants completed self-report measures in one subject only.

Some attrition occurred from one wave of data collection to the next due to participants being absent from school due to illness or truancy, having moved school, or exercising their ethical right to withdraw their participation. From the first to second waves of data collection participant attrition was 10.7% (T_2 sample n = 1280) and from the second to third wave of data collection attrition was a further 11.7% (T_3 sample n = 1127).

During years 10 and 11, students follow an eighteen-month program of study leading to the high-stakes school exit examinations in the General Certificate of Secondary Education (GCSE). Students typically study between eight and ten subjects. Mathematics, English, and science are compulsory subjects and the remaining subjects are chosen from options offered by a particular school. The first wave of data collection was early in the autumn term (October 2013), the second wave of data collection early in the spring term (January 2014), and the final wave of data collection early in the summer term (April 2014). Data collection was scheduled in this way to separate each wave by three months and to fit the logistical demands of the English school year. Term starts in September, hence schools are typically reluctant to collect data during this time, and GCSE examinations are scheduled over May and June, hence Year 11 students stop attending regular scheduled lessons in April. It is not feasible to collect data from Year 11 students after April.

2.2 Study Measures

2.2.1 Attainment value.

Attainment value was measured using three items adapted by Putwain and Remedios (2014a) from the *Michigan Study of Adolescent Life Transitions* scales (Eccles et al., 2005).

All items were made specific to GCSE and the subject that students completed measures in relation to (mathematics exemplar item: 'How important is it to you to get a good grade in GCSE maths?'). Participants responded on a five-point scale of 1 – 5 (1 = not important, 3 = neither, 5 = very important). Internal reliability coefficients were acceptable (T_1 Cronbach's α = .70; T_2 Cronbach's α = .75).

2.2.2 Academic self-efficacy.

Academic self-efficacy was measured using three items selected from the from the academic self-efficacy scale in the *Motivated Strategies for Learning Questionnaire* (Pintrich & DeGroot, 1990). Items were selected on the basis of their face validity that they explicitly referred to action-control beliefs (i.e., academic self-efficacy of success) and were adapted to refer to GCSE and the subject that students completed measures in relation to (mathematics exemplar item: 'I think I will receive a good grade in my maths GCSE'). Participants responded on a five-point scale of 1 – 5 (1 = strongly disagree, 3 = neither, 5 = strongly agree). Internal reliability coefficients were acceptable (T_1 Cronbach's α = .83; T_2 Cronbach's α = .85).

2.2.3 Appraisal of fear appeals.

The appraisal of fear appeals was measured using six items from the *Revised Teachers Use of Fear Appeals Questionnaire* (Putwain & Symes, 2014). All items were made subject-specific to the class that they were completed in relation to. Challenge appraisal was (mathematics exemplar item: 'Does it make you want to pass GCSE maths when [name of teacher inserted] tells you that unless you work hard you will fail?'), and threat appraisal (e.g., 'Do you feel worried when [name of teacher inserted] tells you that maths GCSE is important in order to get a good job?') were measured with three items each. Participants responded on a five-point scale of 1 – 5 (1 = never, 3 = sometimes, 5 = most of the time).

Internal reliability coefficients were acceptable for both challenge (Cronbach's $\alpha = .78$) and threat appraisal (Cronbach's $\alpha = .84$).

3. Results

3.1 Preliminary Data Analyses

3.1.1 Measurement Model

A measurement model of attainment value and academic self-efficacy at T_1 and T_3, and fear appeals appraisals at T_2 was estimated using robust maximum likelihood estimation with robustness to non-normality in M*plus* 7.3 (Muthén & Muthén, 2012). The 'complex' and 'cluster' commands were used to adjust standard errors for estimates to account for the clustering of student responses within classes. Residual variance was allowed to correlate for the three attainment value and academic self-efficacy items between T_1 and T_3, and between pairs of challenge and threat appraisal items at T_2 with corresponding domains (failure in general, getting a job, and obtaining a college place). Attrition was not statistically related to study variables and missing data were treated as missing-at-random. Subsequent analyses used full-information-maximum-likelihood to handle missing data.

[Table 1 here]

M*plus* provides a variety of model indices: χ^2 statistic, root mean square error or approximation (RMSEA), the standardized root mean square residual at within and between levels (SRMR), comparative fit index (CFI), and Tucker Lewis Index (TLI). As the χ^2 statistic is widely accepted to be sensitive to sample size, we focus our interpretation on the remaining four statistics. Good fitting models can be expected show a RMSEA of $\leq .05$, a SRMR of $\leq .08$, and CFI and TLI $\geq .95$ (Marsh, Hau, & Grayson, 2005; Marsh, Hau, & Wen, 2004). By these standards the measurement model showed a good fit to the data: $\chi^2(111) = 177.38$, $p < .001$, RMSEA = .021, SRMR = .031, CFI = .990, TLI = .987. When factor loadings and intercepts were constrained to be equal for attainment and value academic self-

efficacy and attainment T_1 and T_3 (strong invariance) there was no substantial deterioration in model fit (ΔCFI/ TLI >.01).

3.1.2 Latent Bivariate Correlations

Latent bivariate correlations between attainment value, academic self-efficacy, and fear appeals apprasials are reported in Table 1. A challenge appraisal was positively correlated with, and a threat appraisal was negatively correlated with, academic self-efficacy (at both T_1 and T_3). A challenge appraisal was positively correlated with attainment value at both T_1 and T_3. However, a threat appraisal was positively correlated with attainment value at T_1 but negative correlated with attainment value at T_3. Challenge and threat were positively intercorrelated, as were academic self-efficacy and attainment value (at both T_1 and T_3).

3.2 Structural Equation Modelling

A SEM was estimated in M*plus* 7.3 (Muthén & Muthén, 2012) using maximum likelihood estimation with robustness to non-normality and the 'complex' and 'cluster' to account for the nested structure of the data. In addition to the paths specified in Figure 1, gender (0 = male, 1 = female) and year group (0 = Year 10, 1 = Year 11) were included as covariates. The SEM showed a good fit to the data: $\chi^2(136) = 251.13$, $p < .001$, RMSEA = .025, SRMR = .029, CFI = .982, TLI = .975. Standardised path coefficients and covariance (estimated using the STDYX command in M*plus*), are shown in Figure 2.

A stronger challenge appraisal followed from higher attainment value ($\beta = .53$, $p < .001$) and higher academic self-efficacy ($\beta = .25$, $p < .001$) whereas a stronger threat appraisal resulted from higher attainment value ($\beta = .31$, $p < .001$) and lower academic self-efficacy ($\beta = -.38$, $p < .001$). Attainment value and academic self-efficacy were stable from T_1 to T_3 ($\beta = .68$, $p < .001$; $\beta = .66$, $p < .001$, respectively). A greater challenge appraisal resulted in higher attainment value ($\beta = .29$, $p < .001$) and higher academic self-efficacy ($\beta = .33$, $p < .001$) whereas a greater threat appraisal resulted in lower attainment value ($\beta = -.22$, $p = .001$) and

lower academic self-efficacy (β = -.23, $p < .001$). Paths from T_1 academic self-efficacy to T_3 attainment value and from T_1 attainment value to T_3 academic self-efficacy were not statistically significant (β = .11, p =.09; β = .01, p = .98, respectively). Of the covariates included in this model, gender was associated with challenge appraisal (β = .14 p = .003), threat appraisal (β = .20 $p < .001$), and T_1 academic self-efficacy (β = -.13 p = .002). Year group was associated with threat appraisal (β = .13, p =.02). All other associations with covariates were non-statistically significant (p >.05).

For instance, all things being equal, a student who with high attainment value and high academic self-efficacy (+1SD) at T_1 would report a challenge score of 4.17 (corresponding to a 'strong' endorsement of a challenge appraisal) and a threat score of 2.56 (a threat appraisal was neither endorsed nor rejected). At T_3 such a student would have an above average academic self-efficacy (a score of 3.86, approaching a 'strong' endorsement of academic self-efficacy) and attainment value (a score of 4.24, corresponding to a 'strong' endorsement of attainment value).

4. Discussion

The aim of this study was to examine how attainment value and academic self-efficacy may be outcomes as well as antecedents of the way fear appeals are appraised. Results showed that higher attainment value and higher academic self-efficacy lead to a greater challenge appraisal (supporting H_1) whereas higher attainment value and lower academic self-efficacy lead to a greater threat appraisal (supporting H_2). Furthermore, a stronger challenge appraisal lead to higher attainment value and higher academic self-efficacy (supporting H_3), and a stronger threat appraisal lead to lower attainment value and lower academic self-efficacy (supporting H_4). These results confirm that attainment value and academic self-efficacy are outcomes as well as antecedents of how fear appeals are appraised.

Appraisals predicted subsequent attainment value and academic self-efficacy while controlling for prior attainment value and academic self-efficacy.

4.1 The Appraisal of Fear Appeals

These findings are in line with those from previous studies using cross-sectional (Putwain, Remedios, & Symes, 2014) and experimental data (Putwain & Symes, 2014) and confirm the roles of attainment value and academic self-efficacy, derived from EVT and CVT, as antecedents of the appraisal of fear appeals. When students are presented with a fear appeal by their teacher, they appraise the message, initially, on the basis of its personal significance. Students for whom academic achievement is a strong part of their personal identity, and who value attainment in their GCSE subject, appraise the fear appeal as personally meaningful. The secondary appraisal of the fear appeal is made on the basis of academic self-efficacy. When the student believes they are capable of responding successfully to the demands in the fear appeal the result is a challenge appraisal. When the student does not believe they are capable of responding successfully to the demands in the fear appeal the result is a threat appraisal. The relatively large shared variance observed between a challenge and threat appraisal is likely to be the result of attainment value.

4.2 The Outcome of Fear Appeals Appraisal

The nascent literature examining the outcomes of fear appeals, used prior to high-stakes examinations, has shown that when fear appeals are appraised as threatening they result in a higher performance-approach goal, higher test anxiety, lower intrinsic motivation, and lower examination and test grades (Putwain & Best, 2011, 2012; Putwain & Symes, 2011b; Putwain & Remedios, 2014; Sprinkle et al., 2006). The results of this study extend this body of work to show how attainment value and academic self-efficacy are also influenced by how fear appeals are appraised. Whereas previous work focused only on negative educational outcomes arising from threat appraisal, the results of this study show that when appraised as a

challenge fear appeals can result in positive educational outcomes (i.e., higher attainment value and academic self-efficacy). These results are also in line with predictions from CVT (Pekrun 2006, Pekrun et al., 2007) that emotions, which we believe will arise from challenge and threat appraisals of fear appeals, feedback to control and value beliefs, such as academic self-efficacy and attainment value.

4.3 Fear Appeals Appraisals and Educational Achievement

Academic self-efficacy and attainment value predict successful educational outcomes including progress and attainment (Chouinard, Karsenti, & Roy, 2007; Fan & Wolters, 2014; Federici & Skaalvik, 2014; Nagengast et al., 2011; Walker, Greene, & Mansell, 2006). On the basis of this one would expect that challenge and threat appraisal of fear appeals would also be likely to influence subsequent educational achievement. Previous research has shown how the threat appraisal of a fear appeal is related to lower achievement (Putwain & Remedios, 2014b; Putwain & Symes, 2011b) however research has yet to empirically demonstrate how challenge appraisals relate to subsequent educational achievement. The higher academic self-efficacy and attainment value resulting from a challenge appraisal would strongly suggest that higher achievement would be the likely outcome. Furthermore, it would seem plausible that academic self-efficacy and attainment value (as well as other subject task values) would operate as mediators of the linkages between the appraisal of fear appeals and subsequent educational attainment.

Both CVT and EVT propose feedback loops from educational achievement to achievement-related beliefs, values, and emotions (Eccles, 2005, 2007; Pekrun 2006; Pekrun, & Perry, 2014; Pekrun et al., 2007). Furthermore, bidirectional relations have been empirically demonstrated for emotions such as boredom (Pekrun, Hall, Goetz, & Perry, 2014) and competence beliefs such as academic self-concept (Marsh, Kong, & Hau, 2002; Marsh & Martin, 2011). The same principle would also seem likely to extend to that of fear

appeals appraisals and educational achievement. That is, educational achievement might not only be an outcome of appraisals but also an antecedent. Students who do not achieve their expected grades may devalue academic achievement as a way of protecting their self-worth (Loose, Régner, Morin, & Dumas, 2012). Feedback on task performance can also influence one's subsequent academic self-efficacy (Diseth, 2011). Prior achievement might therefore be more likely to influence the subsequent appraisal of fear appeals as a challenge or a threat as a function of academic self-efficacy and attainment value. In sum, the relations between the appraisal of fear appeals and academic achievement could be bidirectional and mediated, as both an antecedent and as an outcome, by academic self-efficacy and attainment value.

4.4 Limitations

There are three limitations of our study to highlight. Theoretically speaking we focused only on one element of subjective task value. There may be merit to include other subjective task values, in particular cost. Cost is an important, yet often overlooked element of EVT (Wigfield et al., 2009). However, beliefs about costs could play an important role in understanding both the appraisals and outcomes of fear appeals. Fears about failure and the potential costs to self-worth worth may increase the likelihood of a threat appraisal and could be considered as another influence on secondary appraisal. Even if a student believes that they are capable of success and are enthused about their subject if the perceived costs of failure are high a threat appraisal would be more likely.

Methodologically speaking we relied on student-reported data, increasing the likelihood of common method variance. Although there may be little alternative to self-report for the measurement of private experiences (fear appeals appraisals, attainment value, and academic self-efficacy), it would be advantageous to include additional variables, such as academic attainment, that were not self-reported.

Finally, we focused in this study on student's appraisals of fear appeals, but did not examine actual teacher behaviour (e.g., frequency or strength of fear appeals). Fear appeals are a classroom climate or environment phenomenon and could be measured either from observers, teacher's self-reports, or aggregated student-reports. An appropriate analytic approach would also be required to model data at the classroom level. These could include class-average appraisals, subjective task-values, academic self-efficacy, and academic achievement.

4.5 Educational implications

The simple message from this research is that students can respond in very different ways to fear appeals depending on her or his beliefs about attainment value and capacity to respond effectively. Appraisals are important because they influence subsequent attainment value and academic self-efficacy; both salient predictors of academic achievement. The utopian view would be for all students to appraise fear appeals as a challenge, however, this is unlikely as it is almost inevitable that some students will value their attainment but anticipate that they will not achieve their aspired grades. A more pragmatic solution might be for programmes of initial teacher education and the continuing professional development of teachers to include interpersonal skills and relational support. The hope would be for teachers and instructors to be able to understand the beliefs and motivations of individual students and guide them about how to interpret and respond to messages and communications in the most adaptive way. Sadly relational and interpersonal competencies are not currently prioritised for the initial education of teachers England (Malmberg, Hagger, Burn, Mutton, & Colls, 2010). It is important that students should understand the potential of their education, and their school exit examinations in particular, to influence their future life trajectory. However, the concern highlighted in this study is that without attending to how students interpret or

appraise messages that convey this importance, there is a risk of some students responding in the very way that the message was intended to avoid.

4.6 Summary

This study is the first to examine how attainment value and academic self are both antecedents and outcomes of how fear appeals are appraised. Results confirm the findings of earlier studies that fear appeals are appraised on the basis of attainment and academic self-efficacy. Furthermore, a stronger challenge appraisal resulted in higher, and threat appraisal in lower, attainment value and academic self-efficacy. These findings contribute to the nascent body of work examining fear appeals used in an educational and instructional context and more generally to the body of work examining the perception of the psychosocial classroom environment.

5. References

Ainly, M., & Ainly, J. (2011). Student engagement with science in early adolescence: The contribution of enjoyment to students' continuing interest in learning about science. *Contemporary Educational Psychology, 36*(1), 4–12.doi: 10.1016/j.cedpsych.2010.08.001

Anderson, R.B. (2000). Vicarious and persuasive influences on efficacy expectations and intentions to perform breast self-examination. *Public Relations Review, 26*(1), 97–114.doi: 10.1016/S0363-8111(00)00033-3

Assor, A., & Kaplan, H. (2001). Mapping the domain of autonomy support: five important ways to enhance or undermine student's experience of autonomy in learning. In A. Efklides, J. Kuhl, & R. M. Sorrentino (Eds.) *Trends and prospects in motivation research* (pp. 101-120). Dordrecht: Kluwer.

Assor, A., Kaplan, H., Kanat-Maymon, Y., & Roth, G. (2005). Directly controlling teacher behaviours as predictors of poor motivation and engagement in girls and boys: the role of anger and anxiety. *Learning and Instruction, 15*(5), 397-413.doi: 10.1016/jlearninstruc.2005.07.008

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York, NY: Freeman.

Bong, M. (2001). Between- and within-domain relations of academic motivation among middle and high school students: self-efficacy, task-value and achievement goals. *Journal of Educational Psychology, 93*(1), 23-34.doi: 10.I037//0022-0663.93.1.23

Bong, M., & Skaalvik, E.M. (2003) Academic self-concept and academic self-efficacy: How different are they really? *Educational Psychology Review, 15*(1), 1–40.doi: 10.1023/A:1021302408382

Chouinard, R., Karsenti, T., & Roy, N. (2007) Relations among competence beliefs, utility value, achievement goals, and effort in mathematics. *British Journal of Educational Psychology*, 77(3), 501-517.doi: 10.1348/000709906X133589

Cismaru, M., Nagpal, A., & Krishnamurthy, P. (2009). The role of cost and response-efficacy in persuasiveness of health recommendations. *Journal of Health Psychology, 14*(1), 135-141.doi: 10.1177/1359105308097953

Dettmers, S., Trautwein, U., Lüdtke, O., Goetz, T., Frentzel, A. C., & Pekrun, R. (2011). Students' emotions during homework in mathematics: Testing a theoretical model of antecedents and achievement outcomes. *Contemporary Educational Psychology, 36*(1), 25–35.doi: 10.1016/j.cedpsych.2010.10.001.

Diseth, Å. (2011). Self-efficacy, goal orientations and learning strategies as mediators between preceding and subsequent academic achievement. *Learning and Individual Differences, 21*(2), 191-195.doi: 10.1016/j.lindif.2011.01.003

Feng, B., & Burleson, B.R. (2008). The effects of argument explicitness on responses to advice in supportive interactions. *Communication Research, 35*(6), 849-874.doi: 10.1177/0093650208324274

Eccles, J.S. (2005). Subjective task value and the Eccles et al. model of achievement-related choices. In A. J. Elliot & C. S. Dweck (Eds.), *Handbook of competence and motivation* (pp. 105–121). London: Guildford Press.

Eccles, J. S. (2007). Families, schools, and developing achievement related motivations and engagement. In J. E. Grusec and P. D. Hastings (Eds.), *Handbook of socialization* (pp. 665–691). New York, NY: Guilford Press.

Eccles, J.S., O'Neill, S.A., & Wigfield, A. (2005). Ability self-perceptions and subjective task-values in adolescents and children. In K.A. Moore & L.H. Lippman (Eds.) *What*

do children need to flourish? Conceptualizing and measuring indicators of positive development. (pp. 239-247). Springer, NY: New York

Fan, W., & Wolters, C.A. (2014). School motivation and high school dropout: The mediating role of educational expectations. *British Journal of Educational Psychology,* 84(1), 22-39.doi: 10.1111/bjep/12002

Fauth, B., Decristan, J., Rieser, S., Klieme, E., & Büttner, G. (2014) Student ratings of teaching quality in primary school: Dimensions and predictions of student outcomes. *Learning and Instruction, 29*(1), 1-9.doi: 10.1016/j.learninstruc.2013.07.001

Federici, R.A., & Skaalvik, E.M. (2014Students' perception of instrumental support and effort in mathematics: The mediating role of subjective task value. *Social Psychology of Education.* Advance online publication.doi: 10.1007/s11218-014-9264-8

Oades, L. G., Robinson, P., Green, S. & Spence, G. B. (2011). Towards a positive university. *Journal of Positive Psychology, 6* (6), 432-439.doi: 10.1080/17439760.2011.634828

Loose, F., Régner, I., Morin, A.J.S., & Dumas, F. (2012) Are academic discounting and devaluing double-edged swords? Their relations to global self-esteem, achievement goals and performance among stigmatized students. *Journal of Educational Psychology, 104*(3), 713-725. doi: 10.1037/a0027799

Lorsbach, A., & Links, J. (1999). Self-efficacy theory and learning environment research. *Learning Environments Research, 2*(2), 157–167.doi: 10.1023/A:1009902810926

Mainhard, M.T., Brenkelmans, M., & Wubbels, T. (2011) Coercive and supportive teacher behaviour: Within- and across-lesson associations with the classroom social climate. *Learning and Instruction, 21*(3), 345-354.doi: 10.1016/j.learninstruc.2010.03.003

Malmberg, L. E., Hagger, H., Burn, K., Mutton, T., & Colls, H. (2010). Observed classroom quality during teacher education and two years of professional practice. *Journal of Educational Psychology, 102*(4), 916-932.doi: 10.1037/a0020920

Maloney, E.K., Lapinksi, M.K., & Witte, K. (2011). Fear appeals and persuasion: A review and update of the extended parallel process model. *Social and Personality Psychology Compass, 5*(4), 206–219.doi: 10.1111/j.1751-9004.2011.00341.x

Martin, A. J., Bobis, J., Anderson, J., Way, J., & Vellar, R. (2011). Patterns of multilevel variance in psycho-educational phenomena: Exploring motivation, engagement, climate, teacher, and achievement factors. *German Journal of Educational Psychology, 25*(1), 49–61.doi:10.1024/1010-0652/a000029.

Marsh, H. W., Hau, K.T. & Wen, Z. (2004). In search of golden rules: Comment on hypothesis testing approaches to setting cut-off values for fit indexes and dangers in overgeneralising Hu & Bentler's (1999) findings. *Structural Equation Modelling, 11*(3), 320–341.doi:10.1207/s15328007sem1103_2

Marsh, H. W., Hau, K-T & Grayson, D. (2005). Goodness of fit evaluation in structural equation modelling. In A. Maydeu-Olivares & J. McArdle (Eds.) *Contemporary psychometrics. A festschrift for Roderick P. McDonald* (pp. 275–340). Mahwah, NJ: Erlbaum.

Marsh, H. W., Kong, C. K., & Hau, K. T. (2002). Multilevel Causal Ordering of Academic Self-concept and Achievement: Influence of Language of Instruction (English vs. Chinese) For Hong Kong Students. *American Educational Research Journal*, 39(3): 727-763.doi: 10.3102/00028312039003727

Marsh, H.W., Lüdtke, O., Nagengast, B., Morin, A. J. S., & Von Davier, M. (2013). Why item parcels are (almost) never appropriate: Two wrongs do not make a right—camouflaging mispecificaton with items parcels in CFA models. *Psychological Methods, 18*(3), 257–284.doi: 10.1037/a0032773

Marsh, H.W., Lüdtke, O., Nagengast, B., Trautwein, U., Morin, A. J. S., Abduljabbar, A. S. ,et al. (2012). Classroom climate and contextual effects: conceptual and methodological

issues in the evaluation of group-level effects. *Educational Psychologist, 47*(2), 106-124. doi.10.1080/00461520.2012.670488.

Marsh, H.W., & Martin, A.J. (2011) Academic self-concept and academic achievement: relations and causal ordering. *British Journal of Educational Psychology, 81*(1), 59-77.doi: 10.1348/000709910X503501

Morin, A.J.S., Marsh, H.W., Nagengast, B., & Scalas, L.F. (2014). Doubly latent multilevel analyses of classroom climate: An illustration. *The Journal of Experimental Education, 82*(2), 143-167.doi: 10.1080/00220973.2013.769412

Muthén, L. K. & Muthén, B. O. (2012). *Mplus user's guide. Seventh edition.* Los Angeles, CA: Muthén & Muthén.

Nagengast, B., Marsh, H.W., Scalas, L.F., Xu, M.K., & Trautwein, U. (2011). Who took the "×" out of academic self-efficacy -value theory? A psychological mystery, a substantive-methodological synergy, and a cross-national generalisation. *Psychological Science, 22*(8), 1058-1066.doi: 10.1177/0956797611415540

Parker, P.D., Marsh, W.W., Ciarrochi, J., Marshall, S., & Abduljabbar, (2014). Juxtaposing math self-efficacy and self-concept as predictors of long-term achievement outcomes. *Educational Psychology: An International Journal of Experimental Educational Psychology, 34*(1), 29–48.doi: 10.1080/01443410.2013.797339

Pekrun, R. (2006). The control-value theory of achievement emotions: Assumptions, corollaries, and implications for educational research and practice. *Educational Psychology Review, 18*(4), 315–341.doi: 10.1007/s10648-006-9029-9

Pekrun, R., Frenzel, A., Goetz, T., & Perry, R. P. (2007). The control–value theory of achievement emotions: An integrative approach to emotions in education. In P. A. Schutz & R. Pekrun (Eds.), *Emotion in education* (pp. 13–36). San Diego, CA: Academic Press.

Pekrun, R., Goetz, T., Frenzel, A. C., Barchfeld, P., & Perry, R. P. (2011). Measuring emotions in students' learning and performance: The Achievement Emotions Questionnaire (AEQ). *Contemporary Educational Psychology, 36*(1), 36–48.doi: 10.1016/j.cedpsych.2010.10.002

Pekrun, R., Goetz, T., Perry, R.P., Kramer, K., Hochstadt, M. & Molfenter, S. (2004) Beyond test anxiety: Development and validation of Test Emotions Questionnaire (TEQ). *Anxiety, Stress and Coping, 17*(3), 287–316.doi: 10.1080/10615800412331303847

Pekrun, R., Goetz, T., Titz, W., & Perry, R. P. (2002). Academic emotions in students' self-regulated learning and achievement: A program of qualitative and quantitative research. *Educational Psychologist, 37*(2), 91-105.doi: 10.1207/S15326985EP3702_4

Pekrun, R., Hall, N.C., Goetz, T., & Perry, R.P. (2014). Boredom and academic achievement: Testing a model of reciprocal causation. *Journal of Educational Psychology, 106*(3), 696–710.doi: 10.1037/a0036006

Pekrun, R., & Perry, R.P. (2014). Control-value theory of achievement emotions. In R. Pekrun and L Linnenbrink-Garcia (Eds.) *International Handbook of Emotions in Education* (pp. 120 – 141). London: Routledge.

Peters G-J., Y., Ruiter, R.A.C. & Kok, G. (2013). Threatening communication: a critical re-analysis and a revised meta-analytic test of fear appeal theory. *Health Psychology Review, 7*(sup1), 8-31.doi: 10.1080/17437199.2012.703527

Pintrich, P. R., De Groot, E.V. (1990). Motivational and self-regulated learning component of classroom academic performance. *Journal of Educational Psychology, 82*(1), 33-40.doi: 10.1037/0022-0663.82.1.33

Popova, L. (2012). The extended parallel process model: Illuminating the gaps in research. *Health Education & Behavior, 39*(4) 455–473.doi: 10.1177/1090198111418108

Putwain, D.W., & Best, N. (2011) Fear appeals in the primary classroom: effects on test

anxiety and test grade. *Learning and Individual Differences, 21*(5), 580-584.doi: 10.1016/j.lindif.2011.07.007

Putwain, D.W., & Best, N. (2012). Do highly test anxious pupils respond differentially to fear appeals made prior to a test? *Research in Education, 88*(2), 1-10.doi: 10.7227/RIE.88.1.1

Putwain, D.W., Larkin, D., & Sander, P. (2013). A reciprocal model of achievement goals and learning related emotions in the first year of undergraduate study. *Contemporary Educational Psychology, 38*(3), 361-374. doi: 10.1016/j.cedpsych.2013.07.003

Putwain, D., & Remedios, R. (2014, April 14). The scare tactic: Do fear appeals predict motivation and exam Scores? *School Psychology Quarterly*. Advance online publication, doi:10.1037/spq0000048

Putwain, D.W., & Roberts, C.M. (2009). The development and validation of the Teachers Use of Fear Appeals Questionnaire. *British Journal of Educational Psychology, 79*(4), 643-661.doi: 10.1348/000709909X426130

Putwain, D.W., & Roberts, C.M. (2012). Fear and efficacy appeals in the classroom: the secondary teachers' perspective. *Educational Psychology, 32*(3), 355-372.doi: 10.1080/01443410.2012.659845

Putwain, D.W. & Remedios, R. (2014a). Fear appeals used prior to a high-stakes examination: What makes them threatening? *Learning and Individual Differences.* Advance online publication.doi: 10.1016/j.lindif.2014.10.018

Putwain, D.W., & Remedios, R. (2014b). The scare tactic: Messages which contain fear appeals prior to a high-stakes test predict lower self-determined motivation and exam scores. Advance online publication. *School Psychology Quarterly*.doi: 10.1037/spq0000048

Putwain, D.W., Remedios, R., & Symes, W. (2014). The appraisal of fear appeals as

threatening or challenging: Frequency of use, academic self-efficacy and subjective value. *Educational Psychology: An International Journal of Experimental Educational Psychology*. Advance online publication.doi: 10.1080/01443410.2014.963028

Putwain, D.W., & Symes, W. (2011a). Teachers' use of fear appeals in the Mathematics classroom: worrying or motivating students? *British Journal of Educational Psychology 81*(3), 456-474.doi: 10.1348/2044-8279.002005

Putwain, D.W., & Symes, W. (2011b). Classroom fear appeals and examination performance: facilitating or debilitating outcomes? *Learning and Individual Differences, 21*(2), 227-232.doi: 10.1016/j.lindif.2010.11.022

Putwain, D.W. & Symes, W. (2014). Subjective value and academic self-efficacy: The appraisal of fear appeals used prior to a high-stakes test as threatening or challenging. *Social Psychology of Education*, 17(2), 229-248.doi: 10.1007/s11218-014-9249-7

Reeve, J. (2009).Why teachers adopt a controlling motivating style towards students and how they can become more autonomy supportive. *Educational Psychologist 44*(3), 159-175. doi: 10.1080/00461520903028990

Ruiter, R.A.D., Abraham, C., & Kok, G. (2001). Scary warnings and rational precautions: A review of the psychology of fear appeals. *Psychology and Health*, *16*(6), 613–630.doi: 10.1080/08870440108405863

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*, 68–78.doi: 10.1037/0003-066X.55.1.68

Schunk, D., & Pajares, F. (2002). The development of self-efficacy. In A. Wigfield and J.S. Eccles (Eds.) *Development of Achievement Motivation* (pp. 16–32). San Diego: Academic Press.

Senko, C., & Harackiewicz, J. M. (2005). Regulation of achievement goals: The role of competence feedback. *Journal of Educational Psychology, 97*(3), 320–336.doi.org/10.1037/0022-0663.97.3.320.

Sin, N. L., & Lyubomirsky, S. (2009). Enhancing well-being and alleviating depressive symptoms with positive psychology interventions: A practice friendly meta-analysis. *Journal of Clinical Psychology, 65*(5), 467–487.doi: 10.1002/jclp.20593

Skaalvik, E. M. (1997). Issues in research on self-concept. In: Maehr, M., and Pintrich, P. R. (Eds.), *Advances in Motivation and Achievement Vol. 10* (pp. 51–97). JAI Press: New York.

Smerecnik, C.M.R., & Ruiter, R.A.C. (2010) Fear appeals in HIV prevention: The role of anticipated regret. *Psychology, Health and Medicine, 1*5(5), 550 – 559.doi: 10.1080/13548506.2010.498888

Sprinkle, R., Hunt, S., Simonds, C., & Comadena, M. (2006). Fear in the classroom: An examination of teachers' use of fear appeals and students learning outcomes. *Communication Education, 55,* 389–402.doi:10.1080/03634520600879170

Swann, W., Chang-Schneider, C., & McClarty, K. (2007). Do people's self-views matter? Self-concept and self-esteem in everyday life. *American Psychologist, 62*(2), 84–94. doi:10.1037/0003-066X.62.2.84

Umphrey, L.R. (2004). Message defensiveness, efficacy, and health-related behavioural intentions. *Communication Research Reports, 21*(4), 329-337.doi: 10.1080/08824090409359997

Walker, C. O., Greene, B. A., & Mansell, R. A. (2006). Identification with academics, intrinsic/extrinsic motivation, and self-efficacy as predictors of cognitive engagement. *Learning and Individual Differences, 16*(1), 1-12.doi: 10.1016/j.lindif.2005.06.004

Waters, L. (2011). A review of school-based positive psychology interventions. *The Australian Educational and Developmental Psychologist*, 28(2), 75–90. doi:10.1375/aedp.28.2.75

Wigfield, A., & Eccles, J.S. (2000). Academic self-efficacy -value theory of achievement motivation. *Contemporary Educational Psychology*, *25*(1), 68–81.doi: doi:10.1006/ceps.1999.1015

Wigfield, A., Tonks, S., & Klauda, S. L. (2009). Academic self-efficacy -value theory. In A. Wigfield & K. R. Wentzel (Eds.), *Handbook of motivation at school* (pp. 55–77). New York: Routledge.

Witte, K., & Allen, M. (2000). A meta-analysis of fear appeals: Implications for effective public health campaigns. *Health Education & Behavior*, *27*(5), 591–615.doi: 10.1177/109019810002700506

Table 1
Latent bivariate correlations and descriptive statistics for academic self-efficacy, attainment value, and the appraisal of fear appeals.

	1.	2.	3.	4.	5.	6.
1. T_1 Academic self-efficacy	—	.52***	.20**	-.25***	.72***	.30***
2. T_1 Attainment value		—	.41***	.13**	.43***	.71***
3. T_2 Challenge appraisal			—	.68***	.25***	.41***
4. T_2 Threat appraisal				—	-.21***	-.19**
5. T_3 Academic self-efficacy					—	.45***
6. T_3 Attainment value						—
Mean	4.11	3.53	3.31	2.64	4.06	3.59
SD	.72	.69	1.12	1.16	.77	.72

* p <.05, ** p <.01, *** p <.001

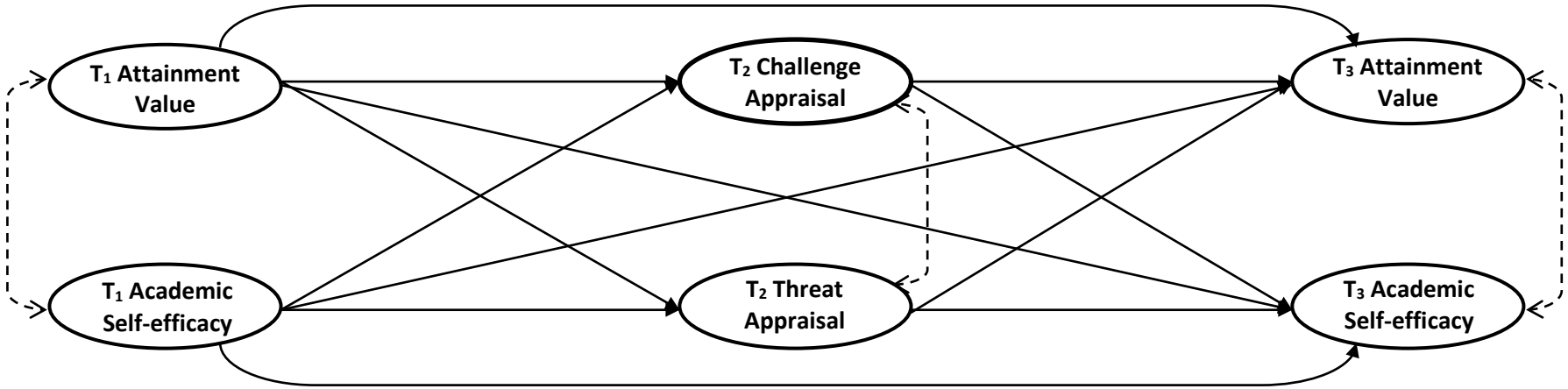

Figure 1. The a priori model showing hypothesised paths from T_1 attainment value and academic self-efficacy to T_2 challenge and threat appraisals, and T_3 attainment value and academic self-efficacy, and from T_2 challenge and threat appraisals at T_3 attainment value and academic self-efficacy. Single-headed black lines represent path coefficients and double-headed dashed lines represent covariances.

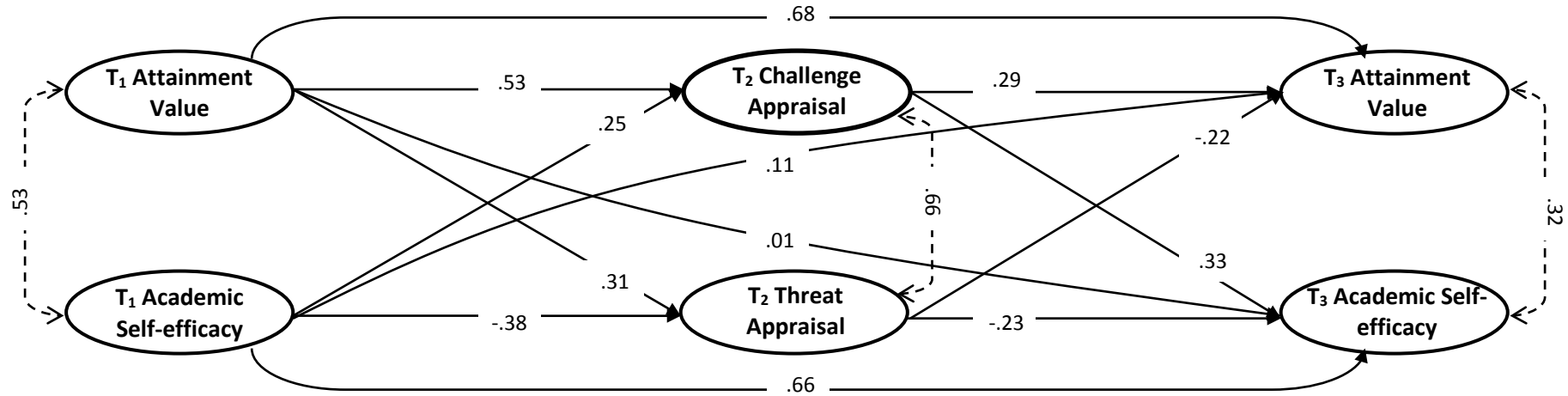

Figure 2. Standardised coefficients from the SEM (for clarity covariances for gender and year group were omitted).