Teachers Use of Fear Appeals Prior to a High-stakes Examination: Is Frequency Linked to Perceived Student Engagement and How Do Students Respond?

Abstract

Prior to high-stakes examinations teachers use messages that focus on the importance of avoiding failure (fear appeals). This study examined whether teacher use of fear appeals was related to their perceptions of student engagement, followed by students' interpretation of fear appeals, and how they related to student-reported engagement. Teachers used more frequent fear appeals when they perceived student engagement to be low. More frequent fear appeals resulted in stronger challenge and threat appraisals. A challenge appraisal was associated with greater, and a threat appraisal with lower, behavioural and emotional engagement. Student appraisal seems to determine the effectiveness of these messages.

Keywords: Fear appeals, challenge, threat, engagement, behavioural engagement, emotional engagement.

Teachers Use of Fear Appeals Prior to a High-stakes Examination: Is Frequency Linked to Perceived Student Engagement and How Do Students Respond?

1. Introduction

High-stakes school leaving examinations are a feature of many educational systems (Nichols & Berliner, 2007; Office of Qualifications and Examinations Regulation, 2012). The outcomes of these examinations can have a profound bearing on the subsequent life trajectory of students and, increasingly, are being used as indicators of teacher effectiveness (Allensworth, 2005; Carnoy, 2005; Jacob, 2005; von der Embse, Schoemann, Kilgus, Wicoff, & Bowler, 2016). It is, therefore, not surprising that teachers, and other school personnel, communicate to students the value and importance of these examinations and the implications of success and failure; these messages convey a potentially potent motivational quality. Extant research has focused on messages used prior to high-stakes examinations that focus on the importance of avoiding failure, those factors that determine how students interpret these messages, and what effects they might have on students. Understanding of the factors that might impact on why teachers use these messages is currently limited. The present study addressed this limitation by examining how teachers' perceptions of student engagement related to the use of teacher messages, subsequent student appraisal of those messages, and student-reported engagement.

1.1 What Are Fear Appeals?

Fear appeals are persuasive messages that highlight the negative consequences of a particular course of action, and how those consequences can be avoided with an alternative course of action (Maloney, Lapinksi, & Witte, 2011; Witte, & Allen, 2000). They have been most commonly used, and researched, in promoting health-conscious behaviours such as smoking cessation, safe sex practices, and UV protection in sunlight (Peters, Ruiter, & Kok, 2012; Ruiter, Kessels, Peters, Kok, 2014). The goal of the fear appeal is to create an adaptive

fear of the negative outcome in order to motivate an alternative course of action (Popova, 2012). The past decade has also seen fear appeals researched in an educational context used prior to high-stakes examinations. In this context, teachers and school managers, communicate to students in lessons and assemblies the negative consequences of failure on high stakes examinations for one's future life trajectory (e.g., continued study and training, employment opportunities), and one's sense of self-worth, as a means to motivate students to engage in those behaviours (e.g., effort, persistence, and participation) likely to enhance chances of success (e.g., Author & Author, 2009; Author & Author, 2016).

1.2 How Frequently are Fear Appeals Used?

Author and Author (2012) surveyed 230 secondary school teachers about the types of messages they used prior to the high-stakes school leaving examination used in English schools (the General Certificate of Secondary Education: GCSE). Results showed 51.7% of respondents agreed, and 29.9% of respondents strongly agreed, that students should be reminded that they would fail if they did not complete coursework and revision; 56% of respondents agreed, and 11.5% of respondents strongly agreed, that students should be reminded that they would not get college or university places if they failed. Furthermore, when asked to report their typical use of fear appeals, both teacher- and student-reports suggest that in Years 10 and 11, during the GCSE programme of study, on average, teachers use fear appeals fairly regularly (Author, Author, & Author, 2014). The use of fear appeals would therefore seem to be relatively widespread prior to high-stakes examinations and worthy of investigation.

1.3 What is Student Engagement?

Student engagement is a metaconstruct that is used to describe and capture the range of behaviours, cognitions, and emotions, that contribute to successful completion of, and performance on, educational programmes of study (Fredericks, Blumenfeld, & Paris, 2004;

Jimerson, Campos, & Gried, 2003; Reschly & Christenson, 2012). In this study we draw on the classic two-component model of student engagement comprising behavioural and emotional engagement (Finn, 1989; Finn & Zimmer, 2012). Emotional engagement is a sense of belonging, and valuing of one's lessons and other school activities; indicators include interest and enjoyment (e.g., Appleton, Christenson, Kim, & Reschly, 2006; Fredricks, McColskey, Meli, Mordica, Montrosse, & Mooney, 2011; Fredricks & McColskey, 2012). Behavioural engagement refers to active participation and involvement in one's lessons and other school activities; indicators include on-task behaviours and persistence on challenging tasks (e.g., Appleton et al., 2006; Fredricks et al., 2011; Fredricks & McColskey, 2012).

1.4 Why Might Teachers Use Fear Appeals More or Less Frequently?

The classroom and instructional behaviours of teachers are subject to a wide range of influences, including experience, pedagogical and subject knowledge, self-efficacy, and expectations of their students (e.g., Coe, Aloisi, Higgins, & Elliot, 2014; Good & Brophy, 2000; Kyriakides, Creemers, & Antoniou, 2009; Morris-Rothschild & Brassard, 2006; Struyven, Dochy, & Janssens, 2010; Wolters, & Daugherty, 2007). Specifically, when teachers perceive their students to be less engaged, they use instructional behaviours that are more controlling, coercive, and directive. For instance, external observers rated physical education teachers as using a more controlling instructional style with students they perceive to be less motivated (Sarrazin, Tessier, Pelletier, Trouilloud, & Chanal, 2006). Similarly, elementary school teachers report using more coercive behaviours, and less autonomy support, when they perceive their students to be less behaviourally engaged (Skinner & Belmont, 1993).

If teachers do not perceive their students to be engaged in tasks, particularly when those might adversely impact on students' chances of success (as is typically the case with a programme of study leading to a high-stakes examination), it is plausible to suggest that

teachers might warn students of the consequences of their actions (i.e. use fear appeals).Indicators of behavioural enjoyment are overt and tangible, whereas indicators of emotional engagement are private experiences that are necessarily harder for observers to judge accurately (see Appleton et al., 2006; Urhahne, Chao, Florineth, Luttenberger, & Paechter, 2011). Therefore, a more pronounced relationship might be expected between teacher perceptions of low behavioural engagement and the more frequent use of fear appeals, than for teacher perceptions of low emotional engagement.

1.5 How Are Fear Appeals Interpreted by Students?

Building on models of the stress appraisal process and frameworks for health-based fear appeals, Author and Author (2014, 2016) propose that fear appeals could be interpreted in different ways depending on the importance afforded to success or failure by the student, and the belief that they are capable of performing those behaviours required to avoid failure (or attain success). In appraisal models of stress (e.g., Folkman, 2008; Lazarus, 2006; Skinner & Brewer, 2002) events are judged in a two-part process of primary and secondary appraisal. Primary appraisal refers to the personal importance or significance of an event and secondary appraisal refers to beliefs in whether a favourable outcome can be achieved. Similarly, models of health-based fear appeals (e.g., Maloney et al., 2011; Popova, 2012; Witte, & Allen, 2000) propose that fear appeals are interpreted in an adaptive way when the person receiving the message believes they are susceptible to the negative outcome and capable of performing those behaviours required to avoid the negative outcome.

Studies examining the appraisal of fear appeals, prior to high-stakes examinations, have drawn on expectancy value-theory (Eccles, 2005, 2007; Wigfield, Tonks, & Klauda, 2016) to inform the measurement of importance and outcome beliefs. Importance is judged in terms of attainment value, referring to the importance of achievement for one’s sense of self-identity and self-worth, and utility value, referring to the importance of achievement for one’s

goals or aspirations. Outcome beliefs are judged in terms of academic self-efficacy, that one is capable of performing a particular course of action, and expectancy of success. The combination of high subjective attainment or utility value with high academic self-efficacy or expectancy of success leads to the appraisal of fear appeals as a challenge (Author, Author, & Author, 2014; Author & Author, 2016). A challenge appraisal is growth and mastery focused accompanied by positive emotions (e.g., hope) and positive behavioural intentions (e.g., Hijzen, Boekaerts, & Vedder, 2007; McCarthy, 2011; Shiota, Neufeld, Yeung, Moser, & Perea, 2011).

On the other hand, when high subjective attainment or utility value is combined with low academic self-efficacy or expectancy of success, the likely outcome is the appraisal of fear appeals as a threat (Author & Author, 2014, Author et al., 2015). Valued aspirations and/ or self-worth are threatened, accompanied by negative emotions (e.g., anxiety) and avoidance-orientated behaviours (e.g., Covington, 2000, 2009; Meijen, Jones, McCarthy, Sheffield & Allen, 2013; Roseman, 2013). Although not included in this study, fear appeals would be most likely ignored or disregarded if students held low attainment or utility beliefs (Author & Author, 2014, 2016).

The relations between fear appeals and educationally salient cognitions, emotions, and behaviours, would likely depend on their interpretation. The mastery and growth focus of a challenge appraisal would link to educational gains and the avoidance and protective focus of a threat appraisal would link to educational losses. Accordingly, a challenge appraisal is associated with greater attainment/ utility values, competence beliefs, and student engagement (Author, Author, & Author, 2015; Author, Author, Author, Author, Author, & Author, 2016). A threat appraisal, however, is associated with greater test anxiety, a performance-avoidance goal to avoid performing worse than one’s classmates, and lower

intrinsic motivation, engagement, and examination scores (Author et al., 2016; Author & Author, 2014b; Author & Author, 2011a, 2011b).

1.6 More Frequent Fear Appeals Lead to Greater Challenge and Threat Appraisals

Studies have reported that more frequent fear appeals, made by teachers, are associated with stronger challenge *and* threat appraisals (e.g., Author et al., 2014; 2016). Although the mechanism is not wholly clear, it seems likely that fear appeals prompt a student to reflect on the judgements that underpin challenge and threat appraisals; their perceived value or importance and whether the student believes they are capable of performing those behaviours required to attain success (or avoid failure). Judgements become more salient when prompted more frequently. Indeed, evidence from the positive education literature suggests that prompting students to identify and reflect on their strengths serves to reinforce and enhance student's self-esteem and self-worth (e.g., Oades, Robinson, Green, & Spence, 2011; Sin & Lyubomirsky, 2009; Waters, 2011). Sadly, the opposite may also be true. Prompting students to reflect on a belief that they are not capable of success could serve to reinforce and entrench that belief too.

1.7 Aims of the Present Study

Although the relationship between student appraisal of fear appeals and student engagement has been established in previous work (Author et al., 2016), studies have yet to establish if teachers use fear appeals more frequently when they perceive their students to be lacking engagement. This link is examined in the present study at the first wave of data collection (T_1) where we use teacher-reported student engagement and frequency that fear appeals were used. The second wave of data collection (T_2) focuses on student-reported appraisal of fear appeals and engagement. In bringing the two waves of data collection together in a single analytic model, we examine the indirect relationship from teacher

perceptions of student engagement to subsequent student engagement, via teacher use of fear appeals and their appraisal as challenging or threatening (see Figure 1). .

[Figure 1 here]

Teacher reports of student engagement and frequency of fear appeals use were classroom-level (L2) constructs in that they are unique to a particular class. Student reported appraisals and engagement were individual-level (L1) constructs in that they might vary within a class. As we did not theorise distinct relationships between teacher-reported student engagement, or frequency of fear appeals use, and student-reported appraisals, or engagement, at the individual (L1) or class-aggregated levels (L2), we chose to analyse data in a single-level analytic model and control for the clustering of responses by class statistically. This approach is a more parsimonious analytic option that conducting a multi-level model and permissible where classroom-level constructs (L2) precede the student-level (L1) constructs (Krull & MacKinnon, 2001). In the notation of methodologists, this is referred to as a 2→2→1→1 model.

Students were following the eighteen-month GCSE programme of study, taken over the final two years of compulsory secondary schooling in England. GCSE grades can, and do, influence access to job opportunities and access to further educational opportunities. Without minimum GCSE pass grades in mathematics and English, educational and job opportunities for young people are extremely limited (Perryman, Ball, Maguire, & Braun, 2011). We focus on a single subject, mathematics. This is partly due to it being a compulsory subject, hence increasing the potential sample size, and partly due to the high-stakes nature of mathematics. Accordingly, to ensure appropriate level of domain-specificity, all measures used in the study were mathematics-specific. Since gender differences have been reported in mathematics (e.g., Barkatsas, Kasimatis, & Gialamas, 2009; Watt, 2006), and the frequency and appraisal of fear

appeals may differ across the final two years of compulsory schooling, gender and Year Group were included as covariates.

The following hypotheses were tested:

H_1: Teachers who perceive students to be less engaged will use more frequent fear appeals. This relationship will be stronger for behavioural engagement.

H_2: More frequent use of fear appeals will be associated with stronger challenge and threat appraisals.

H_3: Stronger challenge appraisal will be associated with greater student-reported engagement and stronger threat appraisal will be associated with lower student-reported engagement.

In addition to these hypotheses, we also conducted a latent cluster analysis for the student-reported appraisals and engagement. The purpose of this analysis was to examine if homogenous groups students with particular profiles of challenge and threat appraisal scores corresponded with profiles of particular behavioural and emotional engagement scores. The analysis was exploratory in that we did not set out any pre-conceived ideas about the number and/ or combination of clusters that might emerge.

2. Method

2.1 Participants

The participants in this study were 2061 students in their final two years of compulsory secondary education and 49 teachers who were responsible for their mathematics education. In the student sample, there was a roughly even balance of gender (n = 1043 male students, n = 984 female students, n = 34 not reported) and Year Group (n = 1108 Year 10 students, n = 952 Year 11 students, n = 1 not reported) with a mean age of 14.6 years (SD = .62). The majority of students were from a Caucasian background (n = 1667) and smaller numbers from Black (n = 39), Asian (n = 221), other (n = 56), and mixed heritage

backgrounds (n = 66), with n = 12 not reported. Approximately 10.9% of the sample (n = 223) were eligible for free school meals, a proxy for low income (n = 22 not reported).

Students were clustered into 109 classes (M = 18.9 students per class) for their mathematics instruction from six English secondary schools. In the teacher sample (n = 49) there was a roughly even split of gender (n = 23 male, n = 26 female) with a mean age of 39.9 years (SD = 11.2). The ethnic heritage of teachers was predominantly Caucasian (n = 44) with smaller numbers from Black (n = 1) and Asian (n = 4) backgrounds. Teachers may have been responsible for instruction in more than one class. This was most commonly one Year 10 and one Year 11 class, however, a small number of teachers were responsible for teaching two Year 10 or Year 11 classes.

2.2 Measures

2.2.1 Behavioural and emotional engagement. T_1 teacher-reported, and T_2 student-reported, behavioural and emotional engagement were measured using twelve items from the *Engagement vs. Dissatisfaction with Learning Questionnaire* (Skinner, Kindermann, & Furrer, 2009). For T_1 teacher-reported engagement, three items each were taken from the teacher-report version of the behavioural (e.g., 'In my class, the students work as hard as they can') and emotional (e.g., 'In my class, the students seem to enjoy their work) engagement subscales. Items were adapted to refer to a whole class rather than a specific student (as per the original scales). For T_2 student-reported engagement, three items each were taken from the student-report version of the behavioural (e.g., 'I participate in the activities and tasks in my GCSE maths class') and emotional (e.g., 'I enjoy learning things in GCSE maths') engagement subscales. All items were adapted to specifically refer to GCSE mathematics[1]. Participants responded to items on a five-point scale (1 = strongly disagree, 3 = neither agree nor disagree, 5 = strongly agree) such that a higher score represented stronger teacher-

[1] In the UK mathematics is colloquially referred to as maths.

reported or student-reported engagement. The internal consistency and validity (construct and predictive) of data using the full and shortened versions of these scales have been reported in the literature (Skinner & Chi, 2012; Skinner, Furrer, Marchand, & Kinderman, 2008; Skinner et al., 2009). In the present study, acceptable internal consistency (Cronbach's $\alpha > .7$) was shown for both teacher- and student-reported subscales (see Table 1).

2.2.2 Fear appeals frequency and appraisal. T_1 teacher-reported frequency of fear appeals and T_2 student-reported challenge and threat appraisal were measured using nine items from the *Teacher's Use of Fear Appeals Questionnaire* (Author & Author, 2014) in which all items were adapted to be specific to GCSE mathematics. Three items were used to measure the frequency with which the teacher used fear appeals (e.g., 'How often do you tell your class that unless they work hard they will fail Maths GCSE?'), three items were used to measure student-reported challenge appraisal (e.g., 'Does it make you want to pass GCSE maths when your teacher tells you that unless you work hard you will fail?'), and three items were used to measure student-reported threat appraisal (e.g., 'Do you feel worried when your teacher tells you that unless you work hard you will fail your maths GCSE?'). Participants responded to items on a five point scale (1 = never, 3 = sometimes, 5 = most of the time), such that a higher score represents more frequently used fear appeals by the teacher, or a stronger challenge/ threat appraisal by the student. In previous research, the internal consistency and validity (construct and predictive) of data collected using these scales have been demonstrated (e.g., Author & Author, 2014; Author, Author, & Author, 2014). Acceptable internal reliability (Cronbach's $\alpha > .7$) was shown in the present study for teacher-reported frequency and student-reported appraisal (see Table 1).

2.3 Procedure

Data for T_1 teacher-reported engagement and frequency of fear appeals were collected early on in the first term of the school year (October). Teachers completed a separate set of

questionnaires for each Year 10 and Year 11 mathematics class they taught during a subject team meeting. Data for T_2 students-reported engagement and appraisal of fear appeals were collected four months later (January), in the second term of the school year. Students completed questionnaires in the period of the school day used for pastoral and administrative purposes so as not to interfere with usual instruction. Student questionnaires were administered by the regular form tutor and thus were not completed in the presence of their regular mathematics teacher. The form tutors read out standardized instructions that included the purpose of the study, ethical details (participation was voluntary, how to withdraw data, and so on), and which emphasised that the questionnaires were not a 'test'. An abbreviated form of these instructions was provided on the front cover of the questionnaires. Written ethical consent was provided by the Head Teachers (or Principals) of the participant schools and participants (teachers and students). For students, passive parental consent was also sought.

3. Results

3.1 Descriptive Data and Statistics

Descriptive data and statistics are reported in Table 1. Data were, in the main, normally distributed. T_1 teacher-reported fear appeals frequency showed a slight positive skew and T_2 student-reported behavioural engagement showed slight leptokurtosis. Factor loadings, generated from the measurement model described below, were acceptable ($\lambda \geq .52$). Intraclass reliability coefficients (σ_I), were generated from empty multilevel models (i.e., with no predictors) to partition the variance into between- and within-mathematics class components. The proportion of between-class variance was large for T_2 student-reported behavioural and emotional engagement ($\sigma_I = .09 – .10$) and substantial for T_2 student-reported challenge and threat appraisals ($\sigma_I = .19 – .21$).

[Table 1 here]

3.2 Measurement Model and Bivariate Correlations

A measurement model was built using teacher-reported behavioural engagement, emotional engagement, and frequency of fear appeals (three items per construct) at T_1 and student-reported behavioural engagement, emotional engagement, and the appraisal of fear appeals as challenging or threatening (also three items per construct) at T_2. Residual variance for challenge and threat items with the same referent specified in the wording (failure in general, continuing college education, and entering the labour market) were allowed to correlate. A confirmatory factor analysis was used to assess the properties of this measurement model. In M*plus*, version 7.3 (Muthén & Muthén, 2012), the maximum-likelihood estimator (MLR) with robust standard errors was used to account for the slight non-normal distributions of T_1 teacher-reported fear appeals frequency and T_2 student-reported behavioural engagement. The complex/ cluster commands were used to adjust standard errors for the between-class variance in T_2 student-reported engagement and student-reported appraisals.

A number of model fit indices can be used in conjunction with inspection of residuals, factor loadings, and other descriptive information, to guide model fit and/ or misspecification. Model fit indices include the root mean square error of approximation (RMSEA), standardized root means square residual (SRMR), comparative fit index (CFI), and the Tucker-Lewis index (TLI). Although criteria for the interpretation of these indices as providing a 'good' fit to the data (e.g., RMSEA/ SRMR $\leq .05$ and CFI/ TLI $\geq .95$) are widely used, these values should be interpreted as guidance rather than rigid 'rules' (Heene, Hilbert, Draxler, Ziegler, & Bühner, 2011; Marsh, Hau, & Grayson, 2005; Marsh, Hau, & Wen, 2004). The measurement model appeared to show a good fit the data, $\chi^2(165) = 256.49$, $p < .001$; RMSEA = .018, SRMR = .046; CFI = .964, and TLI = .954, and a check of factor

loadings (see Table 1), residuals, and modification indices showed no obvious evidence of model misspecification.

A model with gender (0 = male, 1 = female) and Year Group (0 = Year 10, 1 = Year 11) were added as covariates, to generate latent bivariate correlations (see Table 2), was on the cusp of a good fit: $\chi^2(193) = 336.80$, $p < .001$; RMSEA = .021, SRMR = .047; CFI = .944, and TLI = .927. T_1 teacher-reported behavioural engagement was negatively correlated with T_1 teacher-reported fear appeals frequency. T_1 teacher-reported fear appeals frequency was positively correlated with T_2 student-reported challenge and threat appraisals. T_2 student-reported challenge appraisal was positively correlated with T_2 student-reported behavioural and emotional engagement. T_2 student-reported threat appraisal was negatively correlated with T_2 student-reported emotional engagement. T_1 teacher-reported behavioural and emotional engagement and T_2 student-reported behavioural and emotional engagement were all positively intercorrelated.

[Table 2 here]

3.3 Structural Equation Modelling

A structural equation model (SEM) was used to test the linkages presented in Figure 1. These included paths from T_1 teacher-reported behavioural and emotional engagement to T_1 teacher-reported fear appeals frequency, T_1 teacher-reported fear appeals frequency to T_2 student-reported challenge and threat appraisals, and finally from T_2 student-reported challenge and threat appraisals to T_2 student-reported behavioural and emotional engagement. Gender (0 = male, 1 = female) and Year Group (0 = Year 10, 1 = Year 11) were included as covariates. Analyses were conducted in M*plus* version 7.3 using the MLR estimator and the complex/ cluster commands to control for clustering effects. The SEM showed a reasonable fit to the data, $\chi^2(203) = 361.74$, $p < .001$; RMSEA = .021, SRMR = .066; CFI = .939, and

TLI = .924, with no obvious sources of misspecification. Statistically significant linkages are reported in Figure 2.

[Figure 2 here]

3.3.1 T_1 Teacher-reported behavioural and emotional engagement to T_1 teacher-reported fear appeals frequency. T_1 teacher-reported fear appeals frequency was predicted by T_1 teacher-reported behavioural engagement (β = -.72, p <.001), but not T_1 teacher-reported emotional engagement (β = .44, p = .22).

3.3.2 T_1 teacher-reported fear appeals frequency to T_2 student-reported challenge and threat appraisals. T_1 teacher-reported fear appeals frequency predicted T_2 student-reported challenge (β = .31, p <.001) and threat (β = .38, p <.001) appraisals.

3.3.3 T_2 student-reported challenge and threat appraisals to T_2 student-reported behavioural and emotional engagement. T_2 student-reported challenge appraisal predicted greater T_2 student-reported behavioural (β = .53, p <.001) and emotional (β = .40, p <.001) engagement. T_2 student-reported threat appraisal predicted lower T_2 student-reported behavioural (β = -.35, p <.001) and emotional (β = -.39, p <.001) engagement.

3.3.4 Covariates: Gender and year group. Female students reported higher T_2 threat appraisal (β = .16, p <.001) and T_2 behavioural engagement (β = .09, p =.009), and lower T_2 emotional engagement (β = -.06, p =.03). Year 11 students reported higher T_2 behavioural engagement (β = .12, p =.008). Coefficients for all other covariates were not statistically significant (ps >.05).

3.3.5 Indirect relations from T_1 teacher-reported engagement and emotion to T_2 student-reported engagement. Indirect relationships were assessed by creating 95% confidence intervals (CIs) around the standardised coefficient in M*plus*. CIs that do not cross zero are statistically significant (p <.05). The indirect paths from T_1 teacher-reported behavioural engagement to T_2 student-reported behavioural engagement , via T_1 teacher-

reported fear appeals frequency and T_2 student-reported appraisals, were negative for a challenge appraisal, $\beta = -.119$, SE = .049, 95% CIs [-.038, -.200] and positive for a threat appraisal, $\beta = .095$, SE = .045, 95% CIs [.021, .017]. The indirect paths from T_1 teacher-reported behavioural engagement to T_2 student-reported emotional engagement , via T_1 teacher-reported fear appeals frequency and T_2 student-reported appraisals, were negative for a challenge appraisal, $\beta = -.090$, SE = .038, 95% CIs [-.028, -.153], and positive for a threat appraisal, $\beta = .105$, SE = .049, 95% CIs [.024, .186]. The indirect paths from T_1 teacher-reported emotional engagement to T_2 student-reported behavioural and emotional engagement were not statistically significant the 95% CIs crossed zero.

3.4 Latent Cluster Analysis of T_2 appraisals and engagement

As a supplementary analysis, we performed latent cluster analyses with two latent cluster variables for T_2 appraisal scores and T_2 engagement scores in M*plus* version 7.3 (Muthén & Muthén, 2013). Covariances were specified for the pairs of challenge and threat items with a common referent (college acceptance, entry to workplace, and failure in general). Model fit indices that can be used to guide cluster solutions include the Akaike Information Criterion (AIC), sample-size adjusted BIC (aBIC) and entropy values. The AIC and aBIC are relative model fit indices in that they can only compared for competing models rather than against an absolute criterion. Smaller values indicate a better model fit (Hix-Small, Duncan, Duncan, & Okut, 2004). Entropy values represent a measure of the quality of classification accuracy. Values closer to 1 represent a more accurate latent classification (Celeux & Soromenho, 1996).

We started with a 2-cluster solution for each latent cluster and progressively increased the number of latent clusters to a maximum of five. We did not continue past a 5-cluster solution partly as entropy values declined, suggesting solutions with larger numbers of clusters were less accurate, and partly as cluster membership became increasing small for

some cluster patterns ($n < 10$) suggesting that additional numbers of classes would add little meaningful differentiation between groups of participants. Model fit indices for cluster solutions are reported in Table 3. The optimum balance between AIC/ aBIC and entropy values was achieved for a solution with four latent clusters of challenge and threat appraisal scores and three latent clusters of behavioural and emotional engagement scores resulting in twelve latent class patterns. Classification probabilities for latent status membership are shown in Table 4. Class alignment probabilities, emboldened on the diagonal, were all >.8 indicating a relatively high precision and reliability of classification (Rost, 2006). Mean values for appraisals and engagement for the twelve class patterns were estimated from aggregating the intercepts of the indicators in each latent cluster and reported in Table 5.

[Table 3 here]

[Table 4 here]

3.4.1 The low challenge and threat appraisal cluster. Students in latent cluster patterns 1, 4, 7, and 10, reported low challenge (M = 2.11) and threat (M = 1.66) appraisal scores. Students in this cluster most commonly reported moderate-high behavioural (M = 3.94) and emotional (M = 3.08) engagement scores (pattern 4), followed by moderate-high behavioural (M = 3.65) and low emotional (M = 1.60) engagement scores (pattern 7), high behavioural (M = 4.63) and emotional (M = 4.21) engagement scores (pattern 10), and finally low behavioural (M = 1.89) and emotional (M = 1.79) engagement scores (pattern 1).

[Table 5 here]

3.4.2 The moderate-high challenge and threat appraisal cluster. Students in latent cluster patterns 2, 5, 8, and 11, reported moderate-high challenge (M = 3.92) and threat appraisal (M = 3.66) scores. Students in this cluster most commonly reported high behavioural (M = 4.12) and moderate emotional (M = 2.74) engagement scores (pattern 5), followed by high behavioural (M = 4.40) and emotional (M = 3.95) engagement scores

(pattern 8), moderate-high behavioural (M = 3.77) and low emotional (M = 1.51) engagement scores (pattern 2), and finally moderate behavioural (M = 3.06) and emotional (M = 2.89) engagement scores (pattern 10).

3.4.3 The high challenge and low threat appraisal cluster. Students in latent cluster patterns 3, 6, 9, and 12, reported high challenge (M = 4.11) and low threat appraisal (M = 1.98) scores. Students in this cluster most commonly reported high behavioural (M = 4.46) and moderate-high emotional (M = 3.61) engagement scores (pattern 6), followed by high behavioural engagement (M = 3.61) and moderate-low emotional (M = 2.66) engagement scores (pattern 9), high behavioural (M = 4.74) and emotional (M = 4.68) engagement scores (pattern 12), and finally high behavioural (M = 4.13) and low emotional (M = 1.59) engagement scores (pattern 3).

3.4.3 Summary of latent cluster analyses. In sum, students in clusters characterised by higher challenge appraisal scores reported greater behavioural and emotional engagement. When moderate-high challenge appraisal was combined with moderate-high threat appraisal, engagement tended to be lower (more so for emotional than behavioural engagement). Pattern 1 (the low challenge and threat cluster) contained the lowest engagement scores and pattern 12 (the high challenge and low threat cluster) contained the highest engagement scores, in the twelve cluster patterns. The most common pattern (accounting for 23.1% of participants) was for cluster pattern 5, comprising moderate-high challenge and threat appraisal scores, and high behavioural (M = 4.12) and moderate emotional (M = 2.74) engagement scores.

4. Discussion

The aim of this study was to examine if fear appeals used by secondary school teachers, prior to a high-stakes school leaving mathematics examination, were related to perceptions of low student engagement, and how the subsequent appraisal of messages by

students linked to student-reported engagement. Data were collected over two waves. Teacher-reported student engagement and frequency of fear appeals were collected in the first wave and student-reported appraisal and engagement in the second wave. Results showed that teachers reported using more frequent fear appeals in classes they perceived to be low in behavioural engagement. The likelihood of a fear appeal being appraised as both a challenge and as a threat by the student was increased when fear appeals were used more frequently by the teacher. A challenge appraisal was linked to higher behavioural and emotional engagement whereas a threat appraisal was linked to lower behavioural and emotional engagement. An indirect relationship was established from teachers' perception of behavioural engagement to subsequent student-reported behavioural and emotional engagement; positive through a threat appraisal and negative through a challenge appraisal. A latent cluster analysis showed that clusters of students with higher challenge appraisals, accompanied with low or moderate-high threat, reported higher behavioural and emotional engagement.

The hypothesis that teachers would use fear appeals more frequently when they perceived low student engagement (H_1) was partially supported. A link was established from low behavioural engagement to more frequent use of fear appeals, but not from low emotional engagement to more frequent use of fear appeals. Rather than the relationship between teacher perceived emotional engagement and frequency of fear appeals use being weaker than for teacher perceived behavioural engagement, as we anticipated, the relationship was not statistically significant. This would seem to tally with the proposition that teachers' judge student engagement primarily on overt and tangible indicators, such as on-task behaviour, rather than private experiences such as interest and enjoyment. Indeed, research has shown that teachers find it difficult to accurately judge the emotional and motivational states of their students (Auger, 2004; Givvin, Stipek, Salmon, & MacGyvers,

2001; Urhahne et al., 2011). This may be partly as students may choose not to publically disclose their motivations and emotions in classroom environments (Jackson, 2006, 2013) and partly as secondary school teachers may not have sufficient time to develop trusting relationships in which students could disclose personal feelings (Gregory & Ripski, 2008).

It is also notable that although a link was established from behavioural engagement to more frequent use of fear appeals, the mean frequency of fear appeals use was relatively low (M = 2.10 which approximates, on the scale we used, to occasional use). Although the dispersion of scores was relatively large, suggesting that some teachers are indeed using fear appeals more regularly, this is lower that what might have been expected from other studies (e.g., Author & Author, 2012). Although there are myriad influences on the frequency of fear appeals use (e.g., teacher beliefs and characteristics, accountability pressures from above, and so on) we suggest a likely contributor was the timing of measurement. Fear appeals were measured early on in the academic year when high-stakes examinations were still some way off (GCSEs were approximately 7 months away for Year 11 students and 19 months away for Year 10 students). The frequency of fear appeals would likely increase as the examinations they were used in relation to drew closer.

The hypothesis that more frequent fear appeals would be associated with greater challenge and threat appraisals (H_2) was supported. Although this tallies with previous findings (e.g., Author et al., 2014, 2016), at first sight this finding might appear contradictory; challenge and threat appraisals have differing foci and outcomes. The threat of failure, however, is not uniformly detrimental, and for some individuals can be a powerful motivating force (see Pekrun, 2006; Pekrun & Perry, 2006). Fear appeals are proposed, then, to be a prompt for reflecting on the values highlighted in the fear appeal (e.g., academic success in its own right, getting a college place, and so on) and beliefs about one's capacity to attain success (e.g., academic self-efficacy, expectancy of success, buoyancy and so on). If

one values academic success and holds strong competence beliefs, repeatedly reflecting on these, as prompted by the fear appeal, serves to enhance the growth and mastery-focused mindset characterised by a challenge appraisal. However, if one values academic success but does not hold strong competence beliefs, repeatedly reflecting on these, serves to enhance the self-protective and avoidance-focused mindset characterised by a threat appraisal.

The hypothesis that challenge appraisal would be positively, and threat appraisal negatively, related to behavioural and emotional engagement (H_3) was supported. This tallies with previous findings linking the appraisal of fear appeals to engagement (Author et al., 2016), motivation (Author & Author, 2014b), and values and beliefs (Author et al., 2015). It is also consistent more generally with findings from the adjacent educational psychology literature showing that mastery foci, and positive emotions facilitate engagement whereas avoidance-focused intentions and negative emotions undermine engagement (e.g., Gonida, Voulala, & Kiosseoglou, 2009; Lau, Liem, & Nie, 2008; Liew, Lench, Kao, Yeh, Kwock, 2014; McGregor & Elliot, 2002; Reschly, Huebner, Appleton, & Antaramian, 2008).

Individual differences in challenge and threat appraisal, therefore, determine whether a fear appeal, made prior to a high-stakes examination, is associated with educational gains or losses. Nonetheless, it is important to acknowledge the correlational nature of the data here. Although (Author et al., 2016) showed that challenge appraisal was positively related to, and threat appraisal negatively related to, student engagement over and above the variance accounted for by prior student engagement, we did not do so here. While student engagement is treated as an outcome in this study, it is possible that students who were more engaged to begin with appraised fear appeals as more challenging and less threatening.

Indirect relationships were also shown from the teacher perception of student behavioural engagement to subsequent student-reported behavioural and emotional engagement. The relationship was negative when the fear appeals were appraised as a

challenge; teachers perceived low behavioural engagement, used more fear appeals, students appraised them as a challenge, and students subsequently reported greater behavioural and emotional engagement. The relationship was positive when the fear appeals were appraised as a threat; teachers perceived low behavioural engagement, used more fear appeals, students appraised them as a threat, and students subsequently reported lower behavioural and emotional engagement. This represents an important link by showing how teachers' behaviour in response to low perceived student engagement (their increased use of fear appeals) has differential relations with student-reported engagement depending on how students appraise those fear appeals.

Despite results aligning with the theoretical model, it is important to acknowledge that there may be other, plausible, explanations for findings. For example, there may be certain teacher characteristics that predispose a perception of low student engagement, irrespective of actual engagement, and the use more fear appeals. For instance, some teachers adopt a controlling style (e.g., greater use of threats) as a way of trying motivate students (Reeve, 2009), or use coercive behaviours (e.g., shouting and punishment) to maintain on-task behaviour in a class (Mainhard, Brenkelmens, & Wubbels, 2011). Such teachers have been characterised as having an authoritarian style (Brophy, 2001; Uibu & Kikas, 2014) and it is associated with greater problems in student behaviour and academic competencies (e.g., Lee, 2012; Paulson, Marchant, & Rothlisberg, 1998).

Similarly, it is possible that teacher perceived low engagement and use of fear appeals might be related to student ability. That is, students in lower-achieving sets might appear less engaged (e.g., Kelly, 2007) and teachers use fear appeals as a means of encouraging students in such sets to work harder to increase their chances of success (e.g., Schlusser, 2009). This is not to say that the relationships observed between the perception of low behavioural

engagement and subsequent use of fear appeals shown in this study as spurious. Rather they might both be an artefact of teacher characteristics or student ability setting.

The exploratory latent cluster analysis identified twelve patterns of latent clusters comprising four latent clusters of appraisals and three latent clusters of engagement. Clusters of students reporting higher levels of challenge appraisal were more likely to belong to clusters of students reporting higher behavioural and emotional engagement. The cluster of students reporting low challenge/ threat appraisal scores also included small clusters of students with lowest engagement scores from any of the twelve latent cluster patterns but also small clusters of students with high engagement scores. It is possible that both groups ignore, or disregard teacher fear appeals, but for different reasons. The former group because they are disengaged from the learning process and the later group because they are already highly engaged. Overall, though, the cluster of students with low challenge and threat appraisal scores were most likely to report moderate engagement scores.

The clusters of students containing high challenge/ low threat scores, and moderate-high challenge/ threat scores, corresponded to clusters of students with higher engagement scores than the low challenge and threat cluster. Furthermore, there was no cluster of low engagement scores associated with the high challenge/ low threat and moderate-high challenge/ threat clusters. Overall, it appears that clusters with higher challenge scores are more educationally adaptive for engagement. The highest behavioural and emotional engagement scores were shown for the high challenge/ low threat cluster and, with one exception (see cluster pattern 9), the overall patterns tends to favour the high challenge/ low threat cluster over the moderate-high challenge/ threat cluster. The absence of a challenge appraisal appears to be more damaging for engagement than the presence of moderate-high threat. It is notable that no cluster emerged by high threat with moderate or low challenge.

4.1 Educational Implications

Results are of relevance to both trainee and in-service teachers, to those responsible for educating teachers and providing professional development for in-service teachers, as well as other school professionals (counsellors and psychologists). The principal question is whether teachers should be using fear appeals or not. The answer is not straightforward. Our results suggest that they can be effective, but only if students appraise them as a challenge. There is an additional risk that if students appraise fear appeals as a threat, as well as a challenge, then engagement (particularly emotional engagement) could be damaged. This is especially the case if used with a whole class which will inevitably contain students with a range of value and competence beliefs resulting in differing challenge and threat appraisals. It is also not the case that fear appeals would be more effective in high ability classes as students' beliefs about competence are, in part, judged against their peers (e.g., Bong & Skaalvik, 2003; Wigfield & Eccles, 2002). It is possible that fear appeals could be adaptive if used with individual students who were likely to make a challenge appraisal (i.e., those with high value and competence beliefs). However, as we have already commented on in this article, teachers may not be able, for good reasons, to accurately judge the internal motivational states of students. There is no guarantee that targeting individuals, rather than groups, would result in beneficial outcomes.

4.2 Study Limitations

Although we tested a process model that linked teacher perceptions and behaviours to subsequent student appraisals and student perceptions, we were not able to control for autoregressive relationships. For instance, would teachers' perception of low engagement predict increased use of fear appeals over and above the variance accounted for by their prior use of fear appeals? A related point is that teacher perceptions and behaviour were both measured at the same time point, and student appraisals and perceptions were also measured at the same, albeit later, time point. It is necessary to measure teacher use of fear appeals in

close proximity to their perceptions of student engagement, as their behaviours are likely to change in response to levels of student engagement. Similarly, it is necessary to measure student appraisals and engagement in relatively close proximity as any change in appraisals would likely impact on engagement very quickly. Nonetheless, it would assist a more formal test of mediation if short temporal spaces were inserted between teacher perceptions and behaviours, and between student appraisals and perceptions. As teacher characteristics (e.g., an authoritarian teacher) and student ability grouping might account for the linkages between teacher perceptions of engagement and use of fear appeals, it would advantageous for future studies to include these constructs. Despite these limitations, this study represents an important step in linking teacher use of fear appeals to their perception of class characteristics, and then how those relate to subsequent student appraisals and engagement.

4.3 Conclusion

In this study we show that teachers are more likely to use fear appeals when they perceive students are less behaviourally engaged. This, in turn, links to higher student engagement when students appraise fear appeals as a challenge, and lower student engagement when appraised as a threat. Thus, an indirect link can be established from teachers' perceptions to subsequent student engagement through fear appeals frequency and appraisal. Fear appeals can result in educational gains (i.e., higher engagement), if appraised as a challenge, however we would argue that this is a risky strategy.

References

Allensworth, E. M. (2005). Dropout rates after high-stakes testing in elementary school: A study of the contradictory effects of Chicago's efforts to end social promotion. *Educational Evaluation and Policy Analysis*, *27*(4), 341-364.doi: 10.3102/01623737027004341

Appleton, J. J., Christenson, S. L., Kim, D. & Reschly, A. L. (2006). Measuring cognitive and psychological engagement: Validation of the Student Engagement Instrument. *Journal of School Psychology*, *44*, 427-445.doi: 10.1016/j.jsp.2006.04.002

Auger, R. W. (2004). The accuracy of teacher reports in the identification of middle school students with depressive symptomatology. *Psychology in the Schools, 41*(3), 379–389. doi:10.1002/pits.10164

Barkatsas, A. T., Kasimatis, K., & Gialamas, V. (2009). Learning secondary mathematics with technology: Exploring the complex interrelationship between students' attitudes, engagement, gender and achievement. *Computers & Education*, *52*(3), 562-570.doi: 10.1016/j.compedu.2008.11.001

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

Carnoy, M. (2005). Have State accountability and high-stakes tests influenced student progression rates in high school? *Educational Measurement: Issues and Practice*, *24*(4), 19-31.doi: 10.1111/j.1745-3992.2005.00020.x

Celeux, G., & Soromenho, G. (1996). An entropy criterion for assessing the number of clusters in a mixture model. *Journal of Classification*, *13*(2), 195-212.doi: 10.1007/BF01246098

Coe, R., Aloisi, C., Higgins, S., & Elliot, L.M. (2014). *What makes great teaching? Review of the underpinning research*. London: Sutton Trust.

Covington, M. V. (2000). Goal theory, motivation, and school achievement: An integrative review. *Annual Review of Psychology*, *51*(1), 171-200.doi: 10.1146/annurev.psych.51.1.171

Covington, M. (2009). Self-Worth Theory. Handbook of motivation at school. . In A. Wigfield & K. R. Wentzel (Eds.), *Handbook of motivation at school* (pp. 141–170). New York: Routledge.

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 & P. D. Hastings (Eds.), *Handbook of socialization* (pp. 665–691). New York, NY: Guilford Press.

Finn, J. D. (1989). Withdrawing from school. *Review of Educational Research*, *59*(2), 117-142.doi: 10.3102/00346543059002117

Finn, J.D., & Zimmer, K.S. (2012). Student engagement: What is it? Why does it matter? In S.L. Chistenson, A.L. Reschly & C. Wylie (Eds.) *Research on student engagement* (pp. 97 – 132). New York, NY: Springer.

Folkman, S. (2008). The case for positive emotions in the stress process. *Anxiety, Stress and Coping*, *21*(1), 3–14.doi:10.1080/10615800701740457

Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research, 74*(1), 59 – 109.doi: 10.3102/00346543074001059

Fredricks, J. A., & McColskey, W. (2012). The measurement of student engagement: A comparative analysis of various methods and student self-report instruments. In S.L. Chistenson, A.L. Reschly & C. Wylie (Eds.) *Handbook of research on student engagement* (pp. 763-782). New York, NY: Springer.

Fredricks, J., McColskey, W., Meli, J., Mordica, J., Montrosse, B., & Mooney, K. (2011). *Measuring student engagement in upper elementary through high school: a description of 21 instruments.* (Issues & Answers Report, REL 2011–No. 098). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Southeast. Retrieved from http://ies.ed.gov/ncee/edlabs.

Gonida, E. N., Voulala, K., & Kiosseoglou, G. (2009). Students' achievement goal orientations and their behavioral and emotional engagement: Co-examining the role of perceived school goal structures and parent goals during adolescence. *Learning and Individual differences*, *19*(1), 53-60.doi: 10.1016/j.lindif.2008.04.002

Good, T.L., & Brophy, J.E. (2000). *Looking in classrooms* (8th Ed.). New York: Longman.

Gregory, A., & Ripski, M. B. (2008). Adolescent trust in teachers: Implications for behavior in the high school classroom. *School Psychology Review*, *37*(3), 337-353.

Givvin, K. B., Stipek, D. J., Salmon, J. M., & MacGyvers, V. L. (2001). In the eyes of the beholder: Students' and teachers' judgments of students' motivation. *Teacher and Teacher Education,17*(3), 321–331.doi: 10.1016/S0742-051X(00)00060-3

Heene, M., Hilbert, S., Draxler, C., Ziegler, M., & Bühner, M. (2011). Masking misfit in confirmatory factor analysis by increasing unique variances: A cautionary note on the usefulness of cutoff values of fit indices. *Psychological Methods, 16*(3), 319-336. doi: 10.1037/a0024917

Hijzen, D., Boekaerts, M., & Vedder, P. (2007). Exploring the links between students' engagement in cooperative learning, their goal preferences and appraisals of instructional conditions in the classroom. *Learning and Instruction*, *17*(6), 673-687.doi: 10.1016/j.learninstruc.2007.09.020

Hix-Small, H., Duncan, T. E., Duncan, S. C., & Okut, H. (2004). A multivariate associative finite growth mixture modeling approach examining adolescent alcohol and marijuana use. *Journal of Psychopathology and Behavioral Assessment*, *26*, 255-270.doi: 10.1023/B:JOBA.0000045341.56296.fa

Jackson, C. (2006). *Lads and ladettes in school: Gender and a fear of failure*. Maidenhead: Open University Press.

Jackson, C. (2013). Fear in and about education. In R. Brooks, K. Bhopal, & M. H. McCormack (Eds.), *Contemporary debates in the sociology of education.* (pp. 185-201). Basingstoke: Palgrave-Macmillan.

Jacob, B. A. (2005). Accountability, incentives and behavior: The impact of high-stakes testing in the Chicago Public Schools. *Journal of Public Economics*, *89*(5), 761-796.doi: 10.1016/j.jpubeco.2004.08.004

Jimerson, S., Campos, E., & Gried, J. (2003) Towards and understanding of definitions and measures of school engagement and related terms. *California School Psychologist*, *8*(1), 7-28.doi: 10.1007/BF03340893

Krull, J. L., & MacKinnon, D. P. (2001). Multilevel modeling of individual and group level mediated effects. *Multivariate Behavioral Research, 36*(2), 249–277.doi:10.1207/S15327906MBR3602_06

Kelly, S. (2007). Classroom discourse and the distribution of student engagement. *Social Psychology of Education*, *10*(3), 331-352.doi: 10.1007/s11218-007-9024-0

Kyriakides, L., Creemers, B. P., & Antoniou, P. (2009). Teacher behaviour and student outcomes: Suggestions for research on teacher training and professional development. *Teaching and Teacher Education, 25*(1), 12-23.doi: 10.1016/j.tate.2008.06.001

Lau, S., Liem, A.D., & Nie, Y. (2008) Task- and self-related pathways to deep learning: the mediating role of achievement goals, classroom attentiveness and group participation. *British Journal of Educational Psychology*, 78(4), 639-662.doi: 10.1348/000709907X270261

Lazarus, R. S. (2006). *Stress and emotion*. New York, NY: Springer.

Liew, J., Lench, H.C., Kao, G., Yeh, Y-C., Kwock, O-M. (2014) Avoidance temperament and social-evaluative threat in college students' math performance: A mediation model of math and test anxiety. *Anxiety, Stress and Coping, 27*(6), 650–661.doi: 10.1080/10615806.2014.910303

Lee, J. S. (2012). The effects of the teacher–student relationship and academic press on student engagement and academic performance. *International Journal of Educational Research, 53*(1), 330-340.doi: 10.1016/j.ijer.2012.04.006

Mainhard, M. T., Brekelmans, 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

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

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

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 Modeling, 11*(3), 320–341.doi:10.1207/s15328007sem1103_2

McGregor, H. A., & Elliot, A. J. (2002). Achievement goals as predictors of achievement-relevant processes prior to task engagement. *Journal of Educational Psychology, 94*(2), 381–395.doi: 10.1037/0022-0663.94.2.381

Meijen, C., Jones, M.C., McCarthy, P.J., Sheffield, D., & Allen, M.S. (2013). Cognitive and affective components of challenge and threat states. *Journal of Sports Sciences, 31*(8), 847–855.doi: 10.1080/02640414.2012.753157

Morris-Rothschild, B. K., & Brassard, M. R. (2006). Teachers' conflict management styles: The role of attachment styles and classroom management efficacy. *Journal of School Psychology, 44*(2), 105-121.doi: 10.1016/j.jsp.2006.01.004

Muthén, L. K., & Muthén, B. O. (2012). M*plus user's guide* (7th ed.). Los Angeles, CA: Muthén & Muthén.

Nichols, S., & Berliner, D. (2007). *Collateral damage*: *How high-stakes testing corrupts America's schools.* Cambridge, MA: Harvard Education Press.

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

Office of Qualifications and Examinations Regulation. (2012). *International comparisons in senior secondary assessment*. Ofqual: Coventry. Retrieved from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/372211/2012-06-12-international-comparisons-in-senior-secondary-assessment.pdf

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. & Perry, R.P. (2014). Control-value theory of achievement emotions. In R. Pekrun & L. Linnenbrink-Garcia (Eds.). *International handbook of emotions in education* (pp. 120-141). New York, NY: Routledge.

Perryman, J., Ball, S., Maguire, M., & Braun, A. (2011). Life in the pressure cooker–School league tables and English and mathematics teachers' responses to accountability in a results-driven era. *British Journal of Educational Studies*, *59*(2), 179-195.doi: 10.1080/00071005.2011.578568

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*, S8-S31.doi: 10.1080/17437199.2012.703527

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

Paulson, S. E., Marchant, G. J., & Rothlisberg, B. A. (1998). Early adolescents' perceptions of patterns of parenting, teaching, and school atmosphere: Implications for achievement. *The Journal of Early Adolescence*, *18*(1), 5-26.doi: 10.1177/0272431698018001001

Author et al. (2016). Details removed for peer review.

Author & Author (2014a). Details removed for peer review.

Author & Author (2014b). Details removed for peer review.

Author, Authors, & Author (2014). Details removed for peer review.

Author, Authors, & Author (2015). Details removed for peer review.

Author,& Author (2009). Details removed for peer review.

Author,& Author (2012). Details removed for peer review.

Author& Author (2011a). Details removed for peer review.

Author & Author (2011b). Details removed for peer review.

Author & Author (2014). Details removed for peer review.

Author & Author (2016). Details removed for peer review.

Author & Author (2016). Details removed for peer review.

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

Reschly, A.L., & Christenson, S.L. (2012) Jingle, jangle, and conceptual haziness: Evolution and future directions of the engagement construct. In S.L. Chistenson, A.L. Reschly & C. Wylie (Eds.) *Research on student engagement* (pp. 3 – 19). New York, NY: Springer.

Reschly, A. L., Huebner, E. S., Appleton, J. J., & Antaramian, S. (2008). Engagement as flourishing: The contribution of positive emotions and coping to adolescents' engagement at school and with learning. *Psychology in the Schools*, *45*(5), 419-431.doi: 10.1002/pits.20306

Rost, J. (2006). Latent-class-amalyse. In F. Petermann & M. Eid (Eds.) *Handbuch de Psyhologischen Dianoistik* (pp. 275–287). Göttingen, Germany: Hogrefe

Roseman, I.J. (2013). Appraisal in the emotion system: Coherence in strategies for coping. *Emotion Review*, *5*(2), 141–149.doi: 10.1177/1754073912469591

Ruiter, R.A.C., Kessels, L.T.E., Peters, G-J., Y., Kok, G. (2014). Sixty years of fear appeals research: Current state of the evidence. *International Journal of Psychology*, *49*(2), 63–70.doi: 10.1002/ijop.12042

Sarrazin, P. G., Tessier, D. P., Pelletier, L. G., Trouilloud, D. O., & Chanal, J. P. (2006). The effects of teachers' expectations about students' motivation on teachers' autonomy-supportive and controlling behaviors. *International Journal of Sport and Exercise Psychology, 4*(3), 283-301.doi: 10.1080/1612197X.2006.9671799

Schlussler, D.L. (2009) Beyond content: How teachers manage classrooms to facilitate engagement for disengaged students. *Theory in Practice, 48*(2), 114-121.doi: 10.1080/00405840902776376

Shiota, M.N., Neufeld, W.H., Yeung, W.H., Moser, S.E., & Perea, E.F. (2011). Feeling good: Autonomic system responding in five positive emotions. *Emotion, 11*(6), 1369–1378.doi: 10.1037/a0024278

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

Skinner, E. A., & Belmont, M. J. (1993). Motivation in the classroom: Reciprocal effects of teacher behavior and student engagement across the school year. *Journal of Educational Psychology, 85*(4), 571–581.doi: 10.1037/0022-0663.85.4.571

Skinner, E.A., & Chi, U. (2012). Intrinsic motivation and engagement as "active ingredients" in garden-based education: Examining models and measures derived from self-determination theory. *The Journal of Environmental Education, 43*(1), 16–36.doi: 10.1080/00958964.2011.596856

Skinner, E.A., Furrer, C., Marchand, G., & Kinderman, T. (2008). Engagement and disaffection in the classroom: Part of a larger motivational dynamic? *Journal of Educational Psychology, 100(4*), 765–781.doi: 10.1037/a0012840

Skinner, E. A., Kindermann, T. A., & Furrer, C. J. (2009). A motivational perspective on engagement and disaffection: Conceptualization and assessment of children's

behavioral and emotional participation in academic activities in the classroom. *Educational and Psychological Measurement, 69*(3), 493–525. doi.10.1177/0013164408323233

Skinner, N., & Brewer, M. (2002). The dynamics of threat and challenge appraisals prior to stressful achievement events. *Journal of Personality and Social Psychology, 83*(3), 678-692.doi: 10.1037//0022-3514.83.3.678

Struyven, K., Dochy, F., & Janssens, S. (2010). 'Teach as you preach': The effects of student-centred versus lecture-based teaching on student teachers' approaches to teaching. *European Journal of Teacher Education*, *33*(1), 43-64.doi: 10.1080/02619760903457818

Author & Author (2016). Details removed for peer review.

Author, Author, & Author (2015). Details removed for peer review.

Uibu, K., & Kikas, E. (2014). Authoritative and authoritarian-inconsistent teachers' preferences for teaching methods and instructional goals. *Education 3-13, 42*(1), 5-22.doi: 10.1080/03004279.2011.618808

Urhahne, D., Chao, S., Florineth, M.L., Luttenberger, S., & Paechter, M. (2011) Academic self-concept, learning motivation and test anxiety of the underestimated student. *British Journal of Educational Psychology, 81*(1), 161-177.doi: 10.1348/000709910X504500

von der Embse, N. P., Schoemann, A. M., Kilgus, S. P., Wicoff, M., & Bowler, M. (2016). The influence of test-based accountability policies on teacher stress and instructional practices: a moderated mediation model. *Educational Psychology*. Advance online publication, doi: 10.1080/01443410.2016.1183766

Waters, L. (2011). A review of school-based positive psychology interventions. *The Australian Educational and Developmental Psychologist, 28*(02), 75-90.doi: 10.1375/aedp.28.2.75

Watt, H. M. (2006). The role of motivation in gendered educational and occupational trajectories related to maths. *Educational Research and Evaluation, 12*(4), 305-322.doi: 10.1080/13803610600765562

Wigfield, A., & Eccles, J. S. (2002). The development of competence beliefs, expectancies for success, and achievement values from childhood through adolescence. In A. Wigfield & J.S. Eccles (Eds.) *Development of achievement motivation* (pp. 91 – 120). San Diego, CA: Academic Press.

Wigfield, A., Tonks, S., & Klauda, S. L. (2016). Expectancy-value theory. In K. R. Wentzel & D.B. Miele (Eds.), *Handbook of motivation at school* (pp. 55–74). 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

Wolters, C. A., & Daugherty, S. G. (2007). Goal structures and teachers' sense of efficacy: Their relation and association to teaching experience and academic level. *Journal of Educational Psychology, 99*(1), 181.doi: 10.1037/0022-0663.99.1.181

Table 1

Descriptive data for T_1 teacher-reported engagement and frequency of fear appeals use, and T_2 student-reported engagement and the appraisal of fear appeals as challenging or threatening.

	Mean	SD	α	σ_I	Skewness	Kurtosis	Factor Loadings
T_1 Teacher-reported Behavioural Engagement	2.54	.98	.79	—	.36	-.60	.52 –.83
T_1 Teacher-reported Emotional Engagement	2.47	.94	.84	—	.77	.20	.70 –.97
T_1 Teacher-reported Fear Appeals Frequency	2.10	1.01	.79	—	1.06	.71	.71 –.75
T_2 Student-reported Challenge Appraisal	3.44	1.10	.77	.19	-.48	-.55	.70 –.75
T_2 Student-reported Threat Appraisal	2.73	1.16	.84	.21	.17	-.93	.76 –.83
T_2 Student-reported Behavioural Engagement	4.01	.67	.74	.09	-.68	1.08	.66 –.73
T_2 Student-reported Emotional Engagement	3.01	.99	.85	.10	-.12	-.52	.79 –.88

Table 2

Latent bivariate correlations between T_1 teacher-reported engagement and frequency of fear appeals use, T_2 student-reported engagement, the appraisal of fear appeals as challenging or threatening, gender and year group.

	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. T_1 Teacher-reported Behavioural Engagement	—	.83***	-.35*	-.13	-.22*	.19**	.18***	.02	.09
2. T_1 Teacher-reported Emotional Engagement		—	-.08	-.12	-.18	.15*	.12*	.01	.11
3. T_1 Teacher-reported Fear Appeals Frequency			—	.34***	.36***	-.09	-.05	.01	-.01
4. T_2 Student-reported Challenge Appraisal				—	.65***	.32***	.16***	.07	-.03
5. T_2 Student-reported Threat Appraisal					—	.01	-.12**	.16***	-.07
6. T_2 Student-reported Behavioural Engagement						—	.53***	.06	.14**
7. T_2 Student-reported Emotional Engagement							—	-.10***	.09
8. Gender								—	—
9. Year Group									—

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

Table 3
Model fit indices for cluster solutions

Cluster	AIC	aBIC	Entropy
2 Appraisal Clusters			
2 Engagement Clusters	45836.29	45951.23	.781
3 Engagement Clusters	44893.50	45047.44	.801
4 Engagement Clusters	44182.02	44374.95	.820
5 Engagement Clusters	43826.60	44058.54	.825
3 Appraisal Clusters			
2 Engagement Clusters	45183.24	45331.02	.800
3 Engagement Clusters	44311.47	44510.56	.811
4 Engagement Clusters	43647.02	43897.43	.811
5 Engagement Clusters	43335.69	43637.41	.804
4 Appraisal Clusters			
2 Engagement Clusters	44819.58	45000.20	.810
3 Engagement Clusters	43894.13	44138.38	.829
4 Engagement Clusters	43288.17	43596.05	.820
5 Engagement Clusters	43040.42	43411.92	.823
5 Appraisal Clusters			
2 Engagement Clusters	44558.01	44771.46	.803
3 Engagement Clusters	43744.31	44033.70	.806
4 Engagement Clusters	43215.92	43581.27	.812
5 Engagement Clusters	42951.56	43392.85	.808

Table 4

Classification probabilities for the most likely latent cluster pattern (column) by latent pattern (row)

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	**.954**	.002	.002	.003	<.001	<.001	.004	<.001	<.001	.012	.022	<.001
2	<.001	**.835**	.015	<.001	.083	<.001	.036	.001	.004	<.001	.025	<.001
3	<.001	.053	**.827**	<.001	.006	<.001	.079	<.001	.035	<.001	<.001	<.001
4	.001	<.001	<.001	**.840**	.033	.022	.032	.006	.025	.037	.004	<.001
5	<.001	.037	.003	.021	**.815**	.011	<.001	.056	.018	<.001	.032	<.001
6	<.001	<.001	.001	.025	.020	**.801**	<.001	.026	.062	.021	<.001	.047
7	.008	.033	.022	.028	.015	<.001	**.889**	<.001	.012	<.001	<.001	<.001
8	<.001	<.001	<.001	.017	.058	.033	.001	**.867**	<.001	.009	.006	.009
9	<.001	.002	.029	.043	.044	.091	.010	<.001	**.872**	<.001	.008	.001
10	<.001	<.001	<.001	.062	<.001	.030	<.001	.013	<.001	**.877**	<.001	.019
11	.008	.015	<.001	.021	.052	<.001	.008	.008	.010	<.001	**.876**	<.001
12	<.001	<.001	<.001	<.001	<.001	.064	.037	.037	<.001	.023	<.001	**.876**

Note. Cluster pattern 1: Appraisal cluster 1 with engagement cluster 1, cluster pattern 2: Appraisal cluster 1 with engagement cluster 2, cluster pattern 3: Appraisal cluster 1 with engagement cluster 3, and so on to cluster pattern 12: Appraisal cluster 3 with engagement cluster 3.

Table 5

Cluster counts and proportions, and mean engagement and appraisal scores, for the twelve cluster patterns

Latent Cluster Patterns			Mean Scores			
	n	**%**	**Behavioural Engagement**	**Emotional Engagement**	**Challenge Appraisal**	**Threat Appraisal**
1	22	1.6	1.89	1.79	2.11	1.66
2	107	7.7	3.77	1.51	3.92	3.66
3	27	1.9	4.13	1.59	4.11	1.98
4	191	13.9	3.94	3.08	2.11	1.66
5	319	23.1	4.12	2.74	3.92	3.66
6	150	10.9	4.46	3.61	4.11	1.98
7	97	7.0	3.65	1.60	2.11	1.66
8	202	14.7	4.40	3.95	3.92	3.66
9	67	4.9	3.92	2.66	4.11	1.98
10	74	5.4	4.63	4.21	2.11	1.66
11	70	5.1	3.06	2.89	3.92	3.66
12	53	3.8	4.76	4.68	4.11	1.98

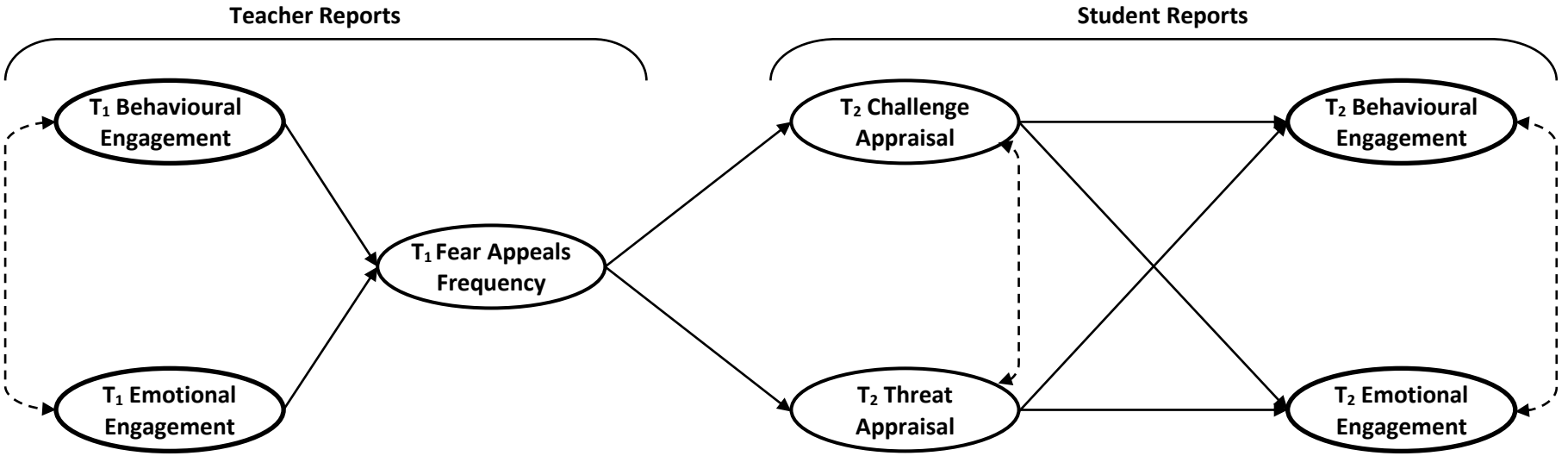

Figure 1. The hypothesised model showing linkages from teacher perceptions of student engagement (behavioural and emotional) to the frequency of fear appeals, from the frequency of fear appeals to student's appraisal of fear appeals, and from the appraisal of fear appeals to student-reported engagement.

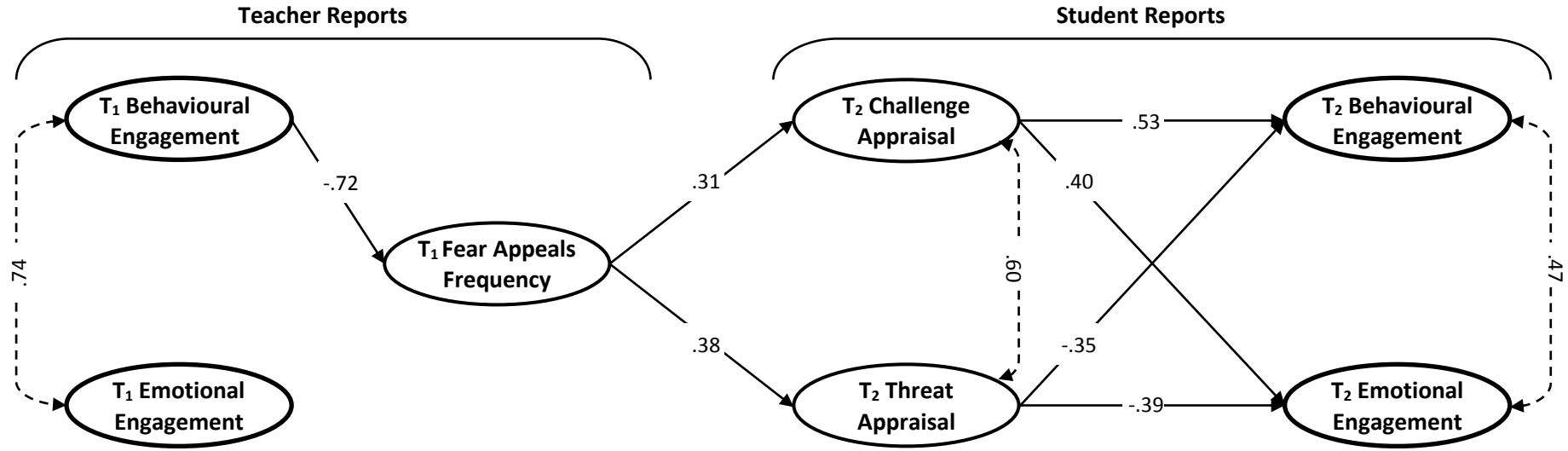

Figure 2. The SEM showing statistically significant linkages from teacher perceptions of behavioural engagement to the frequency of fear appeals, from the frequency of fear appeals to student's appraisal of fear appeals, and from the appraisal of fear appeals to student-reported engagement (behavioural and emotional).