EFFICACY APPEALS IN THE HIGH-STAKES CLASSROOM: RE-EXAMINING TEACHERS' USE OF TEST PREPARATION STRATEGIES

Hannah Wilkinson

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Abstract

The ways in which teachers communicate to students about exams has been found to have a significant impact on student outcomes such as student engagement and motivation, and academic performance. However, research has predominantly centred on the use of communications which highlight the negative consequences of failure in order to motivate students. The present research begins by exploring the variety of ways in which teachers communicate to students about exams through observational analysis of 30 lessons with students undertaking the GCSE syllabus. Findings from this initial study led to the focus on the use of teachers' efficacy communications; namely statements from teachers which provide students with an action to follow which will help them to achieve their target grade. Study Two presents the theoretical development of this concept, and the creation of a questionnaire to measure this phenomenon: the Teacher's use of Efficacy Appeals in the Classroom prior to High-stakes Exams (TEACHE). Cognitive pre-testing is utilised, and the reliability and validity of data obtained from the TEACHE is explored through data collected from 236 Year 10 students. The refinement of the TEACHE following these processes is documented. Study Three deploys multi-level structural equation modelling with data collected from 1062 Year 10 students from seven schools in the North of England to explore how fear and efficacy appeals used by teachers are appraised by students and how this impacts students' levels of engagement. Students' views of their relationship with their teacher and how this relates to fear and efficacy appraisal and engagement are also explored. Students' appraisal of fear and efficacy communications were found to relate to aspects of their engagement. Students' levels of self-efficacy and response efficacy relating to efficacy appeal communications were found to impact their engagement, however frequency of these communication was not found to significantly impact; indicating a similar appraisal-based model of efficacy appeals as seen in the fear appeal literature. Teacher-student relationship was not found to have a moderating role between either fear or efficacy appeals and student engagement. Class-level effects were observed in relation to fear appeal communications, but not efficacy appeals or teacher-student relationships. Two significant cross-level interactions were identified when exploring class-level fear appeal

frequency, but none for efficacy appeals. Results are discussed in line with previous literature. Limitations of the research are considered along with practical implications for teachers and educators, and considerations for future research.

Abbreviations and Definitions

AIC   Akaike Information Criteria

A-Levels   GCE Advanced-level Qualifications; non-compulsory academic qualification in England, Wales and Northern Ireland for students aged 16 and above

CFI   Comparative Fit Index

DfE   Department for Education

EBacc   English Baccalaureate: a set of subjects taken at GCSE which must include: English Language and Literature; Maths; the Sciences; Geography or History; a Language

Efficacy Appeal   A message which assures the recipients that they are capable of performing the fear appeal's recommended actions (self-efficacy) and that performing the recommended actions will result in desirable consequences (response efficacy)

EPPM   Extended Parallel Process Model

EVT   Expectancy Value Theory

Fear Appeal   Persuasive messages which attempt to encourage behaviour change through arousal of fear by emphasising potential danger or harm by not adopting the messages' recommendation

GCSEs   General Certificate of Secondary Education; compulsory academic qualification in England, Wales, and Northern Ireland, generally taken at 16, historically at the end of compulsory secondary education

High-stakes Testing   Test used to make important decisions, either for the test-taker or the educator

Key Stage 4   A stage of secondary education covering years 10 and 11 when children usually take GCSE exams

LPA   Latent Profile Analysis

ML-SEM   Multi-Level Structural Equation Modelling

NCTs   National Curriculum Tests; often referred to as SATs

Ofsted   The Office for Standards in Education; inspection service of educational institutions in England

Response Efficacy   Beliefs about the effectiveness of a recommended response to deter a threat

RMSEA   Root Mean Square of Approximation

SATs	Standardised Assessment Tests; compulsory test taken in England, Wales, and Northern Ireland at the end of KS1 and KS2 in Maths and English
SDT	Self-Determination Theory
Self-efficacy	An individual's belief in his or her capacity to execute behaviours
SEM	Structural Equation Modelling
SRMR	Standardised Room Mean Square Residual
TEACHE	Teacher's use of Efficacy Appeals in the Classroom prior to High-Stakes Exams
TLI	Tucker-Lewis Index

Declaration

No portion of the work referred to in this thesis has been submitted in support of an application for another degree or qualification at this university, or any other university or other institute of learning.

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1 Chapter One: Thesis Orientation

1.1 Thesis Overview

This thesis offers a valuable addition to understanding the implications of teachers' communications to students prior to high-stake exams. Research in the field has heavily focused on teachers' negatively-valanced fear appeal communications but has neglected to effectively consider the impact of teachers' efficacy communications, and how the appraisal of these communications can affect students' educational experiences. This research addresses this gap by offering a conceptualisation of these messages, creating a way to measure teachers' use of and students' appraisal of these communications, and exploring how these appraisals relate to a variety of educational variables.

1.2 Thesis Context

This thesis deviates from a typical format, due to significant alterations from the original planned research owing to the covid-19 pandemic. Study Three was significantly affected by the covid-19 pandemic, with two-thirds of planned data collection lost due to school closures and exam cancellations. Therefore, original research aims, design and analysis had to be reimagined. Study Three was originally planned to utilise longitudinal data to explore potential causal relationships between efficacy appeals, fear appeals, teacher-student relationships, student engagement and grade outcomes within a cross-lagged panel model. Although access to only one time point of data poses analytical limitations, and was not the original intent for the thesis, Study Three still offers useful insight into the appraisal process of efficacy appeal communications and how they relate to other educational variables.

1.3 Thesis Structure

The thesis presents three sequential studies which build upon one another in order to initially establish a gap within the literature, secondly identify how this can be effectively measured through the creation of a questionnaire, and finally, begin to explore how this phenomenon relates to other educational variables.

The thesis is divided into seven chapters. Chapter One provides an orientation of the thesis. Chapter Two presents a general introduction to the area of high-stakes testing in order to contextualise the

research. A literature review provides a backdrop to high-stakes testing and considers its implications for educators and students, giving rise to the importance of understanding the ways in which teachers communicate to students about exams.

Chapter three documents Study One; an exploratory observational analysis of teachers' communications to students regarding GCSE exams. At the beginning of the PhD journey, the researcher was interested in undertaking research on teachers' communications prior to high-stakes exams, however, was uncertain which aspect to focus upon, so this approach aimed to narrow the research focus. Due to the explorative nature of this study, an initial literature review is not presented. Study One presents the findings from this initial exploratory piece of research, through observing the types of communications teachers use prior to high-stakes exams. Findings are discussed alongside relevant theory. Although many elements were unearthed, a particular line of enquiry peaked the researchers' interest, namely, the conceptualisation of teachers' communications regarding test-taking skills and techniques as 'efficacy appeals'. A thorough literature review of efficacy appeals is considered within Chapter Four, as this forms the basis for Study Two.

Chapter Four presents Study Two. Study Two documents the application of efficacy appeals into the educational field, with rise to the theoretical and empirical considerations to the definition of efficacy appeals. It offers critical consideration of previous research of efficacy communications within the educational field and demonstrates a gap in the research. Furthermore, this chapter details the process of creating and refining a measure of efficacy appeals to be used to explore the use of and appraisal of these communications within a naturalistic setting. Study Two also documents the validity and reliability of the data obtained from this questionnaire in order to support the use of this measure for future research.

Chapter Five presents Study Three which sets out to explore how the use of, and appraisal of efficacy appeals relate to other educational variables. The chapter begins presenting a literature review of the fear appeals in the educational field. Contrary to efficacy appeals, the concept of fear appeals has received notable research in the education field and the construct is more developed. Furthermore,

the introduction considers how students' engagement and perception of their relationship with their teacher are important variables to consider in relation to appraisal of fear and efficacy appeals. Study Three consider how teachers' use of fear and efficacy communications and students' appraisals of these communications relate to their engagement and may be impacted by students' perception of their relationship with their teacher. Findings are discussed in line with previous literature.

Chapter Six offers an overall discussion of the three studies, considering the general theoretical and practical implications offered from the body of research, as well as considering limitations of the research and future directions. Chapter Seven summarises the thesis in a Conclusion Chapter.

2 Chapter Two: Introduction to the High-Stakes Testing Environment

2.1 Chapter Overview

Chapter Two provides a general introduction to the context of high-stakes testing. A brief background of high-stakes testing and accountability measures in England is presented, followed by considerations of the implications of this system on schools, teachers, and students. These reflections provide context for the remainder of thesis; highlighting why the focus of teachers' communications regarding high-stakes exams should be a critical focus of research.

2.2 High-Stakes Testing and Accountability Measures: A Brief Overview

Wilkins et al. (2012) suggest that England has the most intensive performance regulatory framework in the world. Much of this stems from changes introduced in the Education Reform Act in 1988 (DES, 1988). The changes made from this act placed increased emphasis on measurable data, and provided parents with a preference for their child's school placement (Hutchings, 2015), transforming schools into a competitive market, which was hoped to improve schools and student outcomes (Berliner, 2011).

A new qualification was introduced: the General Certificate of Secondary Education (GCSE). Within this new qualification framework, students are expected to undertake study in the core subjects of English, Maths and Science and a range of elective subjects (Gregory & Clarke, 2003). Results from these exams impact an individual's access to future educational or employment opportunities (Denscombe, 2000; Elwood, 2012; Putwain, 2009a). Recent reforms to GCSEs in 2015 have ended modularization and coursework assessment, replacing them with rigorous end of course examinations, with the grading system being amended from A*-U (with A*-C, considered as a pass), to 9-1 (with 9-4, considered as a pass; A*/9 considered the highest grade) (Ofqual, 2013).

The Education Reform Act also introduced the Office for Standards in Education (OFSTED) in order to improve the quality of education and raise educational standards (OFSTED, 1995). OFSTED

assesses whether schools meet targets in relation to learning outcomes and pupil experiences via regular inspection of schools, with findings published in a written report (Matthews & Smith, 1995).

The introduction of performance league tables in 1992, enabled parents more measurable ways to compare schools (Perryman et al., 2011). Schools were required to publish the number of students achieving five or more passes at GCSE; meaning that these qualifications became the measure of success for schools. Schools are also now subject to performance data on EBacc (English Baccalaureate; a set of subjects taken at GCSE which must include English Language and Literature; Maths; the Sciences; Geography or History; a Language). Schools are assessed on the number of students taking up the EBacc, as well as their students' average performance across these five subjects (DfE, 2015).

The emphasis on grade output, and the use of test results to judge the quality of teachers and schools, means that GCSEs are often referred to as high-stakes exams (Hutchings, 2015). Politicians believed that the combination of published exam results and inspection reports from OFSTED would focus schools to deliver an observably efficient product and improve student outcomes (Adams, 2014). However, high-stakes testing and increased accountability measures have received criticisms. Nichols (2007) proposes that the traditional beliefs that high-stakes tests are effective are based on fundamentally flawed assumptions such as: students will work harder when they have a high-stakes test; high-stakes tests are a good measure of performance; and that teachers need to be held accountable to motivate them to teach better. The fact that league tables neglect to take into account contextual factors, such as social and economic circumstances, or students population factors, has also been criticised (Gregory & Clarke, 2003). Furthermore, Wiliam (2010) posits that as between-school differences only account for a small amount of variance in student scores (on average, globally around 10%), they are not an appropriate tool to hold schools and staff to account. He suggests that although high-stakes tests can be a cost-effective way to increase student achievement, it has the potential for a range of unintended outcomes which may have a negative impact (Wiliam, 2010).

During the Covid-19 pandemic, there was a shift away from the ways in which students were graded for their GCSEs, as exams were cancelled due to extended school closures. However, the alternative approaches could not be described as successful, with an OFQUAL report citing 'the commotion over 2020's 'algorithm' driven grade awarding issue' (OFQUAL, 2022). When asked about the cancellation of exams in a survey, students reported both negative and positive valanced feelings (with 42% reporting both positive and negative valence feelings) (McCaldin, 2023). However, mixed feelings may be reflective of the uncertainty students felt about what the alternative assessment methods were going to be (McCluskey et al., 2021). There was also split opinions relating to the cancellation of exams, with some students appreciative of the relief of not having their exams, whilst others commented they missed the 'opportunity to prove themselves' and felt as though they were 'missing out on a rite of passage'. Indeed, Brown and Woods (2022) comment that the majority of students are invested in their GCSEs and view them as an important step on their journey to their future aspirations. When considering alternative to GCSE exams, students also raised concerns about the fairness of the teacher-reported grade approach, highlighting concerns for potential bias and subjectivity in grading (McCaldin, 2023). Indeed, students have previously echoed concerns about the potential inequality in utilising internal assessment processes, such as potential bias from teachers (Elwood, 2012). The unsuccessful attempts over the two years of cancelled exams due to the ongoing issues of the pandemic highlight the issue whether there is an effective alternative to high stakes exams, or whether exams are the only fit-for-purpose means of delivering valid student assessment (McCaldin, 2023).

High-stakes testing and increased accountability to external agencies have had significant consequences for the educational landscape (Troman, 2008), providing additional stress for schools, teachers and students (Kruger et al., 2018). The impact on schools, teachers and students will now be addressed.

2.3   Implications for Schools

The costs for schools 'failing' to deliver in high-stakes exams are high (Baird et al., 2013). Sanctions include: written warnings from the government; increased OFSTED inspections; removal of the headteacher; closure of the school and replacement with an academy, implications for funding

(Hutchings, 2015; Stobart, 2008). To avoid these sanctions, schools have adopted a results-driven approach (Ball et al., 2012; Perryman et al., 2018), changing how they operate in order to achieve the best position in league tables (Adams, 2014). As Harlen and colleagues comment: "high-stakes tests can become the rationale for all that is done in classrooms" (Harlen et al., 2002 p. 4).

In their 2010 publication, 'A Case for Change', the Department for Education, highlighted that the focus on test scores had driven gaming behaviour in schools, in which schools undertook practices which would ensure more favourable results would be published (DfE, 2010), even resulting in dubious practices such as lower test scorers being removed from taking tests thereby inflating average test scores (Nichols & Berliner, 2005). Although there was a recognition of the problem, there was no move to amend performance and accountability measures (Adams, 2014). Instead, schools were encouraged to enter pupils for academic exams regardless of their needs or aptitude, however this puts some students at risk of leaving school with little qualifications (Hutchings, 2015).

2.4   Implications for Teachers

Teachers' work is increasing regulated due to accountability measures (Perryman et al., 2011; Tymms & Merrell, 2007). This can be exacerbated by the practice of performance-related pay based upon students results, and the expectation for grades to improve each year irrespective of the nature of the current year group (Conner, 2003; DfE, 2013; Perryman et al., 2011). Backwash effects are a common occurrence; in which high-stakes test influence the instructional programme which prepares the student for the test (Daly et al., 2012) resulting in altered teaching practice; often referred to as 'gaming the system' (Meadows & Black, 2018).

Teachers express feelings of stress and pressure due to the focus on grades and accountability (Hutchings, 2015; Perryman et al., 2011); reporting this pressure as constant (Barksdale-Ladd & Thomas, 2000). Concerns about job security, salary cuts and being forced out of teaching was a common rhetoric noted from teachers in one study, despite the authors noting they didn't find any evidence of staff actually losing money (Barksdale-Ladd & Thomas, 2000). Feelings of stress have been seen to increase significantly as exams approach (von der Embse & Mankin, 2021).

Although teachers reflect their desire not to pass down their own pressures onto students (Flintcroft et al., 2017), they acknowledge that it does impact their teaching practice; adopting a more controlling teaching style and emphasising the transmission of knowledge (Black et al., 2002; Pelletier et al., 2002). Teachers reflect these approaches contradict the notions of good educational practice (Abrams et al., 2003; Barksdale-Ladd & Thomas, 2000). For example, it stifles their ability to teach creatively (Jones, 2007), and reduces their ability to promote in-depth understanding of context, and promote activities which involve collaboration, independence or higher order learning skills (Barksdale-Ladd & Thomas, 2000). As Christensen (1999 p. 14) argues: "Can we 'teach to the test' without compromising what we know to be true about teaching and learning?".

Although teachers acknowledge that exam preparation is an important aspect of their responsibilities (Abrams et al., 2003; Daly et al., 2012); they comment that they feel they spend too long preparing students for tests and this negatively impacts their teaching (Barksdale-Ladd & Thomas, 2000). A significant pedagogical outcome of high-stakes examinations is the narrowing of the curriculum students are offered. This can be seen on a broader school level-scale; with an increased focus and time spent on core, tested subjects (Tymms & Merrell, 2007), particularly in years where there are high-stakes tests (Boyle & Bragg, 2006). Berliner (2011) offers that although narrowing of the curriculum is a rational response to high-stakes testing, it leaves less time for creative subjects and does not allow students to follow their interests in topics. This narrowed curriculum also reduces the educational experiences students are exposed to (Abrams et al., 2003) and reduces students' time to engage in higher cognitive processes (Berliner, 2011).

This narrowed approach is also prominent within day-to-day teaching practices; often coined, 'teaching to the test'; whereby the curriculum is constricted to content which will be tested (Baird et al., 2013; Gulek, 2003; Hutchings, 2015; Jones, 2007; Nichols & Berliner, 2005), with an increased emphasis on tested subject matter (Barksdale-Ladd & Thomas, 2000; Cuff et al., 2019; Harlen et al., 2002; Stecher et al., 2004). In addition to narrowing the material taught to students, teachers spend an increased amount of time preparing students in how to take their exams (Abrams et al., 2003), teaching them to become 'assessment literate' (Gulek, 2003). Test preparation is regarded as part of daily instruction

(Barksdale-Ladd & Thomas, 2000), with 85% teachers reporting they taught test-taking skills to prepare students for high-stakes tests (Abrams et al., 2003). An understanding of test-taking strategies allow the test-taker to deal with test situations in an appropriate manner, such as knowing how to prepare, and what to do during the test (Dodeen et al., 2014).

Preparation for high-stakes tests includes coaching students on the style of tests and test-taking strategies (Barksdale-Ladd & Thomas, 2000; Cuff et al., 2019), such as the sequence of answer completion and skipping difficult questions (Stenlund et al., 2017), as well as teaching time management strategies (Gulek, 2003; Stenlund et al., 2017). Much time is also devoted to undertaking practice tests (Black et al., 2002; Daly et al., 2012; Harlen et al., 2002; Hutchings, 2015; Stenlund et al., 2017), as well as the additional timetabling of intensive subject-specific revision classes (Flintcroft et al., 2017), including out of school days (Perryman et al., 2011). Teachers have also been found to focus their teaching efforts on 'borderline' students (those who are close between a pass and fail grade) (Meadows & Black, 2018; Perryman et al., 2011; Stobart, 2008) in order to increase the number of passes to include in the league tables, however, this can be problematic for the more or less able students because they can be side-lined (Adams, 2014).

Critics suggest that improved test scores may be a result from these gaming the system practices, rather than being truly representative of pupils' understanding and knowledge (Hutchings, 2015). Indeed, when comparing results from 2006 to 2012, the percentage of pupils achieving 5 A*-C in their GCSEs (including English and Maths) increased by 15 percentage points, but at the same time period, PISA scores (a low-stakes international test taken only by a sample of schools) did not increase (Wheater et al., 2013). Consideration of the Sawtooth effect may also provide support for this assertion. The Sawtooth effect is a phenomenon whereby cohort performance in high-stakes assessments drop suddenly following assessment reform, and rises slowly overtime (Cuff et al., 2019). Cuff and collegues propose this phenomenon may be due to teachers being less familiar with the new assessments and having less knowledge and confidence regarding information about the test (such as commonly tested material and strategies for answering different types of questions). As teachers gather this information over the course of several years of the new assessment, they are more able

to authoritatively offer students advice about the exams, enabling students an advantage to gaining higher marks.

2.5   Implications for Students

Exams can also be considered as high-stakes from the student perspective when the consequences are highly valued for the test-taker (Stenlund et al., 2017). For example, GCSEs are considered as high-stakes because results can limit individuals' access to future educational or employment opportunities (Denscombe, 2000; Elwood, 2012; Putwain, 2009a). This high-stakes nature can have negative impacts upon mental health and well-being (Brown & Woods, 2022; Denscombe, 2000; Harlen et al., 2002; Putwain, 2009b). This high-stakes approach can result in students viewing the main purpose of schooling to be gaining qualifications, and that it is only worth learning things which are tested (Elwood, 2012; Hutchings, 2015). Although most students appear invested in their GCSEs and see them as important for their future; they dislike them and comment on the lack of sense of control and agency they have over them (Brown & Woods, 2022; Harlen et al., 2002)

With high-stakes exams being the focus of much classroom instruction (Harlen et al., 2002), students report frequent use of undertaking past papers and looking at mark schemes (Daly et al., 2012) and receipt of instruction from teachers regarding basic information about the exam and revision advice (Flintcroft et al., 2017). However, interestingly, in a systematic review of papers exploring GCSEs, Brown and Woods (2022) found that students' reflections of teacher behaviours which supported them through their GCSEs included: clear instruction; experiential methods; social learning; clear direction on improvement; help; encouragement and positive comments on work; and making work interesting and challenging. None of which relate to any 'teaching to the test' practices.

Although the focus on 'teaching to the test' is criticised, effective study skills can result in improved attitude towards tests and motivation for the subject (Dodeen et al., 2014) and improved academic performance and learning related emotions (Andrade & Valtcheva, 2009; Credé & Kuncel, 2008; Putwain et al., 2013). Indeed, it is considered that students should be familiar with the format of their exams and how to approach them, so that it is assessing their knowledge, skills and understanding,

rather than their ability to interpret the question (Baird et al., 2013). In a study exploring A-levels students' perspectives to high-stakes exams, Daly et al. (2012) report that students felt that having clear expectations about the exams and understanding commonly tested content was valuable for structuring their learning and revision, and that teachers' use of preparation strategies boosted their confidence. Additionally, they believed that good performance would be dependent upon their understanding of the mark scheme and knowing what was valued by examiners. However, the authors note that the sample used was of relatively high achievers, so these findings may not be fully representative (Daly et al., 2012).

Although seemingly an effective approach, students have reported that doing well on exams was constantly 'hammered' into them from teachers and others from a very early stage (Elwood, 2012) and that they felt teachers took their stress out on them (Denscombe, 2000). Furthermore, they commented that exam preparation 'takes over their lives' (Daly et al., 2012). Students also report frustration that their choice of subjects for high-stakes exam years is restricted, either through school organisational processes, or pressure to choose subjects based upon likely grade attainment (Brown & Woods, 2022).

Although research can provide evidence for increase in test scores (see Phelps, 2012 for review) when teachers teach to the test, it is not necessarily the case that students are learning more (Nichols, 2007; Nichols et al., 2006; Phelps, 2012), it is more likely a result of increased test preparation (Moon et al., 2003). As Gregory and Clarke comment: "rising test scores demonstrate little more than teachers' increasing abilities to teach to tests…and increased narrowing of the curriculum" (Gregory & Clarke, 2003 p. 69). This is potentially demonstrative of the of the Sawtooth effect (Cuff et al., 2019).

Therefore, the benefits to students in consideration of the wider sphere of learning and education is questionable. The high-stakes classroom environment can result in reduced motivation (Amrein & Berliner, 2002; Hutchings, 2015) and outcome-driven approach to education (Adams, 2014; Black et al., 2002). The focus on learning formulaic responses, memorization and recall discourages students from learning in different contexts and often inhibits in-depth learning and understanding, and the

development of higher-level thinking skills (Daly et al., 2012; Jones, 2007; Morgan, 2016). Universities and employers have expressed concerns about this too, stressing that it does not prepare students for life following school (Hutchings, 2015). Students also reported the conflict they felt with higher education institutions looking for balanced individuals, but the focus on exams and grades meant that extra-curricular activities were often put on hold (Elwood, 2012).

Although students benefit from the instructional practices which result from a high-stakes testing environment in relation to their exam results; there may be negative wider implications for their attitude to learning, their mental health and thriving in future education or employment settings.

2.6   Chapter Summary

Chapter Two has provided a brief background to the context of high-stakes exams, its implications for classroom instruction, and consequences for students. A body of evidence has explored how teachers communicate to students about exams within a psychological context (see Putwain et al., 2021 for review); but this has predominantly focused upon highlighting to students the consequences of failure. Although an inspiration for the direction of the thesis, the author was keen to explore how the high-stakes environment may affect other ways in which teachers communicate to students about exams. Indeed, one study reports conflicting views of teachers on this element of their teaching practice; with some teachers reported that they did not consciously think about the language which they used when they talked about exams to students, whilst others suggested that they utilise different language depending upon which students they were speaking to in order to consider the best approach for that student (Flintcroft et al., 2017).

As teachers' ways of interacting with students is of major educational importance, affecting student learning, enjoyment and engagement (De Meyer et al., 2014), it seems important to explore other ways teachers communicate to students about high-stakes exams, through an educational-psychology lens. Therefore, the preliminary study in this thesis presented subsequently in Chapter Three, offers an exploration into how teachers communicate to students about high-stakes exams in the classroom environment.

3   Chapter Three: Study One: An Exploration into Teachers' Communications preceding High-Stakes Exams

3.1   Chapter Overview

Chapter Three presents Study One, which documents the initial exploratory phase of the PhD research, undertaken with the aim to develop research questions and hypothesises for the main study. Observational analysis was adopted in order to gain an understanding of the variety of ways in which teachers communicate to students prior to their GCSE exams. The use of observations enables researchers to look afresh at everyday behaviours in a new light, which otherwise may go unnoticed (Cooper & Schindler, 2014).   Any communication from a teacher regarding exams was recorded and thematic analysis, following Braun and Clarke (2006) six-stage method was adopted to analyse the data. Four higher-order themes were identified, further divided into sub-themes, and are discussed in line with theoretical considerations.

3.2   Research Aims

Study One was embarked upon as an exploratory phase of the PhD project; with the intention that observations and analysis of classroom practices would narrow research ideas for the main study.   Due to the exploratory nature of the study, the aim of the research remained broad, namely: to explore how teachers communicate to students about GCSE exams.   Whilst there is a body of research exploring teachers' communications about exams and how these communications can affect students (Putwain et al., 2021), this data is typically gathered from teachers and students in the form of self-report retrospective quantitative accounts. To the authors knowledge, there have been no studies conducted in the classroom environment to document direct communications teachers make regarding exams. Therefore, this exploratory piece of research was deemed a valuable place to begin the PhD research journey.

3.3 Method

3.3.1 Procedure

Observations were conducted over a two-week period in a secondary school in the North West of England. The school, part of an academy chain, holds a strong focus on leadership and had an OFSTED rating of 'good' when the observations were undertaken.

In total, 30 observations were conducted, spanning over year groups 7-11 and a variety of subjects: math, English, science, MFL, geography, history, computer science. Eighteen of the lessons were conducted by a female teacher, and 12 by a male teacher. Class size was on average 30 students, with lessons lasting one hour. The gatekeeper at the school organised classes for the researcher to observe, ensuring the member of staff consented to being observed. Whilst this could have potentially biased the classes the researcher was exposed to, the wide range of teachers who were observed during the observation period (n=20) indicated that a bias of exposure to particular staff was reduced. The school operated an open door policy in relation to observations, with staff regularly encouraged to drop in on each other's lessons to observe examples of good practise. This regular exposure to additional members of staff in the classroom meant that the teacher being observed and the students in the lesson were not fazed by the researchers' presence in the classroom. The researcher placed themself in a discrete position, at the side or at the back of the room as to impose minimal influence on the typical classroom proceedings to encourage natural observations to take place and reduce the effect of reactivity (Robson, 2011).

Due to the exploratory nature of the research, an unstructured observation approach was deemed to be the most suitable methodology due its hypothesis-generating approach (Cohen et al., 2017) and means of investigating the complexity of human phenomena (Gough & Lyons, 2016). Adopting a more structured method of data collection may have led to loss of important findings and limited the scope of the research (Cohen et al., 2017).

The observation protocol (see Appendix B) was unstructured in nature, but had three core areas to concentrate observational notes. Firstly, demographic information was recorded about the context of

the class (such as subject, year group, set, number of students in the class). Secondly there was space to write reflective notes regarding the general classroom environment (such as reflections on teaching style, student-teacher relationships, class dynamic). Finally, the protocol provided the space to note any communications made by the teacher relevant to students' forthcoming exams, whether this be explicit or implicit by the context of previous dialogue. Quotes were recorded verbatim and this was also supplemented with additional space for field notes (for example, the context of the message, the tone of voice used, or other salient observations), in order to aid subsequent analysis (Boulton & Hammersley, 2006). Observations and field notes were refined and typed up the same day as the observation to ensure detailed accounts of observations (Gray, 2021) and authentic recollection, to reduce selective memory (Robson, 2011).

3.3.2   Quality and Rigor

As the research was undertaken within one school, it could be criticised for providing a limited context and range of experiences to gather observations from, thereby limiting the reliability of the findings across other educational contexts. Whilst this limitation is acknowledged, it should be considered that the purpose of the observations in the present study were exploratory in nature, in order to aid the focus of future research, therefore the generalisability of the findings was not an imperative feature of the research design. However, the findings from the current research do form an integral part of the development of a measure for the forthcoming studies (see section 4.4.2.1). This measure was subsequently utilised across a number of schools (see Study Two and Three), asking students to rate the frequency of teachers' comments relating to test preparation strategies. Findings across both studies about teachers' frequency of these communication strategies indicates that, in relation to efficacy appeals at least, there may be the ability to generalise these observational findings across other schools.

As a method of the researcher acknowledging the potential subjectivity they bring to the research and to add a layer of 'quality control' (Clarke & Braun, 2013), the researcher engaged in undertaking a reflective diary during the observational period, including noting any saliant reflections of the process of data collection and initial impressions from the data (Creswell & Creswell, 2017).

3.3.3   Ethical Considerations

Ethical approval was granted by the proportionate review committee at Liverpool John Moores University (reference number: 16/TPL/008) (see [Appendix A](#) for ethics approval letter). The school gatekeeper organised classes for the researcher to observe, ensuring the member of staff consented to being observed and teachers were provided with pseudonyms to maintain their anonymity.

3.4   Analytical Approach

Thematic analysis was adopted to analyse the observational data. This approach is flexible (Braun & Clarke, 2006) and allows for a large amount of data to be summarised into key features (Robson, 2011), as well as providing the ability to generate unanticipated insights (Braun & Clarke, 2006). Braun and Clarke (2006) six phases of thematic analysis were adopted to analyse the data:

1) Familiarising yourself with your data
2) Generating initial codes
3) Searching for themes
4) Reviewing themes
5) Defining and naming themes
6) Producing the report

A total of 139 quotes were collected from the observations. Quotes were recorded if the teacher referred to forthcoming exams or if this was implicitly implied within the context of the quote. Each quote was initially coded into as many codes as were relevant, using field notes in order to aid interpretation. For example, *"This is your maths exam book to success…let's start with a positive look on life…Or call it the journey to grade point 6…"* was initially coded as *"positive/grade point/empowerment"*.   Quotes were then revisited to make sure that codes were applied harmoniously through the entire dataset. The second phase of analysis entailed collating the codes together and beginning to identify concurrent ideas into potential themes. This was an organic process and the sub-themes emerged naturally. When it came to piecing together the sub-themes into higher order themes, some themes came together naturally, however for others, the initial bottom-up

process was adapted into a top-down perspective; with theoretical ideas driving the culmination of sub-themes into potential themes. This process took several stages of refinement until the sub-themes formed a coherent group of higher order themes. In order to check that the higher order and subthemes accurately portrayed the data, the quotes identified as initially relating to the themes were placed into a table so that it would be easy to check that the theme appropriately covered the quotes. The themes were confirmed to depict the quotes, and the creation of the table meant for ease of selecting the most compelling and vivid quotes to support the themes. Appendix C provides a table of quotes relating to each theme.

3.5   Analysis and Discussion

Thematic analysis of the quotes used by teachers in the classroom, resulted in four distinct higher-order themes emerging from the data: Instructional Practices, Direction of Message, Grade Point and Efficacy Appeals. Themes often contained multiple layers of subthemes, which can be visualised in the thematic map (see Figure 3.1). Themes will be discussed in turn, with quotes presented to augment the exploration of the theme, whilst relevant empirical evidence and theoretical considerations are drawn upon to discuss themes and subthemes within the wider literature.

Figure 3.1 *Thematic Map demonstrating the themes and sub-themes identified in Study One*
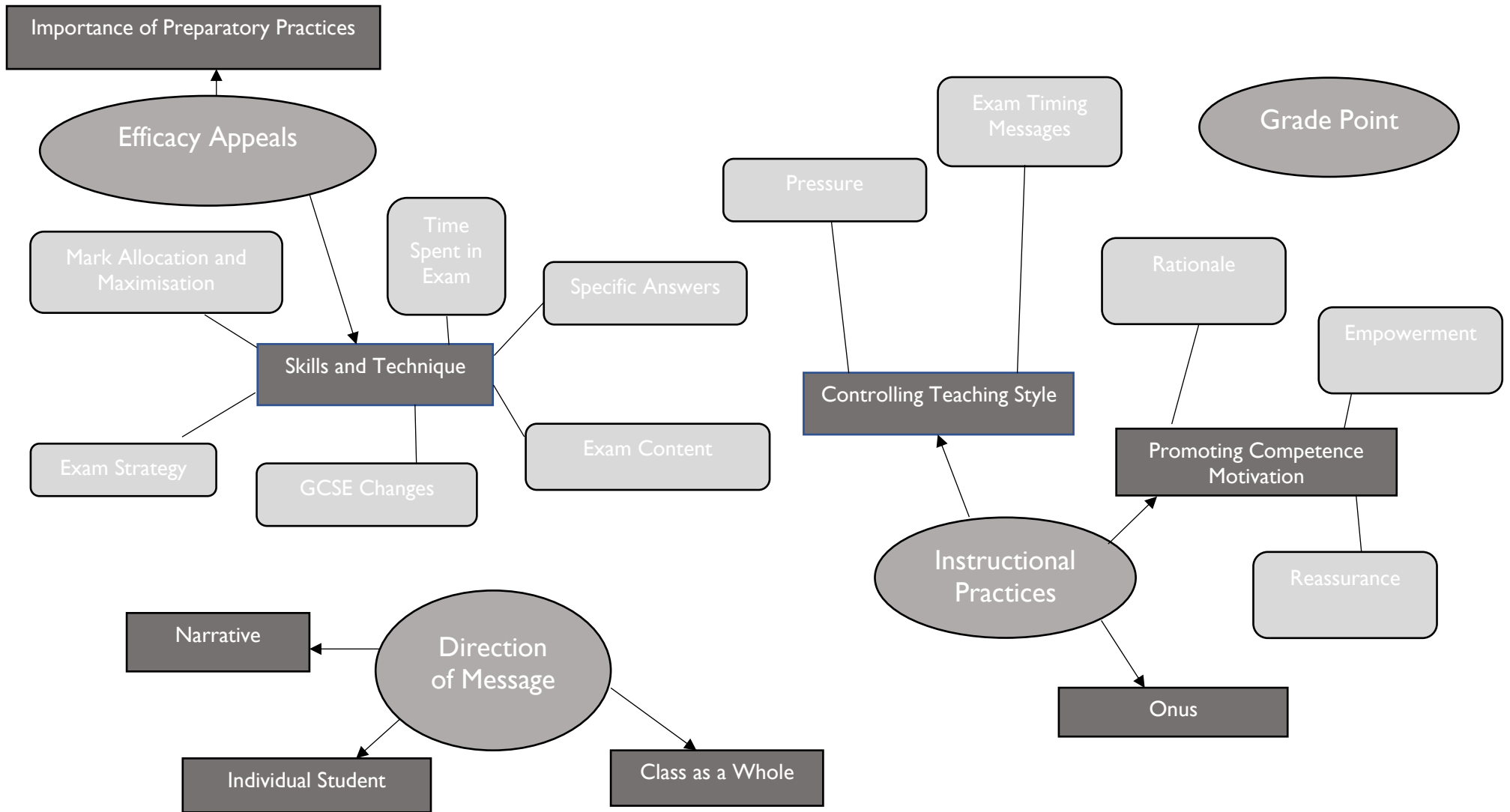
3.5.1 Theme One: Instructional Practices

The theme Instructional Practices summarises ways in which teachers utilised different teaching practices in relation to communications about exams. This theme encompasses three subthemes: Adopting a Controlling Motivating Style; Encouraging Competence Motivation; and Onus of Responsibility. The themes of 'Adopting a Controlling Motivating Style' and 'Encouraging Competence Motivation' pertain to teachers' differing approaches to attempt to motivate students to engage in productive learning behaviours. Whilst the final sub-theme, 'Onus of Responsibility' discusses how teachers differentiate accountability and onus of responsibility of the completion of tasks or behaviours relating to preparing for exams.

3.5.1.1 *Adopting a Controlling Style*

Adopting a controlling motivating style is a term coined by Reeve (2009) to describe a teaching style which aims to motivate students by controlling them to adopt their perspective or pressuring them to think, feel and behave in a certain way. This approach can be intrusive of students' thoughts and feelings. Despite well-documented research to suggest students may suffer from this type of instructional practice, it is a common style amongst teachers (Reeve, 2009). Reeve's conceptualisation of a controlling motivating styles aligns with the self-determination theory (SDT) of motivation (Deci & Ryan, 2000; Ryan & Deci, 2000). Briefly, SDT theorises three basic psychological needs for optimal functioning: autonomy (feeling as though you are the perceived source of own behaviour); competence (having the opportunity to exercise one's own capabilities); and relatedness (having a sense of belonging with others). The extent to which these needs are fulfilled can support or hinder people's growth-orientated processes (Niemiec & Ryan, 2009). Autonomy-support is considered a key dimension of effective teaching style (De Meyer et al., 2014) with a controlling motivating style being considered to undermine students' autonomous motivation and has been linked to subsequent poorer academic performance (Soenens et al., 2012). The sub-theme of 'Adopting a Controlling Style' emerged from several initial codes, such as: 'pressuring', 'chastising', 'task management'. The conceptualising of a controlling motivating teaching style effectively encapsulated these initial codes. This sub-theme has been split into two further sub-themes: Pressure and Exam Timing Messages.

These will be discussed in further detail, alongside some demonstrative examples of teacher-talk to illustrate the sub-themes.

3.5.1.1.1   Pressure

Using pressure in order to get students to think, feel or behave in a specific way and relying on pressure-inducing language (such as 'should' and 'need to', or guilt inducing criticism) are both behaviours associated with a controlling motivating style (Reeve, 2009). As Weinstein et al. (2018) demonstrate, small differences can make a significant difference to the message for example, 'you may do this' versus 'you must do this'; the first utterance supports self-initiation, whilst the second pressurises and stifles self-expression.

A teachers' controlling style can be considered as external or internal (Soenens & Vansteenkiste, 2010). Externally controlled teaching utilises strategies such as punishments and explicitly controlling language (e.g., you must) to create a sense of external obligation in students to undertake tasks or behaviours. Whereas internally controlled teaching triggers internal pressures for students, such as inducing reflections of shame, anxiety, and self-worth (e.g., everyone should be able to complete this task). Both types of these pressure-inducing language were observed in classes and were often co-occurring. For example, in one observation, where the teacher and students were discussing the answers to several practice questions they had just completed and students had not answered a question correctly, the teacher remarked: '*This is something that we have done for 2 learning cycles now, you shouldn't be getting this wrong. If you don't know it then you need to go and learn it*' (Mark, Year 11 Science). The teacher here appeared frustrated with the students and relied upon internal control (shouldn't be getting this wrong) to shame the students and external control (need to go and learn it) to motivate the students to go and revise their work again.

Internally controlled teacher communications to try to urge students to work harder can also be seen in the following example, where students in the class did not appear to have fully grasped an element of the curriculum, and the teacher vocalised: '*We're heading towards the end of year 10, rapidly moving towards year 11, this is stuff you should know by now*' (Christine, Year 10 French).

An additional element of controlling teacher instructional style is the use of threats to control behaviour (Urdan & Turner, 2005). Within the observations, teachers used reference to students' exams in order to get students back on track with their current classroom task. For example, in a science class when students were answering a practice question individually and the classroom noise level increased, the teacher remarked: '*Remember it's a mark a minute in the exam…you've already wasted 2 marks some of you*' (Mark, Year 11 Science). Here, although the teacher is providing students with some information about time spent in the exam, he is using this as a method to control the class to remain on-task. Another example of this tactic was used with an interaction with an individual student who was not completing their work due to having run out of space within their workbook: *"Do you think you're going to get your GCSEs and A levels by saying I couldn't fit it in my book…This is going to be on your test, you're not going to be able to do well by having done 2 questions"* (Rob, Year 10 Maths).

Both the use of pressure inducing language and threats to control behaviour have been conceptualised as facets of controlling teacher instruction. External pressure has been considered a key attribute source of teachers adopting a controlling motivating style (Ryan & Brown, 2005). Reeve (2009) posits three main categories: pressure from above, pressure from below and pressure from within. The use of threats to control behaviour may be viewed under Reeve's definition as pressure from below, whereby a controlling motivating style can be reactionary to student disruptiveness, lack of motivation or noncompliant behaviour (Reeve, 2009). Whereas the use of pressure is more likely to be driven by the accountability and responsibility that teachers feel they have for student behaviours and outcomes. When teachers themselves are pressured to produce student outcomes they tend to pass the pressure to their students via a controlling motivating style (Deci et al., 1982; Flink et al., 1990). The more that teachers perceive pressures from above and pressure from below, the less likely they are to be self-determined toward teaching (Pelletier et al., 2002) and therefore may be more reliant on adopting a controlling style. Observations of teachers' use of frequent controlling behaviours have been found to be correlated with students' increased feelings of pressure, even when the occurrence of controlling teacher behaviours was low; indicating controlling teacher behaviours are salient for students, with even sporadic exposure producing a negative effect on students (De Meyer et al., 2014).

3.5.1.1.2 Exam Timing Messages

Teachers also used messages which highlighted to students the proximity of their forthcoming exams; these are often referred to as exam timing messages (Putwain & Roberts, 2009; Putwain et al., 2019b; Putwain & von der Embse, 2018). For example, in at the end of a lesson spent working on practice questions, Sandra, a Year 11 Geography teacher commented to her class: "*You've got 5 months until your exam now, but we're not going to be going over this stuff again",* Whilst Christine, a Year 10 French teacher also used a similar type of message: "*We're heading towards the end of year 10, rapidly moving towards year 11, this is stuff you should know by now.*"

Although originally conceptualised as a fear appeal communication (Putwain & Symes, 2014) timing messages have since been conceptualised in relation to self-regulated learning (Putwain et al., 2019b; Putwain & von der Embse, 2018) (see section 5.2.2.1.4). Self-regulated learning refers to students being active participants in their own learning process; with thoughts, feelings and actions being self-generated to attain learning goals (Zimmerman, 1986). Self-regulated learning is considered to span three cyclical phases: forethought phase, performance phase and self-reflection phase (Zimmerman & Campillo, 2003). When considered within the self-regulatory learning framework, timing reminders act as a prompt to support the regulation of students' preparation for forthcoming tests, both within the forethought phase and performance phase (Putwain & von der Embse, 2018). Within the forethought phase, timing reminders may prompt students to engage in activities necessary to achieve their goals. For example, if students have not begun preparations for their exams, or are putting little effort into studying, then messages such as this may emphasise the need for them to set goals or plan the steps in order to achieve those goals. Within the performance phase, timing reminders may prompt students' task-focus and on-task behaviour, in addition to persistence during lessons and private studying (Putwain & von der Embse, 2018).

Self-regulatory learning processes are regarded as having a generally positive impact upon learning motivation and academic achievement (Zimmerman & Bandura, 1994). Therefore, it could be considered that teachers' use of timing reminders would help to prompt students to engage in

preparation for forthcoming exams, which, in turn, would likely to increase their motivation and achievement.

Despite the theoretical move away from considering exam timing messages within a fear appeal conceptualisation (Putwain et al., 2019b; Putwain & von der Embse, 2018), the observations from the classroom may indicate a more complex nature to these messages. Within the observations, timing messages were also accompanied by a pressure element (e.g., *we're not going to be going over this stuff again)*, thereby aligning them with pressure-inducing statements. Imposing deadlines can undermine intrinsic motivation (Amabile et al., 1976; Reader & Dollinger, 1982) and the pressure exerted from someone to think, feel or behave in a certain way can undermine autonomy (Deci & Moller, 2005). Therefore, when considered within this context, the exam timing messages seen within the observations may align with a teachers' controlling motivating style (Reeve, 2009). The use of exam timing messages to control the classroom environment has also been reported by A-level students, with students voicing that teachers' use of timing reminders begins early in the academic year and the intensity and frequency increases towards exams. One student in the focus group commented her teacher made comments such as; "Guys, why are you talking, you've got an exam in two weeks" (Chamberlain et al., 2011 p. 198).

The use of exam timing messages and pressure-inducing language have been considered as sub-themes of a controlling teaching style as both can be seen as ways teachers try to motivate students by controlling them to adopt their perspective or pressuring them to think, feel and behave in a certain way (Reeve, 2009).

3.5.1.2 Encouraging Competence Motivation

Urdan and Turner (2005) use the phrase 'competence motivation' as an overarching term to describe the impetus to develop or demonstrate competence. This conceptualisation synthesises several theoretical frameworks which all share the same premise; motivating students by increasing their feelings of competence. Due to the number of motivation theories, many of which have overlapping ideas, the notion of using a general concept of competence motivation provides a succinct framework

to explore the sub-themes which emerged from the observations. Classroom practices which are supportive of students' feeling of competence are associated with greater intrinsic motivation, willingness to engage in less interesting tasks and more likely to value academic activities (Niemiec & Ryan, 2009). Within the current data, three prominent facets of encouraging competence motivation arose: Rationale; Reassurance; and Empowerment. These sub-themes will be presented, along with illustrative quotes and are discussed in line with theory and empirical evidence.

3.5.1.2.1   Rationale

It was observed that teachers used reference to forthcoming exams in order to provide a rationale for current tasks and activities. For example, in a French lesson where the students were using white boards to complete a group task, the teacher explained why they were using this method: "*The reason we are using error board technique today is because no GCSE exam is going to be perfect and error free, but you can still get your highest possible grade with a percentage of errors." (*Christine, Year 10 French). Another example comes from a Year 9 Geography lesson where the teacher explains why he has asked the class to write out a detailed answer to a question he posed: "*The reason we've done that is if any question at the end of the learning cycle is about the formation of a spit then you will be able to answer it…it will enable you to get full marks on any question relating to this type of landform."* (Rob, Year 9 Geography). These types of messages were said in an informative manner, providing students with a context for their current tasks.

Providing rationale for tasks is conceptualised within both SDT (Deci & Ryan, 2000; Ryan & Deci, 2000) and the Expectancy-Value Theory (EVT) (Wigfield & Eccles, 2000). SDT emphasises the importance of sources and types of motivation behind people's actions (Ryan & Deci, 2000). A key component of SDT is that humans need to have a sense of autonomy in order to feel motivated (Deci & Ryan, 2000). This sense of autonomy comes from feeling the sole cause of participating in a behaviour. It is recognised that under the constraints of the education system, not all lessons can be inherently satisfying in this way, therefore, researchers propose that teachers may turn to the provision of rationale to explain to students why the behaviour or task is worthy of the students' effort (Niemiec & Ryan, 2009; Reeve, 2009) and explain the contribution of the learning task to

students' personal goals (Assor et al., 2002). These techniques can encourage identified regulation motivation (Deci & Ryan, 2000), which although is still a form of extrinsic motivation, students feel that they have a greater sense of motivation because the rationale provided by the teacher is valuable to them. Put simply, the students will feel a greater sense of ownership and motivation over the task because they value the goal at the end of the behaviour.

A similar interpretation is offered by EVT. The general concept of EVT is that an individuals' choice, persistence and performance is explained by their beliefs about how they well do on a given task and how much they value the task (Wigfield & Eccles, 2000). A key component in EVT is subjective-task value, which comprises of different values a person may have for engaging in a task. Subjective-task value is comprised of four facets: attainment value, intrinsic value, utility value, and the costs associated with undertaking the behaviour (Wigfield & Eccles, 2000). Utility value is the component which relates to the use of providing a rationale for tasks and it refers to how a task may be instrumental to reaching future goals (Wigfield & Eccles, 2000). According to EVT, utility value is instrumental to increasing motivation for a given task because it encourages the recipient to value the importance of the task for their future goals. The concept of the link between subjective-task value and teachers' exam messages has been explored in a study conducted by Putwain and Symes (2016). When given a vignette of fictional students portrayed as hearing exam related messages from their teachers, participants (high-school students) responded that they believed fictional students who were portrayed to have high levels of subjective-task value, alongside high expectancy of success, would respond positively, with positive behaviour intentions towards studying and a focus on personal growth. Naturalistic studies have offered findings that utility value has wider positive effects, such as increased academic achievement and educational aspirations (Guo et al., 2015).

When applied to the current context, student's motivation for current in-class tasks may increase when teachers relate the task to future exams as they view this as important for their future. However, Canning and Harackiewicz (2015) suggest that teachers' direct communications regarding utility value can actually undermine students' interest and performance if they have low confidence, and propose that supporting students' self-generated utility value is a more effective approach.

Both SDT and EVT accept that not all tasks students undertake within the classroom can be intrinsically interesting, and teachers may have to turn to strategies which relate learning and current tasks to those required for their exams in order to maintain student engagement and motivation.

3.5.1.2.2   Reassurance

Another element pertaining to increasing competence motivation was teachers' use of messages aiming to reassure students. In the following example, the teacher provided students with a Grade 8 question as a starter activity, and when the students indicated they were struggling, he offered reassurance:

This is hard, it's hard stuff. We'll do it again when we come to revision. Make a note that you don't know it…This is hard, don't worry if you don't get it, we're going to keep doing these…Don't worry if you can't do it, we're going to do a lot more practice of these…By the time it's your exam we will have done lots of practice…You don't need to worry about it, we're going to practice, by the time you come to it you'll be fine…You'll watch how I do it and pick it up (Mark, Year 10 Maths)

Providing this type of positive message, which encourages students to recognise that they have control over their learning is a key feature within attribution theory (Weiner, 1985). Attribution theory refers to how an individual explains their success or failure. The theory posits three key dimensions to how a person can view the causes of achievement or failure: locus, stability, and controllability. Locus refers to the perceived location of the cause of a behaviour; either internal or external. For example, ability and effort would be considered to be internal causes of success or failure; whilst chance and help from others would be considered external. Stability reflects the duration of the cause; ability would be considered a stable cause, whereas chance would be considered unstable. Controllability considers perceptions of a person's control over the cause; effort would be considered personally controllable, but luck would be viewed as uncontrollable (Weiner, 2005). Perceptions about attributions for previous learning impact students' subsequent emotions, motivation and behaviours (Weiner, 2010) and have been found to predict academic success (Dong et al., 2015; Gordeeva et al., 2020).

When considering the above example from the classroom, the teacher focuses students' lack of success on the task as relating to the difficulty of the question and assures that with practice they can succeed, thereby attempting to direct students' feelings of failure away from a lack of ability. By

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focusing the causality of difficulty on something that the students can change (i.e., increase the time practising) this is likely to increase their motivation as students will feel they are able to control the future outcome. Indeed, attribution research highlights the importance of providing comments which focus upon the unstable changeable causes for failure (Blumenfeld et al., 1982). By providing reassuring comments which help students to believe that increased effort and practice will secure success in time for their exam, the teacher attempts to boost students' motivation and engagement for exam-related tasks.

Instructional commentary whereby teachers reassure students about their competencies is also recognised as important within EVT. EVT posits that the beliefs about how well one will do on a task and how much a person values the task is integral to their motivation to perform the task (Wigfield & Eccles, 2000). Therefore, it is important for teachers to promote a sense of competence and high expectancies for success; this can be achieved by providing students with moderately challenging tasks within the context of a supportive classroom environment which makes students feel safe to take risks (Urdan & Turner, 2005). This was demonstrated within the above example where the teacher provided a challenging task for the students and encouraged them to give it a try whilst providing them with reassuring commentary.   Within the context of both Attribution theory and EVT, teachers' provisions of challenging tasks within a reassuring classroom environment may help to increase students' feelings of competence and motivation.

3.5.1.2.3   Empowerment

Another element of instructional practice which aligned with encouraging competence motivation was teachers' use of messages which appeared to try and empower their students. These messages were communicated in a motivational and positive manner. For example, one observation took place in a Year 11 maths lesson, which the teacher emphasised as the beginning of their GCSE examination countdown lesson. The teacher used positive, motivational messages to set out how the students should view their lessons until their exam. For example, phrases such as, "*This is the start of working hard and revising for the exam…This is day one of exam prep*" and *"This is your maths exam book to*

success…let's start with a positive look on life…Or call it the journey to grade point 6…" (Hayley, Year 11 Maths).

As outlined, having control over one's learning is a key component within Attribution theory (Weiner, 2000). By using empowering language, and providing students with a sense of control over their learning, this can increase their motivation, and generally results in higher levels of achievement (Pintrich, 2004). The teacher here encourages students to put effort in and engage in appropriate strategies, such as revision; by advocating these strategies as effective and indicating the responsibility of the student to perform these behaviours, this is likely to increase their sense of control over their learning and therefore enhance their achievement outcomes (Dong et al., 2015; Gordeeva et al., 2020).

The sub-theme of 'Encouraging Competence Motivation' demonstrates how teachers utilise a variety of methods (such as providing rationale for learning tasks and using language which reassures and empowers students) in order to motivate them via increasing their feelings of competence in their ability to learn and prepare effectively for their exams.

3.5.1.3   Onus of Responsibility

The third sub-theme of 'Instructional Practice' is 'Onus of Responsibility'. This theme relates to teachers' use of words which imply responsibility of learning processes. Two distinct differences emerged for responsibility of learning in the classroom, with some messages directly implicating students for taking the responsibility for their learning, whereas others appeared to suggest a more collective responsibility.

Messages which were seen to indicate students' responsibility for learning, often made use of the word 'you'. For example, in a Year 9 Science lesson, where students were practising exam questions the teacher used several phrases indicating that students needed to take ownership of their learning: *"I'm not going to re-read books, if you don't make these changes then you are going to struggle for your exam"* and *"This is something that we have done for 2 learning cycles now, you shouldn't be getting this wrong. If you don't know it then you need to go and learn it"* (Mark, Year 9 Science). In another observation, Christine, a Year 10 French teacher was explaining to students their need to revise for their weekly vocabulary

tests and commented: "*There is only so much now that we as teachers can do, there is no shortcut to this*". These messages were communicated in an exasperated manner, and stated when teachers appeared frustrated that students were not at the point the teacher expected them to be at in their learning.

Conversely, other messages used more inclusive language, such as 'we'; advocating the teacher and students were embarking on exam preparation together. For example, at the end of spending time during the lesson on practice questions, James, a Year 10 History teacher told his class, "*We can find out gaps in knowledge so we can work harder for our exams* (James, Year 10 History). In Christine's' Year 10 French lesson, where the students had worked well on a task she commented, "*this is really high-level top set stuff now, but it's what we need to know for the exam*". These types of messages were communicated in a more positive manner than the messages indicating greater student responsibility.

The use of 'you' in the initial quotes presented, hints to the responsibility resting with the student, whereas the more inclusive language of 'we' is more suggestive of a joint venture between the teacher and students. Research into this distinction of personal pronoun use in the classroom suggests that they can have differing effects. The use of the pronouns such as 'you' can create distance between teachers and students and tends to establish a more authoritative social relationship (Oliveira, 2010). Whereas, words such as 'we' can promote solidarity between teachers and students and help to promote a cooperative atmosphere in the classroom, whereby teachers and students work together on a common goal (Brown & Levinson, 1978; Oliveira, 2010; Rounds, 1987). Indeed, Oliveira (2010) suggests that effective teaching can be contingent on teachers' ability to employ inclusive pronouns.

The notion of a collaborative learning environment, with teacher and students working together, was further exaggerated by teachers' reference to the examiner. Teachers often referred to the examiner when they were explaining to students required content or skills for their forthcoming GCSE exam. For example, when explaining to students why they were focusing on numbers in their vocabulary tests over the forthcoming weeks, Christine remarked to her Year 10 French class; "*Part of the new exam is knowing your numbers; they expect you to know your numbers*". Whilst explaining to her class the importance of showing their working out in their answers, Hayley, a Year 11 Maths teacher, provided

the following rationale: "*Weeks after the exam, your work is going to be sent off to people who you have never seen, you need to communicate to them*".

When considering self-categorisation theory (Turner et al., 1987), this distinct use of the examiner as an outsider (implied through the word 'them'), may be considered to enhance greater group solidarity for the teachers and students in the class, as the emphasis on the distinction between 'us' and 'them' encourages greater conformation to ingroup norms, which in the present context could be considered an effective, collective learning atmosphere. For example, when exploring the use of personal pronouns in the university maths classroom, Rounds (1987) comments that the use of 'us' and 'them' language develops an authoritarian situation where the examiner dictates to the teacher and students, which could thereby contribute to a cooperative classroom atmosphere, with teachers and student working on a shared goal of preparing for the exam.

The use of differing personal pronouns highlights how slight differences in teachers' use of language can have an impact upon how a message about exam preparation can alter the perceived responsibility of learning processes and affect students' feelings of support on their learning journey.

3.5.1.4   Theme Summary: Instructional Practices

The theme 'Instructional Practices' relates to different teaching practices used when communicating about exams and was comprised of three sub-themes**.** Firstly, Adopting a Controlling Style refers to a teaching style which aims to motivate students to act in a certain way via controlling methods (Reeve, 2009). Two further subthemes within Adopting a Controlling style, were Pressure and Exam Timing Messages. Pressure refers to the use of pressure-inducing language to get students to think, feel or behave in a specific way. These messages incited both external (such as punishments and explicitly controlling language) as well as internal (via inducement of reflections of shame and self-worth) pressures upon students. Exam timing messages are communications which highlight to students the proximity of forthcoming exams. Due to these communications being interlaced with pressure-inducing language, these communications were considered as a way of controlling students to motivate them to engage in exam preparation behaviours.

Secondly, the sub-theme of 'Encouraging Competence Motivation' describes the impetus to develop or demonstrate competence (Urdan & Turner, 2005). There were three further subthemes noted in how teachers attempted to develop these feelings of competence within their students: Rationale; Reassurance and Empowerment. Rationale explores how teachers made reference to forthcoming exams to provide a rationale for engagement in current tasks and activities. However, compared to the use of Exam Timing Messages seen in the previous sub-theme; communications regarding Rationale were conveyed in a positive manner to support students' feelings of competence. The sub-theme of Reassurance considers how teachers use positively phrased messages to students to highlight the control they have over their learning and support their feelings of competence. Whilst Empowerment reflects communications which aim to provide students with a sense of optimism and positivity to motivate them to engage in learning tasks relating to their exams and increase their feelings of competence.

Lastly, 'Onus of Responsibility' discusses how teachers' differing use of personal pronouns could affect the perception of responsibility of learning tasks. The use of words such as 'we' contribute to the sense of collaborative learning environment where teachers and students work together towards exam preparation, whereas the emphasis on 'you' can establish a more authoritative relationship between the teacher and students, and places emphasis of learning responsibility onto the students.

3.5.2   Theme Two: Direction of Message

Teachers were observed to communicate about exams in a variety of directions to students in their class, aligning to three sub-themes emerging: Class as a Whole; Individual Student; and Narrative/Commentary. Each sub-theme will be discussed in turn, with examples to illustrate meaning, accompanied by discussion about how the direction of communication could be influential in the intention, transmission, or interpretation of the communications.

3.5.2.1   Class as Whole

The majority of communications regarding exams which teachers made across the observations were directed to the whole class whilst the teacher held the classes' attention. These messages span across

all other themes, so were communicated in a variety of ways, for a variety of purposes, but they were all communicated to the class as a whole. For example, when discussing an example question shown on the white board with her Year 11 Geography class, Yvonne commented; "*Remember you get marked on your English…The English is basic in the example. For the 7-8 marks is for how you structure your sentences*".

These findings are reflective of general teacher practices, with Strati et al. (2016) identifying via observational analysis that 60% of teachers' interactions were directed to the entire class. These findings may provide support for research conducted via self-report questionnaires exploring teachers' use of a certain type of exam-related communication: fear appeals. These communications attempt to manipulate students' behaviour by highlighting the negative consequences of particular actions, or courses of behaviour relating to preparing for exams (Putwain & Roberts, 2009). When establishing the inter-rater reliability between students in a given class about their teachers' use of these communications, students report strong consensus in the frequency that their teachers uses these communications (with typical ICC2 ranging from .85- to 95 (Putwain, Remedios, et al., 2016; Putwain, Symes, et al., 2017; Putwain et al., 2021; Symes et al., 2015). Taken together with the findings from the observations, this could indicate that teachers generally make communications about exams to the class as a whole, rather than targeted to individuals.

3.5.2.2 Individual Student

Although infrequent, there were some instances of teachers communicating to individual students about exams whilst the class were conducting independent work. The infrequency of individual communications to students corresponds to that seen in wider teacher-talk in the classroom (Bloome & Theodorou, 1988). Reflective of the sub-themes found within the 'Instructional Practices' theme, communications to individual students were utilised for a variety of purposes. For example, one teacher, Yvonne, used this type of dialogue to help a student in her Year 11 Geography class to improve a practice exam answer and reassure her of her ability to achieve: "*Adding in that extra information will get you that A*… [student looks at teacher disbelievingly] … come on you already got one in your mock*". This commentary is reflective of the teachers' attempt to promote the students' feelings

of competence. Whereas, in another example, Anna, used dialogue to target an individual student in her Year 9 History class who had not completed their homework: "*Come on [student's name] it's important now, it's GCSE work*". The tone and comment utilised in this interchange is more reflective of those seen within Adopting a Controlling Style; with the teacher trying to motivate the student to engage in the task at hand. Although this communication was made directly to the individual student, it was still audible to the rest of the class. As Bloome and Theodorou (1988) posit, much of what would be considered as teachers' individual communications to students, are in fact reflective of communications to the wider classroom. Citing an example discourse similar to the one presented in the current observation by Anna, they outline that although the explicit message is made to the individual student, statements such as these have wider implications, indicating to students appropriate and expected behaviours. Using a novel methodology whilst exploring teacher communication and student engagement, Strati et al. (2016), found that when teachers used sarcasm in an individual interaction, the engagement of the students in the whole class generally declined. This highlights the potential impact that a teacher's interaction with a single student can have upon an entire class. Indeed they comment, "teachers' interactions with a single student has the potential to impact an entire classroom, whether intentional or not" (Strati et al., 2016 p. 38).

3.5.2.3 Narrative/Commentary

This sub-theme considers how teachers utilise communications in a narrative manner; providing commentary to students whilst they were otherwise engaged in another task, whether that be individual or group work. Some messages were used to communicate additional information to students, for example when his Year 11 Science class were completing practice questions, Mark commented: "*Why do I want this question to come up in every exam…because your answer is always going to be the same*". Whereas other messages also contained a request for students to do something. For example, whilst her Year 11 English class were working on a practice question, Emma commented; "*You're never going to have this much time to do it in the exam so you need to speed up a bit*". Wallace et al. (2014) consider these types of dialogue as 'providing cautionary reminders of rules and procedures (p. 41).

What is particularly poignant about the use of narrative commentary is the possible implications that the different methods of transmission of messages may have upon students' interpretation and appraisal of the message. For example, it is unclear whether students take notice and acknowledge messages more if the teacher is directing messages to the class as a whole more so than when they were said in more of a narrative manner. Furthermore, it poses the question of whether the method of transmission influences the interpretation of the message i.e., it could be that communications made directly to the class are appraised differently to if they are presented in a narrative tone.

Prior research exploring fear appeal communications (a specific type of exam communication) typically utilises self-report questionnaire to explore teachers' frequency of communications to the class and students' appraisal of these communications. Questions are framed in the sense of 'how often does your maths teacher tell your class…' (Putwain et al., 2019b) which does not differentiate between the type of transmission of the message. The impact of distinct types of transmission of messages would therefore be an interesting consideration in future research on student appraisal of messages. Greater understanding would help to provide teachers with advice about how to target messages for the most effective impact on students' motivational processes.

3.5.2.4   Theme Summary: Direction of Message

The theme 'Direction of Message' considers the ways in which teachers make communications to students about exams. The observation that most communications about exams were directed to the class as whole is supportive of research from teachers' fear appeal communications, whereby students regularly report consistency in teachers' use of these communications across the class (Putwain et al., 2021) and also of wider teacher communications (Bloome & Theodorou, 1988). When used to individual students, communications about exams were observed to be utilised in positive ways to encourage students' feelings of competence, but also as a way to engage students in a current task, via more controlling methods, with wider implications on the class. Exam communications were also presented in a more narrative fashion, with teachers making utterances to students whilst they were otherwise engaged in a task, leading to the consideration of how different methods of transmission of messages may have upon students' attention to and appraisal of communications.

3.5.3   Theme Three: Grade Point

The theme 'Grade Point' considers how teachers utilised reference to grade point for a variety of purposes. Previous literature exploring teachers communications about grades in relation to exams suggests that teachers may refer to grade points due to the typical minimum pass grade required in English and maths for entry into education or the workplace (Putwain & Remedios, 2014a; Putwain & Symes, 2011b). There has therefore been a focus upon communications from teachers relating to the need to achieve this critical grade (4/C). However, observational analysis from the present study found that teachers made reference to grades for a wider variety of reasons. Although codes identified as commentary on grade point also spanned across other higher order themes; it is useful to consider the reference to grade point as a theme within its own right as it demonstrates the variety of ways in which reference to grade is used to engage and motivate students.

Grade point was used by teachers as a means of motivation; encouraging students to work hard towards their goal. For example, as noted previously in the Empowerment sub-theme, (see section 3.5.1.2.3) Hayley commented to her Year 11 Maths class: *"This is your maths exam book to success…let's start with a positive look on life…Or call it the journey to grade point 6…"*. The use of the grade here sets out expectations for students; a goal for them to work towards, coupled with this use of supportive, empowering language, this is likely to increase student motivation.

Grade point was also seen to be used as a rationale for students to improve their work. This can be seen in the example below, whereby in a French lesson, Amy discusses with a student how to improve their devised answer to a question:

> *Teacher: When we put ourselves in the eyes of the examiner, why would you use more than one tense*
> *Student: To make it more interesting*
> *Teacher: And the more tenses, the more?*
> *Student: The more marks*
> *Teacher: And the more marks equals the higher what [names student to answer]*
> *Student: Grade Point*
> *Teacher: Yes*　　　　　　　　(Amy, Year 9 French)

It appears that the teacher is advocating to the class that gaining the highest grade point is the most important reason for improving their skills and work, as opposed to developing their skills or making their work more interesting. The goal is to improve their answers in order to improve their marks on their exam, in order to achieve a higher grade. Messages such as this may promote and reinforce to students that achieving a high grade is the primary goal of their learning. The disparity seen in the present example between the student's focus of making their work more interesting and the teacher's emphasis of gaining more marks may be reflective of differences in views of achievement goals.

Achievement goal theory considers that individuals pursue different goals for engaging in learning tasks. Although there has been much discussion and development of the achievement goal model (see Elliot, 2005; Senko et al., 2011), the foundations of the model proposes two primary goals: mastery and performance (Ames & Archer, 1988; Nicholls, 1984). Mastery goals focus on developing competence; whilst performance goals relate to demonstrating ones' competence and outperforming others (Ames & Archer, 1988). Mastery goals have been found to be related to a host of positive educational outcomes, such as persistence (Sideridis & Kaplan, 2011), increased interest (Harackiewicz et al., 2000), engagement in deep learning strategies (Ames & Archer, 1988), and positive learning emotions (Harackiewicz et al., 2000; Pekrun et al., 2009). However, are often found to be unrelated to academic achievement (Harackiewicz et al., 2000; Hulleman et al., 2010; Pekrun et al., 2009). Whilst performance goals are more often found to be related to academic achievement (Elliot & Church, 1997; Harackiewicz et al., 2000).

In Senko and Miles (2008) exploration of why students with a performance goal generally outperform those with an mastery goal, they propose that students who hold a performance goal are often better able to pick up on teacher cues about what is regarded as important to study than those with a mastery goal. Students with a mastery goal, however, are more likely to pursue their own learning agenda, usually directed by their personal interests, which may not include likely tested material. Indeed, students with a mastery goal have been suggested to determine their own criteria for judging success (Senko et al., 2012). With performance approach goals most regularly linked with increased academic

performance, it can be understood why teachers may aim to refocus students to this type of approach to learning, rather than placating to their mastery goal focus.

Research into the impact of achievement goals in the classroom expose some interesting findings. For example, teachers differ in the performance goal approaches they employ with higher and lower ability students (Bardach et al., 2019). Additionally, class-average achievement goal perceptions have been found to be linked to class behaviour, with higher class-average performance goals associated with higher disruptive behaviour, and higher class-average mastery goals related to lower disruptive behaviour (Kaplan et al., 2002). This may in turn, modify teachers' approaches to teaching (Robarts, 2014). Teachers' own views of performance goals have also been shown to influence their teaching. Teachers with a mastery goal approach have been linked to positive outcomes, such as more adaptive instruction (Retelsdorf & Günther, 2011), higher educational innovation (Gorozidis & Papaioannou, 2016), higher expectations of students (George & Richardson, 2019) and reduced burnout (Li et al., 2021). Whereas, teachers with a performance goal approach have been associated with surface learning practices (Retelsdorf & Günther, 2011), lower levels of educational innovations (Gorozidis & Papaioannou, 2016) and increased feelings of burnout (Li et al., 2021). The example above may be demonstrative of a teachers' focus on performance goals or an aim to focus students to develop this type of goal approach.

This type of teacher communication regarding grade could also be considered in line with EVT. Focusing students on the importance of achieving good grades may be demonstrative of teachers' attempts to motivate students to engage in their learning by encouraging them to focus on attainment value. According to EVT, attainment value is a component of subjective-task value which focuses upon the importance of doing well on a certain task (Eccles et al., 1983). Students with higher levels of subjective-task value are anticipated to be more engaged with their learning, and have higher effort and persistence, resulting in increased academic attainment (Wigfield et al., 2016). Although EVT provides no hypothesis as to which of the components of subjective-task value have stronger relationships with students' achievement, all three components (attainment, utility and intrinsic) have been found to be similarly linked with achievement when tested empirically (Weidinger et al., 2020).

Therefore, by focusing students on the importance of increasing their grade, teachers may aim to increase students' value of the task, thereby increasing their engagement and motivation.

Reference to grade point was seen to be used as a way of distinguishing between students within the class. For example, in a history lesson, whilst students were working on a task, James commented: *"We're prone to writing things quickly, especially the GP 6/7, we need to be checking what we have written"* (James, Year 10 History). In the same lesson, a student asked for support in structuring a sentence for their individualised work and James responded: *"We're all aiming for between a high C and an A this year and I'm giving you sentence help…that's not on"* (James, Year 10 History). This demonstrates the use of grade to highlight teachers' expectations of students' wider capabilities. The use of grade point here to distinguish between students may be demonstrative of teachers' use of social reference standards (Lüdtke et al., 2005). A well-established phenomenon in education, the Big-Fish-Little-Pond Effect (BFLPE) considers that students compare their academic ability with those of their peers; this social comparison impression can act as a basis for forming their own academic self-concept (Marsh, 1984; Marsh & Parker, 1984). Academic self-concept is considered to be students' self-evaluations of their academic abilities (Brunner et al., 2010). Thereby, one's own academic concept is formed, not just on own accomplishments, but also of their classmates (Marsh, 2006). Teachers' use of highlighting students' grades could place increased emphasis on students' social comparisons and intensify this effect. Indeed, in classes where teachers demonstrate individualised frame of reference (i.e., evaluate students in consideration of their prior achievement) this has been found to have positive effects on students' self-concept, motivation, and achievement. Whereas, when teachers hold a social reference standard (where they compare students to one another) this can have a negative impact on students motivation and affect (Dickhäuser et al., 2017; Lohbeck & Freund, 2021; Lüdtke et al., 2005).

Research also indicates that students' perceptions of their teachers' frame of reference has educational implications. For example, when students perceived their teacher to have individualised frame of reference, there was a small decline in their academic self-concept. Whereas, when students perceived their teacher to hold social reference norms, the decline in their academic self-concept was larger (Dickhäuser et al., 2017). Furthermore, Lohbeck and Freund (2021) suggest that students may adopt

the reference norms used by their teacher. Therefore, comments as seen in the example above would be considered to denote a teaching environment focusing upon social reference norms, which may be detrimental to students. Indeed, as Lüdtke and colleagues state, "in a highly competitive environment in which all students know how their performances compare with those of other students, there are likely to be a few 'winners' and a lot of 'losers'" (Lüdtke et al., 2005 p.268). Teaching practices should discourage highly competitive environments which encourage social comparison processes and instead, primarily use individual reference norms due to this being most beneficial for students (Lohbeck & Freund, 2021; Marsh & Craven, 2002).

3.5.3.1 *Theme Summary: Grade Point*

The theme of 'Grade Point' demonstrates the variety of ways in which teachers refer to grade point in the classroom environment. Although codes identified also spanned across other higher-order themes, the culmination of a theme in itself highlights the diversity of ways in which grades were used to engage and motivate students in their work. These can be seen in a positive, encouraging light, as well as a means to focus students on attainment outcomes and distinguish between students within the class.

3.5.4 Theme Four: Efficacy Appeals

The majority of the codes from the observational analysis fell under the theme termed 'Efficacy Appeals'. Efficacy appeals, alongside fear appeals, are considered to be persuasive communications made to encourage behaviour change. Fear appeals highlight the negative outcomes of current behaviours, whilst efficacy appeals promote alternative strategies to encourage behaviour change (Witte & Allen, 2000). According to the Extended Parallel Process Model (EMMP) (Witte, 1992), efficacy appeals are comprised of two facets: response efficacy and self-efficacy. Response efficacy is considered as an individuals' perception of whether a recommended response will avert the threat; whilst self-efficacy considers whether they will be able to perform that response (Witte et al., 1996; Witte & Allen, 2000). Fear and efficacy communications are typically studied in relation to health literature (Ruiter et al., 2014).

When applied to the educational field, efficacy appeals have been considered to pertain to messages which communicate to students the ways in which they could develop mastery, efficacy and self-regulated learning (Putwain & Roberts, 2009). They posit that the following would be considered as efficacy appeals: communications explaining assessment demands required by types of examination questions; explaining how marks would be awarded for exemplar questions; and communicating to students the importance of preparatory practices in avoiding failure. This conceptualisation of efficacy appeals aligned with the sub-themes identified and therefore, the theme of 'Efficacy Appeals' emerged. As Efficacy Appeals is a key focus for the remainder of the thesis, the theoretical and empirical considerations will remain brief here. Study Two offers discussion of the development of fear and efficacy appeal models and critical reflections on the research conducted on efficacy appeals in the educational field.

The theme of 'Efficacy Appeals' is divided into two subthemes: 'The Importance of Preparatory Practices' and 'Skills and Technique'. 'Skills and Technique' are further subdivided into six subthemes: Exam Strategy; Exam Content; Specific Answers; Time Spent in Exam; Mark Allocation and Maximisation; and GCSE changes. The themes will be presented separately with examples of teacher-talk to illustrate, followed by discussion of previous literature and theoretical considerations on the theme as a whole.

3.5.4.1   The Importance of Preparatory Practice

The sub-theme of 'The Importance of Preparatory Practices' relates to teachers' use of communications to explain to students how important it is for them to prepare for their exams.

These messages, although grouped within the same theme due to their similar intention, were communicated by teachers in different ways. Some messages were seen to be communicated in a more positive manner. For example, in the first lesson of the Year 11 Maths revision lesson, Hayley stated: "*This is the start of working hard and revising for the exam…This is day one of exam prep*". Whereas others were communicated with a more negative connotation. For example, when Christine was explaining to her Year 10 French class the importance of revising for their vocabulary tests she said,

"*Numbers are a huge part of your GCSE, some of you are not very strong on it and we really need to improve on that very quickly*". In contrast, other messages were said in a more neutral and informative tone. For example, when practising exam questions with a Year 11 English class, Emma stated, "*Structure is a big emphasis on the new exam…We're good on language but we need to not forget about structure…Make sure we are revising structure in our revision guide*".

It is interesting that these messages all appear to have the same aim: to communicate to students the importance of preparing for their exams, however they are delivered in a variety of ways. As can be seen within the sub-themes discussed within the 'Instructional Practice' theme (see section 3.5.1), the delivery of communications can evoke different implications and may be considered to affect how students attend to and infer these communications.

3.5.4.2   Skills and Techniques

The subtheme of 'Skills and Techniques' relates to the ways in which teachers aim to support students in the development of techniques and skill development important for success in their exams. This sub-theme encapsulates the majority of messages seen within the observations. This theme is further subdivided into six sub-themes: Exam Strategy; Exam Content; Specific Answers; Time Spent in Exam; Mark Allocation and Maximisation; and GCSE Changes.

3.5.4.2.1   Exam Strategy

Exam Strategy refers to teachers' presentation of techniques, hints, and tips to try and help students achieve the highest grade possible in their exam. These messages were usually communicated in an informative manner, explaining, or reminding students what they need to do. In one observation of a Year 11 Maths class, the teacher Hayley used many of these types of messages when focusing upon answering one practice question. For example, when encouraging students to decompose the question so they could work out what the question was asking for she commented, "*It's that exam skill of what do you know, what do I need to know, what do I use and how do I do it?*" and then when explaining the importance of providing their working out she explained, "*In Maths now, it's really important to communicate, be really specific, use key terms.*". After the students had completed the question, she

reassured the students by communicating that even though the question appeared challenging, they had the ability to complete it: "*It's all about your technique. You should have learnt all the things that you need, but you need to put them together to fit the criteria.*".

3.5.4.2.2   Exam Content

The theme of Exam Content discusses messages used by teachers to signpost students to topics or areas which they suggest may come up on the exam. These types of messages were mostly presented to students in an informative manner. For example, when discussing an illustration commonly used as a graphic source in the exam, Anna, a Year 9 History teacher, remarked: "*It probably might end up on your exam because it's quite a famous one*". However, this type of message was also at times communicated with a more suggestive element; emphasising that students need to work hard to make sure they know the particular area. For example, in a Year 10 French lesson, Christine commented to the class: "*It comes up time and time again, so you have to know this*". Here, as well as informing students of the area they need to be aware of, she also urges them to make sure they are working on it.

3.5.4.2.3   Specific Answers

Specific Answers pertains to messages where teachers communicate to students how they should answer practice questions undertaken in the lesson if it came up on their exam. These messages were generally communicated in an informative manner and were specific to the content and exam question being covered. For example, when completing an essay style practice question in their Year 11 Geography class, Yvonne commented, "*Somewhere within the first sentence you need to mention that place that you have studied…Then you need to use tourist numbers*", whilst Mark, made it clear to his Year 11 Science class that they needed to include particular vocabulary in their answers: "*That word bias is super important…get the word bias in your answer*".

3.5.4.2.4   Time Spent in Exam

The theme of Time Spent in Exam refers to teachers' communications about how long students should be spending on certain questions in their exam. These communications were generally presented in

an informative manner, whilst students were working on practice questions during the lesson. For instance, in a Year 11 English lesson, whilst students were completing a practice question, teacher Emma commented; "*Bearing in mind that in the exam you're only going to have 10 minutes for this question*". Yvonne, a Year 11 Geography teacher, also used a similar type of message; "*You have 12 minutes to write this, that's about 1 and half minutes a mark*".

3.5.4.2.5   Mark Allocation and Maximisation

Mark Allocation and Maximisation reflect teachers' communications to students about how they can achieve the highest possible marks in the exam, or where marks are allocated. These messages often ventured farther than being simply informative, usually indicating to students what they need to do. For example, when giving her Year 9 History class feedback from a piece of homework they completed, Anna commented; "*So why I am so bothered about your spelling? 9 SPAG marks on each paper. The paper is only worth 80 marks plus 9 for SPAG, and you do 2 tests so that's 18 marks, it's like free marks that we need to nail*". This was also apparent in Yvonne's comments to her Year 11 Geography class, who were completing a practice question: "*Check spelling, punctuation, and grammar. They check that, you need to get those good marks*". This highlights where marks can be picked up but also the importance of gaining marks where possible.

3.5.4.2.6   GCSE Changes

The GCSE curriculum and programme of study had undergone recent changes at the time of the observations (see commentary in section 2.2). For the majority of subjects, assessments are now measured by a one-tiered exam, and by non-exam assessment only if there is an element of essential skills which cannot be tested in an exam (DfE, 2014). The theme 'GCSE Changes' describes where teachers informed students about how these changes may affect exam technique or content. Some of these messages were communicated in a more informative manner. For example, when discussing how students should approach their GCSE exam, Hayley informed her Year 11 Maths class; "*It used to be that the higher and lower paper overlapped, but it's not like that anymore…If you sit the higher paper then you have to look at every question and have a go at everything*". Whereas others included a further element of urging the students that they need to do something because of the changes. For example,

when discussing an element of the curriculum required for their exam, Christine told her Year 10 French class; "*That's the step up from old spec to new spec so you need to know it"*. This sub-theme is likely to be obsolete if observations were carried out in the classroom again; acting as relic of teachers themselves grasping the changes to curriculum and how that would alter students' preparation strategies. Indeed, this may be reflective of the 'Sawtooth effect'. The sawtooth effect describes the phenomenon of cohort performance in high-stakes assessment dropping suddenly following assessment reform, and slowly rising over time (Cuff et al., 2019). This phenomenon is theorised to be due to teachers being less familiar with new assessments which limits their ability to provide students with accurate knowledge of commonly tested material or understanding of the best strategies to use for the exam (Cuff et al., 2019). Indeed, in focus groups with A-level teachers experiencing a transitional period with new-style A-level exams, teachers indicated that they needed to know what examiners were looking for in the new marking scheme in order to be able to prepare students appropriately for the exams (Daly et al., 2012).

3.5.4.3   Theme Summary and Discussion: Efficacy Appeals

The use of instruction of skills and techniques preceding high-stakes examinations is not a new phenomenon. A high level of test-taking skill instruction is common within high-stakes test classrooms (Amrein & Berliner, 2002; Lai & Waltman, 2008), often due to the pressure to raise scores and improve student performance (Abrams et al., 2003). As previously discussed, (see Section 2.4) common teaching practices prior to high-stakes exams, often referred to as 'gaming the system', are similar to those found in the present observations: teaching to the test; focusing on 'test tactics' rather than deep learning and understanding and increased practice tests (Abrams et al., 2003; Hutchings, 2015; Meadows & Black, 2018; Stenlund et al., 2017). These practices are criticised by the suggestion that they inflate test scores, making them less representative of students' true achievement (Amrein & Berliner, 2002; Lai & Waltman, 2008) and often limit the range of educational experiences students are exposed to (McNeil & Valenzuela, 2000). However, there are practical benefits to students, with students confident in testing taking skills having an increased positive attitude and motivation towards exams (Dodeen et al., 2014).

In a study looking at how teachers' communication to students in their penultimate year at Primary school, where their National Curriculum Tests (NCTs) (also commonly referred to as SATs; standardised assessment tests) were imminent, Hall and colleagues (2004) reported similar teaching practices in their observations to those in the present study. For example, teaching students to understand what a question is asking and how to answer it and encouraging students to mimic teachers' demonstrations of good answers. Indeed, they report "This is a lesson that is more about teaching the test than even teaching to the test since it is explicitly about examination technique rather than developing the scientific knowledge or skills the test is designed to assess" (Hall et al., 2004 p. 807). They remark that reminders about exams were frequent, and delivered in such a way which indicated their seriousness. Furthermore, teachers highlighted the importance of the SATs and used this as a rationale to motivate students to attend school and listen in class. Therefore, it appears these types of communications are common throughout high-stakes classrooms across the UK's compulsory education system.

Although test-taking skills and techniques and teachers' focus on the importance of preparing for exams has been previously studied, the present study conceptualises these as Efficacy Appeals. Teachers use these communications as an attempt to invoke a behaviour change in their students (i.e., encouraging them to increase their effort and preparation for their exams) in order to avoid the threat of failing or to gain their desired grade in the exam. Thereby, teachers' communications about how to prepare for their exam and equipping them with the skills and techniques to be able to do this act as an efficacy appeal. Study Two (see Chapter 4) provides a comprehensive overview into the conceptualisation of efficacy appeals within the classroom context as this forms the focus of the remainder of the thesis.

3.6   Conclusion

Observations were undertaken to establish the ways in which teachers communicated to students about their GCSE exams. Thematic analysis identified four higher-order themes: Instructional Practices; Direction of Message; Grade Point; and Efficacy Appeals.

Instructional Practices consider the ways in which teachers use different communications to attempt to motivate students to encourage them to engage in productive learning behaviours, as well as differentiating the accountability of the completion of tasks. The theme Direction of Message documents the variety of ways teachers communicate to the class and students about exams, namely to the class as a whole, to individual students, or in a narrative manner. Grade Point considers the variety of ways in which teachers use reference to grade point to their students. The theme Efficacy Appeals confers the conceptualisation of teachers' use of communications regarding test-taking skills and techniques to support students in preparing for their exams as a form of persuasive communication to invoke behaviour change; encouraging students to engage in behaviours to prepare effectively for their exams.

The aim of this study was to act as an exploratory phase of the PhD project, with the intention this would narrow the research focus for the main study. As Cooper and Schindler (2014) note, the use of observations can enable researchers to look at everyday behaviours in a new light. The conceptualisation of teachers' messages about test-taking skills and techniques as Efficacy Appeals provided a pivotal moment within the PhD research journey and forms the core of the remainder of the thesis.

3.7   Chapter Summary

Study One documents the observational research undertaken to explore the ways in which teachers communicate to students about their GCSE exams. Four higher order higher-order themes were identified: Instructional Practices; Direction of Message; Grade Point; and Efficacy Appeals. These higher-order themes are subdivided into further themes. The themes identified that communications to students about exams were made in a variety of diverse ways. Although unable to infer teachers' intentions or students' interpretations of these communications; this research has been fundamental in documenting the range of ways in which teachers communicate to students about their upcoming exams.

The majority of messages observed focused on teachers supporting students with exam preparation strategies, promoting skills and techniques for preparing for their exam. These practices are typically referred to as 'gaming the system' (Meadows & Black, 2018); but in the present study have been conceptualised as 'Efficacy Appeals'. Efficacy appeals are considered to be persuasive communications promoting alternative strategies to encourage behaviour change (Witte & Allen, 2000), in the educational context this relates to encouraging students to prepare for their exams. Whilst there is a wealth of research exploring fear appeal communications within the educational setting (see Putwain et al., 2021 for review), there is limited research looking at efficacy appeals. As efficacy appeals are considered an important component in understanding how persuasive communications impact on behaviour change (Witte, 1992; Witte & Allen, 2000), the study of efficacy appeals should be considered an important focus for future research. Therefore, the remainder of the thesis focuses on developing a conceptualisation of efficacy appeal communications within the educational environment, developing a way to measure teachers' use of these communications and how students appraise these messages, and exploring how these appraisals relate to other educational variables.

4 Chapter Four: Study Two: The Development and Validation of the Teacher's use of Efficacy Appeals in the Classroom prior to High-stakes Exams (TEACHE) Questionnaire

4.1 Chapter Overview

Study One (see Chapter 3) explored the ways in which teachers communicated to students prior to their forthcoming GCSE exams. The analysis identified a range of themes, however, a key theme of particular note was that of 'Efficacy Appeals' (see section 3.5.4). This theme conceptualised instructional practices relating to test-taking skills, as efficacy appeals. Efficacy appeals are a component of threat communication research. Whilst there has been a significant body of research exploring other factors of threat communication research in the educational field (see Putwain et al., 2021for a review) (also see section 5.2.2), there is limited research on the efficacy component.

Study Two aims to define efficacy appeals within the educational field, design a method of measuring efficacy appeals in the GCSE classroom, develop the questionnaire utilising cognitive pretesting procedures, and test whether this method provides reliable and valid results, in order to warrant its use to further explore the relationship of efficacy appeal appraisal with other variables.

4.2 Introduction

Threat communications have been studied for decades, predominantly within the health literature (see Ruiter et al., 2014 for review). A number of theories have been developed to understand how these types of communication may or may not cause behaviour change. Within the past decade, research has explored how these types of communications are used within the educational context, but the majority of research has focused on the threat-based messages (section 5.2.2 provides a review of this), with a handful of studies exploring efficacy communications. The following section provides a brief overview of threat communication models, and documents how efficacy appeal communications have been translated into the educational context.

4.2.1 A Brief History of Threat Communication Models

Fear Appeals are a strategy used in an attempt to alter people's behaviour by using persuasive communications designed to highlight negative outcomes of current behaviour. The intention is that this will increase the receivers' level of fear and invoke a change in behaviour as to avoid the threat (Basil & Witte, 2012; Maloney et al., 2011). Fear appeals originate from the health literature, with campaigns highlighting the negative consequences of risk behaviours, in order to try to motivate people to reduce current risk behaviour and adopt safer behaviours (Ruiter et al., 2014).

Fear appeal research has produced a number of theories (see Witte & Allen, 2000 for overview). The first 20 years of research primarily focused on the element of fear, with typical research manipulating the strength of the fear appeal to assess whether this produced stronger outcomes than weaker messages (Witte & Allen, 2000). Following inconsistent research assessing the effects of fear appeals, Witte (1992) proposed the Extended Parallel Process Model (EPPM) to unite the research and provide a theoretical position for future researchers to adopt as a basis for comparable findings. This theory drew upon, and expanded existing theories within the threat communication field, namely; the Drive-Reduction Model (Hovland et al., 1953), the Parallel Process Model (Leventhal, 1970) and the Protection Motivation Theory (Rogers, 1983). An overview of the theories will now be presented.

4.2.1.1 *Drive-Reduction Model (Hovland, Janis & Kelley, 1953)*

The Drive-Reduction Model (Hovland et al., 1953) proposed that the level of fear arousal from a fear appeal would act as a drive to motivate actions, either in a facilitative or an interfering way. Facilitative responses may result in positive behaviour change; the individual engages in a self-protective response in order to avoid the negative consequences highlighted in the fear appeal so takes on board the message from the fear appeal. Whereas an interfering response may not result in any behaviour change; individuals may deploy avoidance strategies to protect themselves from the threat of the communication. A core contribution of the drive-reduction model was the proposal that a defensive reaction, such as avoidance, may take place in response to fear-arousing stimuli (De Hoog et al., 2007) The theory posited an inverted U-shaped relationship between fear and attitude change, with the

proposition that a moderate amount of fear produces the greatest level of attitude change, however there was a lack of empirical support for this (Rogers, 1975, 1983).

4.2.1.2 Parallel Response Model (Leventhal, 1970)

The Parallel Response Model (Leventhal, 1970) proposes that fear appeals can produce two separate processes. Firstly, a danger control response, where efforts are used to control the threat, resulting in positive behaviour change. Secondly, fear control response, where efforts are used to control one's fear about the threat, such as avoiding the threatening communication. However, Leventhal (1970) failed to explain under what conditions these responses would be initiated (De Hoog et al., 2007; Witte & Allen, 2000), and the model was criticised for its lack of specificity and difficulty in testing the model (Rogers, 1975). However, the Parallel Response Model is recognised for driving the field of research forward with its proposition of the differences between emotional and cognitive processes (Witte & Allen, 2000).

4.2.1.3 Protection Motivation Theory (Rogers, 1983)

The protective motivation theory has been applied to a diverse range of topics, such as, disease and injury prevention, political issues and environmental concerns (Floyd et al., 2000). The original theory (Rogers, 1975) proposed that a fear appeal communication initiates cognitive appraisal; with outcomes of the communication based upon the perceived severity of a threat, the perceived probability of the threat occurring, and the perceived efficacy of a recommended coping response. The revised theory (Rogers, 1983) included the addition of a fourth cognitive mediating process: self-efficacy. Self-efficacy differs to that of perceived efficacy of a recommended coping response, by the individual considering whether they believe they can effectively perform the recommended response.

Rogers' theory (1983) posits that sources of information about the situation are obtained from environmental factors such as verbal persuasion and observational learning, and from intrapersonal factors such as personality variables and prior experience. After this information is received, two cognitive mediating processes occur: threat appraisal and coping appraisal. Firstly, a threat appraisal occurs. This appraisal process evaluates the maladaptive behaviour, considering the level of threat in

line with intrinsic and extrinsic reward, and the perception of susceptibility and vulnerability to the threat. The model holds that the threat appraisal is the initial response, as a threat needs to be perceived or identified before there can be an evaluation of the coping options. If an individual perceives there to be a threat, they will then engage in a coping appraisal, whereby, the individual evaluates their ability to cope with and avert the danger. This appraisal process is impacted by their evaluations of response efficacy (whether the recommended response will work), self-efficacy (whether they feel capable of performing the recommended response) and response cost. Response cost considers any cost associated with taking the adaptive coping response, with a higher level of response cost theorised to decrease the likelihood of selecting the adaptive response. Threat appraisal processes and coping appraisal processes then combine to form protection motivation, which can result in adaptive (i.e. result in positive behaviour change) or maladaptive (i.e. avoidance) coping responses. Maddux and Rogers (1983) propose that self-efficacy was the most powerful predictor of behavioural intention, with the influence of susceptibility and response efficacy depending largely upon an individual's self-efficacy. Their findings also suggest that an additive model only works up until a certain point. The combination of high susceptibility, response efficacy and self-efficacy does not produce the highest intention of behaviour change score in individuals; nor does that combination of them all being low produce the lowest intention scores, leading Maddux and Rogers (1983) to conclude that if any two of these given variables were high then a threshold was reached, beyond which, additional information would not have a significant effect.

Although meta-analysis data provides support for the model (Floyd et al., 2000) the authors note that, due to the nature of the meta-analytic procedure used, support was based upon comparisons of the single components of the model upon the outcome, and failed to assess the intricacies of the model and outcomes of combination of variables as a whole. Therefore, leaving doubt as to the support for the full model. Although the Protective Motivation Theory is effective at explaining when and why fear appeals work, the model is criticised for failing to explain when and how they fail (Witte & Allen, 2000).

4.2.1.4   *Extended Parallel Process Model (Witte, 1992)*

In 1992, Witte presented the Extended Parallel Process Model (EPPM), which attempted to unite and extend fear appeal research and provide a theoretical position for future researchers to adopt as a basis for comparable findings. She stated that "terms such as fear, threat and efficacy must be carefully defined and used in a consistent manner across studies if the literature is to be reconciled" (Witte, 1992, p. 329). The EPPM provides an easy to understand structure, is useful for guiding decisions of public communication campaigns, reconciles contradictory predictions and findings from previous models (Popova, 2012), and is useful for the construction of threat messages (Basil & Witte, 2012).

The EPPM posits that it is peoples' perception of the threat, rather than the actual threat which motivates them (Maloney et al., 2011). The first part of this perception is based upon the threat; whether the respondent believes that the threat is severe, and whether they think that they are susceptible to the threat. The other component is that of efficacy, which is subdivided into perceived self-efficacy and perceived response efficacy. Perceived self-efficacy refers to "beliefs about one's ability to perform the recommended response to avert the threat" (Witte et al., 1996, p.320) and perceived response efficacy refers to "beliefs about the effectiveness of the recommended response in deterring the threat" (Witte et al., 1996, p.320). Put simply, does the recipient think that the particular action suggested to avoid the threat would be effective and do they think that they can perform it?

According to the EPPM, upon exposure to a fear appeal, individuals can respond in one of three ways: (i) non-response, (ii) danger control response, (iii) fear control response. When an individual is first exposed to a threat, they will engage in threat assessment to determine whether they are susceptible to the threat, and whether the threat is severe. If the individual does not perceive the threat to be high, they will not perceive fear and will not be motivated to make subsequent appraisals (i.e., non-response). If the individual perceives the threat to be high, they will turn to efficacy appraisal. If they perceive they have enough efficacy to avert the threat, they will reduce their fear by engaging in danger control responses, which are defined as "belief, attitude, intention or behaviour changes in accordance with a messages' recommendations" (Witte et al., 1996, p.320). If a respondent perceives the threat

to be high but does not feel they have the efficacy to avert the threat, they will reduce their fear by engaging in fear control responses, defined as, "coping response that diminish fear, such as defensive avoidance, denial, and reactance" (Witte et al., 1996, p.320). Fear control responses are considered an emotional process, whilst danger control responses are considered a cognitive process (Popova, 2012). If no information with regard to the efficacy of the recommended response is provided, individuals will rely on past experiences and prior beliefs to determine efficacy (Witte & Allen, 2000).

The EPPM has been used as the foundation for over 50 empirical studies (Popova, 2012) and has been used in the context of many different health prevention behaviours, such as: HIV/AIDS (Witte & Morrison, 1995); skin cancer (Stephenson & Witte, 1998); teen pregnancy (Witte, 1997); and meningitis (Gore & Bracken, 2005). Furthermore, a number of meta-analyses focusing on the EPPM have been conducted (see Peters et al., 2013; Ruiter et al., 2014; Tannenbaum et al., 2015; Witte & Allen, 2000). The general consensus is that demographic factors, such as gender, age or ethnicity do not appear to have much influence on the processing of fear appeals (Witte & Allen, 2000).

The strength of the message is an important factor in the outcome of the communication. Witte and Allen (2000) conclude that stronger fear appeals result in greater arousal of fear, greater perception of the severity and susceptibility to the threat, resulting in greater attitude, intention, and behaviour changes. This is mirrored with efficacy messages; with stronger efficacy messages resulting in greater perceptions of response efficacy and self-efficacy, and stronger the attitudes, intentions, and behaviours towards the recommended response. However, research asserts the need for balance, as strong fear appeals, paired with a weak efficacy message is likely to increase the level of defensive, fear control responses, such as: denial, biased information processing and allocating less attention to messages. Poignantly, these counter-productive effects are most likely for those at higher risk of the threat, which is usually the target audience of who the message was designed (Ruiter et al., 2014). Witte (1997) suggests that for individuals with a high level of pre-existing fear, messages should focus on the efficacy of the recommended response, however, in some cases, this alone cannot overcome an individual's perceived threat, and here fear appeals should not be used because they would likely result

in defensive reactions (Witte et al., 1998). Indeed, Muthusamy et al. (2009) advocate that it is ill-advised and ineffective to use fear appeals to persuade those with high levels of pre-existing fear.

Efficacy appears to be the key component which affects positive intention and behaviour change (Basil & Witte, 2012; Gore & Bracken, 2005; Maddux & Rogers, 1983; Peters et al., 2013; Ruiter et al., 2014). "If fear appeals are disseminated without efficacy messages, or with a one-line recommendation, they run the risk of backfiring" (Witte & Allen, 2000, p.607). Indeed, high threat may even decrease behaviour when efficacy is low (Gore & Bracken, 2005; Peters et al., 2013). Therefore, it is necessary for efficacy messages to make the target audience believe that they are able to perform a recommended response and that this response works in averting or minimising the threat (Ruiter et al., 2014; Witte & Allen, 2000).

4.2.2 Application to the Educational Environment

Whilst threat communications have been extensively researched within the health literature, their application into the education field has been more of a recent movement. The majority of the research has focused on fear appeals (see section 5.2.2 for detailed review of this research), with only a handful of studies addressing the use of efficacy appeals within the educational environment. The following section will consider findings from the research which has been conducted to date.

The concept of efficacy appeals has been translated into the educational context in several studies. Firstly, Sprinkle et al. (2006) made use of vignettes in order to compare behavioural intentions following fear, efficacy or combined messages. Putwain and Roberts (2012) explored teachers' view of using efficacy appeals. Whilst von der Embse et al. (2015) used an experimental method to compare the effects of fear and efficacy messages in low and high-stakes situations upon test performance, anxiety and motivation. However, there are conceptual and methodological limitations to these studies, when considered in relation to the EPPM. The following sections will consider the findings from these studies in turn, with critical consideration to their conceptual and methodological limitations.

4.2.2.1 *Sprinkle, Hunt, Simonds and Comadena (2006)*

Sprinkle and colleagues (2006) conceptualise fear appeals as anti-social compliance-gaining strategies and propose that they may be used by teachers to demonstrate the negative consequences students may face if they fail to comply with teachers' desired behaviour change. They highlight that previous research indicates that these types of communications often have negative educational outcomes, such as lower cognitive learning, and negative feelings towards the teacher and subject (Plax et al., 1986). However, they acknowledged that research is yet to examine the impact of these communications coupled with messages of help or advice as to how to avoid the consequences associated with the threat, in other words, both fear and efficacy appeals.

Based upon findings from the health literature, Sprinkle et al. (2006) hypothesised that fear appeals which threaten students without an efficacy statement are likely to result in a negative response. In other words, if teachers threaten students without providing a means to correct or change the desired behaviour, students will likely respond negatively. Furthermore, they propose that a combination of threat and efficacy statements (e.g., offering to show students how to avoid negative consequences) may provide an effective compliance-gaining strategy. In order to explore the impact of fear and efficacy messages, they examined the following educational outcomes: self-perceived motivation; self-perceived affective learning; likelihood of taking another course with the instructor; likelihood of visiting the instructor.

A vignette method was adopted, with 226 undergraduate students at a Mid-Western university in USA. The participants were told to imagine they had just given an informative speech and were receiving feedback from their instructor. As the participants had recently completed an informative speech, it was believed this would support the saliency of the feedback to them. They were provided with one of four feedback statements: fear and efficacy; fear only; efficacy only; none (copy of the vignette speeches can be found in Appendix D). The fear statements were designed to induce threats based on poor grades on the course: negative appraisal by others; future negative consequences such as loss of financial aid, or scholarship; or disqualification from internships or jobs in the future. The efficacy statements were designed to reflect both perceived response efficacy (such as working with

the instructor before future assignments) and perceived self-efficacy (e.g., if you put forth the required effort you can improve your grade for next time).

As is common within fear appeal research (Popova, 2012), the authors conducted manipulation checks to determine whether the manipulation of fear and efficacy was valid. Participants exposed to the scenario containing fear rated those scenarios higher in perceived fear than participants not exposed to the fear scenarios. Participants exposed to the scenario containing efficacy statements rated those statements more efficacious than participants not exposed to the efficacy scenarios. The authors concluded that the manipulation of fear and efficacy within vignettes was successful. However, there are fundamental issues with the authors' conceptualisation of efficacy and how this is then translated into the vignettes. Witte et al. (1996, p.320) define perceived self-efficacy as "beliefs about one's ability to perform the recommended response to avert the threat", whereas Sprinkle and colleagues' conceptualisation ("if you put forth the required effort you can improve your grade for next time"), focuses upon the expectations of whether the respondent would be able to succeed on the task as a whole. Therefore, the conceptualisation of self-efficacy itself is not in line with the EPPM, subsequently, it would be difficult to integrate these findings in line with expectations based on the EPPM and draw concrete conclusions.

Sprinkle et al. (2006) hypothesised that the interaction of fear and efficacy would result in the highest levels of motivation to study, affective learning, likelihood of taking another course with the instructor, and likelihood of visiting the instructor before the next speech. However, results showed that efficacy messages alone, produced significantly higher levels of these positive outcomes, compared to messages containing both fear and efficacy, fear alone, or neither. The authors explained these results by suggesting it was due to the instructional context in which the experiment was conducted, compared to the usual health context. However, an alternative explanation for these unexpected findings, could be the high degree of difference in the onerous of responsibility between the scenarios including efficacy messages, and those not. The onus of responsibility to complete the stated action for the messages in the fear only and no message condition lay explicitly within the hands of the students: "it is your responsibility to make the necessary improvements for the persuasive speech". Whereas for

the messages containing an efficacy appeal, the lecturer indicated that they would take a much greater role in ensuring that the students had the means to improve: "I will do anything I possibly can to help you get the grade that you want".   Research into the impact of personal pronoun use within education proposes that the use of inclusive language may minimise threatening acts because it indicates a togetherness between the teacher and students and a sharing of the same goals and values (Brown & Levinson, 1978; Rounds, 1987).

Indeed, Sprinkle and colleagues postulate that their results indicate that students respond most favourably to an instructor who is encouraging and willing to help which they liken to their efficacy-only condition, but this may be an inappropriate conclusion to draw, because, although an encouraging instructor may invoke a higher degree of perceived response efficacy (based on the assumption that one would be more likely to advocate that a response would be more effective from someone they have a positive relationship with), there is no evidence from the research whether this actually improved students' feeling of self-efficacy.

The results of the research led Sprinkle et al. (2006) to conclude that efficacy alone is a far better compliance-gaining strategy than efficacy and fear together; and therefore conclude that instructors should avoid using fear appeals.   However, they contrive that the use of fear may provide some students with the motivation they require, but these communications should include an efficacy statement as well.   These recommendations, mirror the general consensus from the health literature.

The authors themselves note some limitations of the research, including that the vignette only provided a hypothetical scenario, which is not a replication of the classroom environment or usual type of instruction. They also note that the experiment only provided participants with a brief exposure to fear, and reactions may change with repeated exposure.   Lastly, as with much research on fear and efficacy appeals, behavioural intentions rather than actual behaviour was measured, which does not consistently result in the subsequent performance of that action (Cooke & Sheeran, 2004; Sheeran, 2002).

4.2.2.2 *Putwain and Roberts (2012)*

Putwain and Roberts (2012) introduce the notion of fear and efficacy appeals in the context of communications regarding the General Certificate of Secondary Education (GCSE). They conceptualise communications regarding the importance of GCSE grade for future life trajectory by outlining the negative consequences of behaviour as a fear appeal. Within this context, the authors conceptualise efficacy appeals to be communications pertaining to actions required to avoid failure, for example, through curriculum mastery, or self-regulated learning. They propose that although the impact of efficacy appeals on educational outcomes had not been studied, there is a wealth of research about the role of academic self-efficacy as a predictor for academic achievement and other motivational-affective outcomes. The authors suggest that of the four sources of academic efficacy proposed by Bandura (1997) (namely: vicarious learning; persuasion; mastery experiences; and physiological/psychological feedback), efficacy appeals used by teachers within the context outlined, would primarily use persuasion.

Putwain and Roberts (2012) conceptualise efficacy appeals within the classroom setting to include communications such as: explanations of the assessment demands required by particular exam questions; explanations of how marks would be awarded to exemplar answers and communications regarding the importance of preparatory practices to avoid failure. They assert that although these practices have not previously been explicitly conceptualised as efficacy appeals, they have been identified to be used routinely as part of everyday classroom practice (Johnson & Crisp, 2009; Putwain, 2008). They comment that they use a broader definition of efficacy appeals than is typically used in health psychology literature, defining efficacy appeals within the educational context as, "persuasive messages or environmental cues which focus on how threats can be averted, and the positive consequences of threat avoidance" (pp.359).

Putwain and Roberts (2012) aimed to explore teachers' perspectives of fear and efficacy appeals, more specifically, the extent to which teachers would use these communications and reasons for using them. The authors hypothesised that teachers who believe students could be motivated by fear would be more likely to endorse fear appeals, whilst those who believe that students do not know how to

organise their learning to avoid failing, would be more likely to use efficacy appeals. Based upon prior research on the effects of accountability measures on teaching practises, Putwain and Roberts (2012) also propose that teachers working under greater accountability pressure, in schools where performance is deemed under average, would be more likely to endorse fear and efficacy appeals than schools where student performance is deemed satisfactory or above average. Additionally, the authors hypothesise that novice teachers would be more likely to use fear appeals than experienced teachers.

In order to explore these hypothesises, Putwain and Roberts (2012), surveyed 234 secondary school teachers, asking about their endorsement and beliefs about the influence of fear and efficacy appeals, as well as their use of reassuring messages. There were five items used to measure teacher's view of the endorsement of efficacy appeals:

Teachers should tell pupils, working hard will improve their GCSE grades
Teachers should show pupils how to prepare effectively for their GCSEs
Pupils should be offered additional revision classes to help them prepare for their GCSEs
Pupils should be told they will feel good about themselves if they pass their GCSEs
Pupils should be reminded that effort will be rewarded with better GCSE grades, as a way of motivating pupils.

There were three items used to measure teachers' domain knowledge of efficacy appeals:

Pupils understand the amount of effort required to pass their GCSEs
Pupils know how to prepare effectively for their GCSEs
Pupils understand the importance of GCSEs for their future life trajectory

Teachers were asked to rate their level of agreement with these statements on a 5-point scale, ranging from strongly disagree through to strongly agree. Most teachers agreed or strongly agreed with all five items regarding the endorsement of efficacy appeals. There was variation amongst teachers about their domain knowledge of efficacy appeals.

Interestingly, when conducting a confirmatory factor analysis, the item, 'Pupils should be offered additional revision classes to help them prepare for their GCSEs' was removed to improve model fit. This item is the only one of the items which is not a direct vocal action by the teacher themselves. Additionally, results indicated that endorsement of efficacy appeals was unrelated to domain

knowledge beliefs of efficacy appeals. However, it was found that teachers were more likely to endorse the use of additional revision classes when they believe that students had low efficacy. The combination of these unpredicted findings could imply that teachers may not value the impact their efficacy messages may have upon student's efficacy levels (i.e., they don't think that by telling the students these things, that it will help them to feel more efficacious about their exams). Alternatively, this finding could be explained by ineffective questions regarding efficacy endorsement. The notion of as 'working hard' could be considered a vague term, which teachers may feel may not have any real impact upon students' levels of self-efficacy, and instead, more tangible options which would actively support students in their preparation for the exam (as indicated through offering additional revision classes) would be more effective in this process.

Results also indicated that teachers were more likely to use efficacy appeals when they believed that students could be motivated by a fear of failure. The finding that efficacy appeals were endorsed when teachers believed students would be motivated by fear, but not that they understood the value of efficacy is intriguing. The authors propose that this finding may be explained by the fact teachers may use efficacy appeals irrespectively of their perceptions of students' efficacy as a form of encouragement, or that the fear and efficacy messages are used in a combination to help students avoid failure, and therefore the use of this combination would be related to an understanding of students' level of fear, not efficacy. Alternatively, this finding could indicate that the messages used to measure teachers' views of students' level of efficacy were an ineffective measure. Indeed, when considering the definition of efficacy appeals outlined by Witte et al. (1996) which proposes an efficacy appeal to contain the elements of perceived self-efficacy, defined as, "beliefs about one's ability to perform the recommended response to avert the threat" and perceived response efficacy, defined as, "beliefs about the effectiveness of the recommended response in deterring the threat" (Witte et al., 1996, p. 320), the items used to measure teachers' beliefs about students' levels of efficacy are incongruent.

For instance, the question, "pupils understand the amount of effort required to pass their GCSEs" does not consider whether level of effort alone would be an effective enough method for passing their GCSEs (i.e., response efficacy). Similarly, "pupils know how to prepare effectively for their GCSEs"

assumes that knowledge of how to prepare for GCSE provides students with a level of self-efficacy for approaching their exams. Finally, "pupils understand the importance of GCSEs for their future life trajectory" holds neither a level of self-efficacy nor response efficacy in understanding how to avoid failing exams.

Putwain and Roberts' conceptualisation of efficacy appeals within an educational setting: "persuasive messages or environmental cues which focus on how threats can be averted, and the positive consequences of threat avoidance" (Putwain & Roberts, 2012, p. 359), provides a transition of the concept of efficacy appeals into the classroom setting, supported by educational research concepts such as academic self-efficacy, curriculum mastery, and self-regulated learning. However, this conceptualisation falls short of providing specific core elements of the EPPM; namely, the specific sub-components of perceived response efficacy and perceived self-efficacy, and this therefore limits the capacity to establish findings from the study. Additionally, as Maloney et al. (2011) put forward, it is the perception of threat and efficacy which is important in assessing someone's reaction, therefore, future research should explore efficacy appeals from students' perspective.

4.2.2.3   von der Embse, Schultz and Draughn (2015)

von der Embse et al. (2015) frame their exploration of fear and efficacy appeals in the context of increased pressure on teachers from accountability policies. They propose that fear messages, which convey the consequences of test failure, are instructional practices teachers adopt to improve student test performance. Based upon Witte's definition (1992), the authors form their conceptualisation of efficacy communications as "messages intended to reinforce how capable an individual is of reaching a goal or outcome" (von der Embse et al., 2015, p. 622). For clarification, the following example was provided: "I believe you will perform well on the upcoming test because you have studied for several hours and scored highly on the pre-test".

The study sets out to systematically explore fear and efficacy appeals prior to high and low stakes exams. The stakes were set on the contribution of the test towards a final grade, i.e., high-stakes would be a larger contribution to final grade than low stakes (the authors do note here the

presumption that the student believe the final grade is important). Two research questions were proposed. Firstly, whether fear appeals resulted in poor test performance compared to efficacy appeals, and secondly, whether fear appeals affect test performance due to exacerbating test anxiety.

A total of 487 undergraduate university students, enrolled on an Introductory Psychology course in a South-Eastern university in the USA took part in the study. The participants were split into a fear appeal condition and an efficacy appeal condition. The fear appeal condition reminded students about the consequences of not passing exams and the percentage of each test toward the final course grade. The efficacy appeal condition included language aimed at motivating students and emphasising encouragement and an expectation of high performance. Scripts (see Appendix E for copy of vignette scripts) were formulated for each condition, based upon student survey pilot data and observations of professors. However, there are several distinctions between the fear and efficacy scripts which appear to be theoretically unfounded. For example, the fear appeal script claims, "there are no right or wrong responses" and this is omitted from the efficacy appeal script. Additionally, the efficacy script mentions that "the survey will have questions about various feelings", but this is not mentioned within the fear appeal script. These differences between the script seem unclear in relation to the fear and efficacy literature but provide distinct differences between the conditions, beyond those being tested.

A similar theme to that noted within the Sprinkle paper also emerges; that of onus of control indicated from the scripts. Within the efficacy condition, statements such as, "I will do my best to make sure that you have all the necessary resources and information to succeed on the exam" and "We will both be happy to go over the material with you and suggest ways to help you study". When considering the original perceived efficacy definition proposed by Witte et al. (1996), these statements certainly fall in line with this, as they provide students with tangible support and actions to follow. However, the influence of the greater role provided by the teaching staff may also have provided an additional influence on the results, over and above the efficacy message. Incidentally, there was no acknowledgement within the paper about the number of students who did receive extra support,

which was offered from the teaching staff, as this would have provided those students with an additional advantage compared to those who were offered no support.

Results from the raw data indicated that low-stakes test performance was higher in the fear appeal condition, compared to the efficacy appeal condition. Whilst within the high-stakes condition, performance was similar in both conditions. The authors concluded that the hypothesised prediction that students would exhibit lower test performance over time in the fear appeal condition compared to the efficacy appeal condition was supported. However, the conclusions drawn here do not appear to fully represent the data because the students in the fear appeal condition performed better than students in the efficacy condition, in both the high and low stakes conditions. So, although there may have been an improvement in performance over time within the efficacy condition, the results were still poorer than those in the fear condition. The authors highlight a further limitation of the study; acknowledging that it was unknown whether the script actually made the students feel threatened or efficacious. Indeed, the authors propose future research should employ manipulation checks to assess this.

4.2.2.4 *Critical Consideration of Efficacy Appeal Research in the Educational Environment*

The three studies presented above have attempted to transfer the concept of efficacy appeals into the educational environment. Whilst each of the studies has developed the body of knowledge, there are a variety of limitations identified with the studies and their application of the EPPM, which can be considered under two key issues: definition inconsistencies and measurement inconsistencies. These will be discussed in turn.

4.2.2.4.1   *Definition Inconsistencies*

Each of the studies provide a different definition of efficacy appeals within the educational context. Sprinkle and colleagues (2006) produced statements designed to reflect perceived response efficacy (such as working with the instructor before future assignments) and perceived self-efficacy (e.g., if you put forth the required effort you can improve your grade for next time). Although they attempted to contrive both elements of an efficacy appeal within their research, the element of perceived self-

efficacy appears incongruent with the definition from the EPPM. Within their review, Witte and Allen (2000) put forward that perceived self-efficacy relates to someone believing that they are capable of performing an effective recommended response against the threat. This definition appears to be more related to specific recommended tasks. For example, in Sprinkle et al.'s (2006) conceptualisation, the responses included providing outlines to professor, asking for help to develop arguments, and visiting the speech lab. However, the measure of perceived self-efficacy related to 'putting forth the required effort', which does not coordinate with the responses outlined; it is more focused on the overall outcome.

von der Embse and colleagues' (2015) conceptualisation of efficacy appeals focused on "language aimed at motivating students and emphasising encouragement and expectation of high performance" (von der Embse et al., 2015, p. 625). When compared to the definition laid out by Witte et al. (1996), with perceived self-efficacy defined as "beliefs about one's ability to perform the recommended response to avert the threat", and perceived response efficacy defined as "beliefs about the effectiveness of the recommended response in deterring the threat" (Witte et al., 1996, p.320), the conceptualisation set out by von der Embse and colleagues (2015) is incongruent with that of the EPPM.

Putwain and Roberts (2012) define efficacy appeals within the educational context as, "persuasive messages or environmental cues which focus on how threats can be averted, and the positive consequences of threat avoidance" (Putwain & Roberts, 2012, p. 359). They propose that this includes communications such as: explanations of the assessment demands required by particular exam questions; explanations of how marks would be awarded to exemplar answers and communications regarding the importance of preparatory practices to avoid failure. The specification of examples offered here, provides the focused recommended response from Witte et al. (1996) definition, however there appears to be little empirical support from the EPPM to support the concept of 'positive consequences of threat avoidance'. Additionally, there is no consideration given to self-efficacy within this definition.

The EPPM was developed as a response to inconsistent research on fear appeals within the health literature in an attempt to unite the research and provide a theoretical position for future researchers to adopt as a basis for comparable findings. Indeed, Witte advocated that "terms such as fear, threat and efficacy must be carefully defined and used in a consistent manner across studies if the literature is to be reconciled" (Witte, 1992, p. 329). Although there have only been three studies to date addressing efficacy appeals within the educational context, there is clear disparity between the definitions of terms and therefore it is necessary that a consistent definition needs to be adopted so as to not fall into the same short comings as the health literature.

4.2.2.4.2   Methodological Inconsistencies

In addition to inconsistencies with the definitions of efficacy appeals, there are also issues in relation to the methods used to study efficacy messages within these studies. For both the Sprinkle et al. (2006) and von der Embse et al. (2015) studies, the efficacy conditions used presented a higher degree of responsibility of the teacher for the outcome than the fear appeal condition. The onus of responsibility to complete the stated action within the fear appeal messages lay explicitly within the hands of the students, whereas for the efficacy appeal, the lecturer indicated that they would take a much greater role in ensuring that the students had the means to improve. This could have had a compounding effect on the differences found between the conditions. Namely, it is unclear whether the more positive outcomes found were related to participants' feelings of efficacy or other factors such as increased support from the lecturer.

Furthermore, only Sprinkle and colleagues (2006) conducted manipulation checks to assess whether the efficacy statements had an impact upon their level of efficacy. Indeed, Maloney et al. (2011) state that one of the greatest limitations for the practical application of communication theories is that there is never a guarantee that messages will be interpreted by recipients in the way they were designed to be understood. Therefore, in the research conducted by von der Embse and colleagues (2015), there was no assessment of whether the efficacy appeals had an impact on the students' levels of efficacy; there was just an assumption that efficacy messages would increase student efficacy. When considering the following evidence, this assumption is even more worrisome. In traditional self-efficacy research,

Bandura (1997) posits a variety of ways in which self-efficacy could be enhanced: actual performance, vicarious experiences, physiological indexes and forms of social persuasion. The studies conducted on efficacy appeals in the educational context, utilise the role of social persuasion; where respondents are convinced that they can succeed by another. However, these messages must be believable and from a credible source; the presence of the information alone does not automatically increase self-efficacy, it depends upon their interpretation (Pajares, 1996). Moreover, the fact that the efficacy messages were presented to students on a whole-class level furthermore undermines the believability of these messages, because it may seem a disingenuous comment about their belief in their ability when made to the whole class population. These issues further highlight the need to understand students' perceptions of self-efficacy rather than relying on the assumption that manipulation of self-efficacy automatically increases it upon hearing an efficacy statement.

Within the health literature, fear and efficacy appeals are predominantly evaluated through experiments in which fear and efficacy messages are manipulated and their affects assessed through self-report measures. The studies conducted by Sprinkle et al. (2006) and von der Embse et al. (2015) followed this methodology. However, this is a very unnatural replication of how fear and efficacy appeals would be used within the educational environment. Teaching staff are unlikely to replicate these lengthy, monologist messages. Instead, communications are likely to be used in a fluid, dynamic manner between teachers and students (Wilkinson et al., 2020). Therefore, as opposed to attempting to manipulate conditions in an experimental approach, it may be more prudent to follow the methods adopted by Putwain and colleagues (see Putwain & Symes, 2014; Putwain et al., 2021) on their research on fear appeal appraisal, which assesses students' appraisal of fear appeal messages from their day to day classroom experiences. Indeed, Witte and Allen (2000) highlight the need for increased research in natural, realistic settings.

The considerations presented above, highlight clear issues in the research assessing efficacy appeals within the educational context. As with Witte's (1992) objective of uniting the research on fear appeals and providing a theoretical position for future researchers to adopt as a basis for compatible findings, it appears that this is a necessary step before any future work is conducted on understanding

the use and impact of efficacy appeals within the educational environment. Indeed, researchers within the field have highlighted the importance of focusing future research on efficacy appeals (Putwain & Roberts, 2012; Sprinkle et al., 2006).

4.3   Research Aims

Due to the varying research on the application of efficacy appeals into the educational context, this study aims to provide a universal definition of efficacy appeals within the educational context, seeks to develop a questionnaire that can be used to measure efficacy appeals and explore the data from this questionnaire to ascertain whether it can provide valid and reliable data. Furthermore, the hierarchical nature of the variables will be explored to assess whether there are wider contextual influences on students' responses to the efficacy appeal questions.

4.4   Development of the Teachers use of Efficacy Appeals in the Classroom prior to High-Stakes Exams (TEACHE) Questionnaire

4.4.1   Purpose of the TEACHE

4.4.1.1   *Creating a Measure of Teachers' Communications about Exam Preparation*

The observational analysis conducted within Study One identified the most common type of communication used by teachers about students forthcoming exams to be focused upon skills and techniques students would need to help them succeed in the exam; these communications were conceptualised as 'efficacy appeals'. There is limited research focusing on the use of efficacy appeals within the education setting, and no measure available, to date, to measure the use of these types of communication or how students interpret these types of messages from the teacher. As these types of communications seem to form an integral part of communication in the classroom, it is vital to create a measure to be able to begin to understand how students interpret them.

4.4.1.2   *Ensuring Consistent Efficacy Appeal Research within the Education Sector*

The EPPM (Witte, 1992) aimed to unite the research on fear appeals within the health field, and provide a theoretical position for future researchers to adopt as a basis for comparable findings. This resulted from previously disjointed research within the field, meaning that results could not be

compared. As identified, to date, there has been fragmented research assessing the impact of efficacy appeal messages within the educational field. Therefore, the development of a tool to measure the use and impact of these communications within the classroom is a crucial step in order to allow results from future studies to be appropriately compared. This measure was named: the Teachers use of Efficacy Appeals in the Classroom prior to High-Stakes Exams (TEACHE) Questionnaire.

4.4.2   Empirical and Theoretical Grounding

Pekrun et al. (2004) propose that when constructing a measurement instrument, the strategy used to create the measurement should have both theoretical and empirical considerations. They suggest that that a measure based solely upon theoretical considerations may increase the potential of misrepresenting the phenomena under study, whilst a measure based solely upon empirical data may increase the potential of incorporating implicit biases and assumptions. Therefore, the TEACHE has been developed from both empirical and theoretical grounding.

4.4.2.1   Empirical Grounding

Bandura (2006) argues that "the construction of sound efficacy scales relies on a good conceptual analysis of the relevant domain" (Bandura, 2006, p. 310). Therefore, the empirical basis of the TEACHE was formed from the thematic analysis from the observations from Study One. The theme, 'Efficacy Appeals' (see section 3.5.4) was subdivided into 'Importance of Preparatory Practices' and 'Skills and Technique'. Skills and Technique was further subdivided into six categories: Time Spent in Exam; Specific Answers; Exam Content; GCSE Changes; Exam Strategy; Mark Allocation and Maximisation. These categories formed the basis of the questionnaire. Table 4.1 provides a description of these categories with an illustrative example from Study One.

There are two additional categories that make up the TEACHE that were not in the original 'efficacy appeal' section of Study One. The category of 'reassurance' was part of another theme, however, under the theoretical model adopted, it aligns well within the response efficacy subscale so was included. The category 'reassurance' is defined by teachers' use of messages aiming to reassure students. For example, "*This is hard, it's hard stuff. We'll do it again when we come to revision. Make a*

note that you don't know it…This is hard, don't worry if you don't get it, we're going to keep doing these…Don't worry if you can't do it, we're going to do a lot more practice of these…By the time it's your exam we will have done lots of practice…You don't need to worry about it, we're going to practice, by the time you come to it you'll be fine…You'll watch how I do it and pick it up".

The category of 'revision tips' did not come directly from the observational data, possibly due to the time of year the observational analysis was conducted (exams 7 months away). However, it was deemed this would likely be an area in which teachers would provide communications about how to best revise for their exams with consideration to the wider test preparation strategies literature (Flintcroft et al., 2017; Perryman et al., 2011).

4.4.2.2   Theoretical Grounding

The theme 'Efficacy Appeals' from Study One was derived from a bottom-up process, whereby the initial theme was identified, and relevant theories were drawn together and explored. During this process, Putwain and Roberts (2012) conceptualisation of efficacy appeals mapped well with the codes and sub-themes identified. Putwain and Roberts (2012) definition derives from the EPPM (Witte, 1992). In translating the definition into the educational context, they propose that efficacy appeals pertain to messages which communicate to students the ways in which they could develop mastery, efficacy, and self-regulated learning. They provided the following examples: explaining assessment demands required by types of examinations questions, explaining how marks would be awarded for exemplar questions, and communicating to students the importance of such preparatory practices in avoiding failure. The use of the EPPM to aid research regarding teacher communications was supported by Sprinkle et al. (2006).

The EPPM highlights two subcomponents of efficacy: perceived self-efficacy and perceived response efficacy. Perceived self-efficacy refers to "beliefs about one's ability to perform the recommended response to avert the threat" (Witte et al., 1996, p. 320) and perceived response efficacy refers to "beliefs about the effectiveness of the recommended response in deterring the threat" (Witte et al., 1996, p. 320).

Table 4.1 *Categories of teacher communications measured in the TEACHE, with illustrative examples from Study One*

Category	Description	Example from Observation
Exam Strategy	Where teachers present students with techniques, hints, and tips to try and help students achieve the highest grade possible in their exam.	"*It's that exam skill of what do you know, what do I need to know, what do I use and how do I do it?*"
Importance of Preparatory Practice	Teachers' use of communication to explain to students how important it is for them to prepare for their exams	"*This is the start of working hard and revising for the exam…This is day one of exam prep*".
Mark Allocation	Teachers' messages about how marks are allocated in their exam	"*So why I am so bothered about your spelling? 9 SPAG marks on each paper. The paper is only worth 80 marks plus 9 for SPAG, and you do 2 tests so that's 18 marks, it's like free marks that we need to nail*".
Exam Content	Messages used by teacher to signpost students to topics or areas which they suggest may come up on the exam	"*It probably might end up on your exam because it's quite a famous one*"
Specific Answers	Messages where teachers communicate to students how they should answer practice questions undertaken in the lesson if it came up on their exam	"*Somewhere within the first sentence you need to mention that place that you have studied…Then you need to use tourist numbers*"
Time Spent in Exam	Teachers' communications about how long students should be spending on certain questions when it comes to their exam	"*You have 12 minutes to write this, that's about 1 and half minutes a mark*".
Mark Maximisation	Teachers' communications to students about how they can achieve the highest possible marks in the exam	"*Check spelling, punctuation, and grammar. They check that, you need to get those good marks*"

Put simply, does the recipient think that the particular action suggested to avoid the threat would be effective and do they think that they can perform it? An efficacy message needs to provide an actionable response which provides a strong sense of efficacy; a doable and effective action which can be taken to protect against a danger (Basil & Witte, 2012). Witte and Allen (2000) highlight that results from factor analyses indicate that self-efficacy and response efficacy are separate dimensions of the higher order factor of efficacy, and therefore measures need to include both components separately. Based upon the conceptualisation of efficacy appeals from the EPPM, for each domain identified from the empirical data, there are three elements required:

The frequency of the efficacy appeal (how often the teacher makes the efficacy message)

Perceived response efficacy (whether the student thinks the teacher's recommendation will help them to achieve their target grade)

Perceived self-efficacy (whether the student believes that they can effectively undertake their teacher's recommendation)

4.4.2.2.1   *Conceptualisation of Efficacy Appeal in the Classroom*

The EPPM was used as a theoretical basis for the TEACHE, whilst the empirical data from the observations in Study One provided the core domain areas. Putwain (2008) proposed that educational practices such as study skills training, examination practice, and examination technique help to reduce student stress. This supports the use of the identified TEACHE items within the conceptualisation of efficacy appeals with the EPPM because engaging in these behaviours would reduce the threat of stress which students may be feeling.

The definition of an efficacy appeal within the classroom environment is conceptualised as; 'statements which provide students with an action to follow which will help them to achieve their target grade'. Consideration needs to be given to the Witte et al. (1996) definition that for an efficacy appeal to be effective, the respondent needs to have perceived response efficacy and perceived self-efficacy. Therefore, within classroom terms, perceived response efficacy relates to the student thinking that the teacher's recommendation will help them to achieve their target grade. Whilst perceived self-

efficacy relates to students' believing that they will be able to follow the teacher's recommendation.

An illustrative example, devised by the author, is shown in Table 4.2.

Table 4.2 *Example to illustrate the type of efficacy appeals used in a GCSE classroom, highlighting how response and self-efficacy could influence the interpretation of this efficacy appeal.*

Context	It is 3 weeks before the Maths GCSE exam, the teacher is going through a question the class have completed as part of their revision. The teacher explains how the question is answered, and how a similar one may be approached if it came up on their exam
Teacher Comment	*"The question asks you to circle the fractions with the same value. First you need to convert all the fractions to the same denominator by finding a number which they can all divide into. Then you need to make sure you convert the top number by multiplying by the same number You can then compare the top numbers to see which ones are the same. You would use this process for any question which asks to find fractions with the same value."*
Efficacy Statement	How to tackle this type of question in the exam
Perceived Response Efficacy	Does the student think that following the teacher's suggestion of how to answer the question would get them marks, and help them to achieve their target grade?
Perceived Self-efficacy	Does the student think they will be able to reproduce a similar answer if it came up on their exam?

4.4.2.2.2   No Requirement for Direct Fear Appeal

Within the health literature research, efficacy appeals are usually assumed to adjoin a direct fear appeal. However, it is posited that the application in the classroom provides a different environment, as there is an implicit context of a fear appeal; teachers' messages relate to passing exams, or avoiding failing them, even if they do not expressly say so. This assertion is supported by observations in Study One coming from Key Stage 4 classrooms, where students were completing the GCSE syllabus and the impeding status of their exams. Therefore, although a teacher may not often state the fear appeal element of the message directly, it is undoubtedly there, even if it not explicit. For example, "*It comes up time and time again, so you have to know this",* although the teacher does not directly state that "it comes up time and time again *on your exam*, so you have to know this *so that you can achieve well*"; it is implicit from the context of the classroom situation and for the purpose of why the teacher is saying this communication to the students.

Within the health literature it is widely assumed that a direct efficacy appeal will follow the stated fear appeal, predominantly due to the nature of fear appeal research within this sector, with the majority of studies following an experimental procedure where respondents are shown text based messages (Maloney et al., 2011), or visual images (Wong & Cappella, 2009), which contain manipulated levels of threat (Popova, 2012). These types of studies allow for easy manipulation of variables as fear and efficacy messages are pre-prepared and are not often provided within an interactive context, unlike a classroom setting; meaning there is easier manipulation and control over the messages participants receive. Also, within the applied context of using fear and efficacy messages for health campaigns, these communications are often also presented in the form of text-based messages on posters or leaflets, or through visual images. However, this is vastly different to the classroom environment, where there is a constant interaction between teachers and students and there is not generally the available time for lengthy speeches. Indeed, in commentary about future EPPM research, Witte and Allen (2000) propose that more naturalistic studies are required.

The lack of requirement for a direct fear appeal is supported by research by Hall et al. (2004). In their ethnographic study looking at the impact of National Curriculum Tests (NCTs (also commonly referred to as SATs); compulsory tests taken by children in England in the final year of primary school) within the Year 6 primary school classroom, the authors commented; "Organisational structures are unspoken – by now, early in the second term in year six, pupils are well drilled, they seem to have internalised the routines and they police themselves….No one has to be reminded of where they should be or what they should be doing. All children have the semblance of task-engagement." (Hall et al., 2004, p. 806). The researchers suggest that students became engrained to the SATs routine, they knew that type of lesson was about preparing for their SATs and knew what to do in those lessons. This mirrors the type of environment encountered during observations throughout Study One in the GCSE classroom. The fear is already engrained in the context of the lesson; the children know why they are learning, to attain their GCSE target grade, it does not need to be made explicit on each comment about exam preparation, the context is enough. This is furthermore supported by research exploring the impact of high-stakes exams upon the educational environment: "young people

see the main purpose of schooling as gaining qualifications, because this is what schools focus on" (Hutchings, 2015, p. 5). This can also be illustrated through an example from the observational analysis in Study One. During a GCSE History lesson, a student asked the teacher how to spell the first name of a historical figure they were discussing, the teacher immediately replied, '*You don't need to know it, you don't get any extra marks for knowing anyone's first name in history".* This example demonstrates the focus of lessons to be acquiring knowledge for the purpose of passing exams.

4.4.2.2.3   *Focus upon Appraisal of Message*

The TEACHE is a self-report questionnaire, asking students to rate their personal responses to the frequency of teachers' use of efficacy appeal messages, their level of response and self-efficacy of these messages in order to measure their personal appraisal of these communications. Research from a range of psychological disciplines is used to support the importance of focusing on the individuals' appraisal of teachers' efficacy messages. "The personal quality of the appraisal process explains why a given event can have different meanings for individuals" (Folkman, 2013, p. 902). According to Folkman (2013) stress appraisal model, the primary appraisal process relates to an individual's perception of the personal significance of the situation and is shaped by a person's beliefs, values and goals. Whilst the secondary appraisal refers to the individual's evaluations of options for coping (which are determined both by the situation, such as opportunities for controlling the outcome, and the individual's resources for coping. The variance in both these forms of appraisal determine the extent to which the situation is appraised as a threat or challenge. This appraisal process is also corroborated by the EPPM. The primary appraisal relates to an individual's perception of the severity of and their susceptibility to the threat, whilst the secondary appraisal is based upon the individual's perception of response efficacy and self-efficacy.

Witte (1992) advocates the use of self-report measures to assess individuals' response to fear and efficacy communications because these measures are able to evaluate the subjective experience of fear, which she highlights is necessary within the conceptualisation of the model. Furthermore, Floyd et al. (2000) propose that sources of fear and efficacy information come from both environmental factors, such as verbal persuasion and observational learning, as well in intrapersonal factors such as

personality variables and prior experience, therefore highlighting the subjective nature of how fear and efficacy messages are interpreted. The concept of appraisal transcends a variety of psychological disciplines. Indeed, within motivational research, there are often substantial discrepancies between intended motivational approaches given by an external agent and the way in which this is perceived by individuals on the receiving end (Soenens et al., 2015; Vansteenkiste & Mouratidis, 2016). For example, when considering parenting behaviours, Soenens et al. (2015) propose that parents' actual behaviours are distinct from childrens' appraisal of these behaviours, with children perceiving and interpreting the same parental behaviours differently. Additionally, when considering instructional enhancements to promote student interest, Durik et al. (2015) propose that students have different reactions to instructional enhancements, with the same type of communication 'turning on' one student, whilst simultaneously 'turning off' another. Durik et al. (2015) propose a variety of factors which may impact upon a student's interpretation of teachers' instructional enhancements, such as: prior learning experiences, varying levels of motivation, self-concept of ability, all of which will affect their learning experiences.

The conceptualisation that messages can be interpreted differently by individuals is also supported by research using the 'Transtheoretical Model' of behaviour change (Prochaska & DiClemente, 1983), which proposes that people at various stages of 'behaviour change' respond differently to sources of information about the given high risk behaviour. For example, those within the 'precontemplation phase' (where an individual has no intention to engage in behaviour change action in the foreseeable future), tend to avoid engaging in reading, talking or thinking about their high risk behaviour, process less information and spend less time evaluating themselves in relation to their at risk behaviour (Prochaska, 2008; Prochaska & DiClemente, 1983). This furthers the proposal that although all students may be exposed to the same communications, their interpretation of the frequency of these messages may be processed differently by individuals.

Research from the educational literature on fear appeal communications also supports the importance of the appraisal-based approach. Fear appeals used by teachers prior to high-stakes examinations do not influence students' motivation and engagement directly, but their effects depend upon how the

messages are interpreted and responded to by students (Putwain & Symes, 2014, 2016). Putwain et al. (2019b) suggest that individual student differences resulting from prior educational experiences, dispositions, interests and goals will determine a student's response to a fear appeal message. Putwain et al. (2019b) propose appraisals to be cognitive judgements accompanied by emotions and behavioural intensions. Within the fear appeal literature, three fundamental ways a fear appeal is appraised are proposed (Putwain & Symes, 2014, 2016). Firstly, as a threat, which anticipates the potential for loss and harm, a focus on self-worth protection, and is accompanied by negative emotions and avoidance-orientated behaviours and cognitions. Secondly, as a challenge, which focuses on growth and mastery, with a view that a successful outcome can be achieved and is accompanied by positive emotions and approach-orientated behaviours and cognitions. Finally, students may disregard these communication as they do not see them as relevant to them. Teachers' fear appeal communications are appraised on the basis of their personal significance to the student, and the students perceived capacity for responding effectively to their demands (Putwain et al., 2019b). Personal significance is deemed as how much the student values the outcomes of the exam, whilst perceived capacity to respond depends upon the student's beliefs about their capacity to succeed (based on students' own subjective interpretation of success) on the exam. These could be influenced by factors such as academic self-efficacy, expectancy of success and academic buoyancy (Putwain et al., 2019b). Research reliably suggests that the frequency of teachers' use of fear appeal messages is not the important factor upon outcomes (such as engagement, motivation, academic attainment); it is the student's appraisal of these messages which is important (Putwain, Nakhla, et al., 2017; Putwain, Remedios, et al., 2016; Putwain, Symes, et al., 2016; Putwain et al., 2022; Symes et al., 2015). This highlights the importance of an individual's appraisal of the communication.

In addition to the individualised appraisal of response efficacy and self-efficacy based upon cognitive appraisal models, it is also important to consider the variability of the frequency of efficacy appeal. For instance, when Putwain, Remedios, et al. (2016) compared teachers' and students' self-report data of frequency of fear appeal messages, they found only a moderate correlation, indicating that even at the frequency level, individual factors may impact on how these messages are observed or attended to.

Overall, these findings present a rationale for why an individual's appraisal of an efficacy appeal communication is the salient consideration, and therefore why the TEACHE is designed as a self-report questionnaire to assess students' appraisals of these components.

4.4.3 Overview of the TEACHE Questionnaire Structure

The TEACHE is formed by three subscales, measuring: perceived frequency of efficacy appeals, perceived response efficacy and perceived self-efficacy. These three subscales were formed from the theoretical basis for the questionnaire. For each of the subscales, there are questions regarding different elements of examination preparation which were formed from the observational analysis in Study One and is therefore the empirical basis of the questionnaire. These categories cover: 1) Importance of Preparatory Practice 2) Mark Allocation 3) Exam Content 4) Specific Answers 5) Exam Strategy 6) Revision Tips 7) Time Spent in Exam 8) Mark Maximisation 9) Reassurance

4.4.3.1 Subject-Specific Items

It was necessary to design the TEACHE to be domain specific, namely, to be focused on a particular school subject. Within the threat communication literature, the ways in which individuals' response to fear and efficacy communications is measured is in relation to a specific health concern, such as smoking, rather than global general well-being. Additionally, literature exploring variables affecting educational variables, such as motivation (Martin, 2012a), self-concept (Marsh et al., 1991) and self-efficacy (Bandura, 1986) advocate the necessity for domain-specific rather than global measures.

The TEACHE needs to be domain specific due to the differences between teachers' communication styles, therefore questions need to be centred around a particular teacher to explore the impact of their communications on students' appraisal. Maths was chosen as the focus for the current research for several reasons. Firstly, a pass grade (grade 4) is often required for entry into post-compulsory education and employment, and therefore is likely to be viewed as a high-stakes subject (Nicholson et al., 2019). Additionally, as the fear appeal in education literature to-date has focused on Maths (Putwain, Nicholson, et al., 2016; Putwain & Remedios, 2014a, 2014b; Putwain, Remedios, et al., 2016;

Putwain & Symes, 2014; Putwain, Symes, et al., 2017), this means that comparisons to previous research findings can be more easily drawn.

4.4.3.2 TEACHE Scale

Each question within the TEACHE is measured upon a 5-point Likert scale. For the Frequency questions, respondents are asked to rate the frequency from 'Never = 1' through 'Some lessons = 3' to 'Every Lesson = 5'. For the response efficacy questions, the Likert scale ranges from 'Strongly Disagree = 1' through 'Neither = 3' to 'Strongly Agree = 5'. For the self-efficacy questions, respondents are asked to rate on a scale from 'Not at all Confident = 1' through 'Neither = 3' to 'Very Confident= 5'.

4.4.3.3 TEACHE Questions with Sub-scales and Likert Measurement

Table 4.3 provides an overview of the TEACHE Items, detailing the sub-scale the item belongs to and how it is measured on the Likert scale.

Table 4.3 *List of items from the TEACHE, with sub-scales and measurements*

	Item	Sub-Scale	Likert Scale
1	How often does your teacher tell you that it is important to prepare for your maths GCSE exam?	Importance of Preparatory Practice - Perceived Frequency	Never-Every Lesson 5 point
1a	Do you think if you prepare for your Maths GCSE exam you can achieve your target grade?	Importance of Preparatory Practice - Perceived Response Efficacy	Strongly Disagree-Strongly Agree 5 point
1b	How confident do you feel preparing for your Maths GCSE exam?	Importance of Preparatory Practice - Perceived Self Efficacy	Not at all Confident-Very Confident 5 point
2	How often does your teacher explain how marks are awarded in your maths GCSE exam?	Mark Allocation - Perceived Frequency	Never-Every Lesson 5 point
2a	Do you think knowing how marks are awarded in your maths GCSE exam will help you to achieve your target grade?	Mark Allocation – Perceived Response Efficacy	Strongly Disagree-Strongly Agree 5 point
2b	How confident do you feel using information from your teacher about how marks are awarded in your maths GCSE exam?	Mark Allocation – Perceived Self-Efficacy	Not at all Confident-Very Confident 5 point
3	How often does your teacher explain the marking criteria for your maths GCSE exam?	Mark Allocation - Perceived Frequency	Never-Every Lesson 5 point
3a	Do you think knowing the marking criteria for your maths GCSE exam will help you to achieve your target grade?	Mark Allocation – Perceived Response Efficacy	Strongly Disagree-Strongly Agree 5 point

3b	How confident do you feel using information from your teacher about the marking criteria in your maths GCSE exam?	Mark Allocation – Perceived Self-Efficacy	Not at all Confident-Very Confident 5 point
4	How often does your teacher say that certain questions or topics may come up on your maths GCSE exam?	Exam Content - Perceived Frequency	Never-Every Lesson 5 point
4a	Do you think receiving advice on what questions or topics may come up on your maths GCSE exam will help you to achieve your target grade?	Exam Content - Perceived Response Efficacy	Strongly Disagree-Strongly Agree 5 point
4b	How confident do you feel using information from your teacher on possible exam questions and topics for your maths GCSE exam?	Exam Content - Perceived Self Efficacy	Not at all Confident-Very Confident 5 point
5	How often do you go through practice GCSE questions in your maths class?	Specific Answers - Perceived Frequency	Never-Every Lesson 5 point
5a	Do you think that practising GCSE questions in your maths class will help you to achieve your target grade?	Specific Answers - Perceived Response Efficacy	Strongly Disagree-Strongly Agree 5 point
5b	How confident do you feel that practising GCSE questions will help you in your maths exam?	Specific Answers - Perceived Self Efficacy	Not at all Confident-Very Confident 5 point
6	How often does your teacher explain how you should answer questions if they come up in your maths GCSE exam?	Specific Answers - Perceived Frequency	Never-Every Lesson 5 point
6a	Do you think that following teacher's recommended answers will help you to achieve your target grade in your maths GCSE exam?	Specific Answers - Perceived Response Efficacy	Strongly Disagree-Strongly Agree 5 point

6b	How confident do you feel reproducing your teacher's recommended answers in your maths GCSE exam?	Specific Answers - Perceived Self Efficacy	Not at all Confident-Very Confident 5 point
7	How often does your teacher give you hints and tips on how to achieve your target grade in your maths GCSE exam?	Exam Strategy - Perceived Frequency	Never-Every Lesson 5 point
7a	Do you think following teacher's hints and tips will help you achieve your target grade in your maths GCSE exam?	Exam Strategy - Perceived Response Efficacy	Strongly Disagree-Strongly Agree 5 point
7b	How confident do you feel following your teacher's hints and tips for your maths GCSE exam?	Exam Strategy - Perceived Self Efficacy	Not at all Confident-Very Confident 5 point
8	How often does your teacher give you revision tips for preparing for your maths GCSE exam?	Revision Tips - Perceived Frequency	Never-Every Lesson 5 point
8a	Do you think following teacher's revision tips will help you to achieve your target grade in your maths GCSE exam?	Revision Tips - Perceived Response Efficacy	Strongly Disagree-Strongly Agree 5 point
8b	How confident do you feel following your teacher's revision tips when preparing for your maths GCSE exam?	Revision Tips - Perceived Self Efficacy	Not at all Confident-Very Confident 5 point
9	How often does your teacher explain how long to spend on specific questions in your maths GCSE exam?	Time Spent in Exam - Perceived Frequency	Never-Every Lesson 5 point
9a	Do you think knowing how long you should spend on specific questions in your maths GCSE exam will help you to achieve your target grade?	Time Spent in Exam - Perceived Response Efficacy	Strongly Disagree-Strongly Agree 5 point

9b	How confident do you feel using information from your teacher about how long to spend on specific questions in your maths GCSE exam?	Time Spent in Exam - Perceived Self Efficacy	Not at all Confident-Very Confident 5 point
10	How often does your teacher give you advice on how to spend your time effectively during your maths GCSE exam?	Time Spent in Exam - Perceived Frequency	Never-Every Lesson 5 point
10a	Do you think that knowing how to use your time effectively during your maths GCSE exam will help you to achieve your target grade?	Time Spent in Exam - Perceived Response Efficacy	Strongly Disagree-Strongly Agree 5 point
10b	How confident do you feel using information from your teacher about how to spend your time effectively during your maths GCSE exam?	Time Spent in Exam - Perceived Self Efficacy	Not at all Confident-Very Confident 5 point
11	How often does your teacher explain how you can pick up marks in your maths GCSE exam?	Mark Maximisation - Perceived Frequency	Never-Every Lesson 5 point
11a	Do you think knowing where you can pick marks up in your maths GCSE exam will help you to achieve your target grade?	Mark Maximisation - Perceived Response Efficacy	Strongly Disagree-Strongly Agree 5 point
11b	How confident do you feel using information from your teacher about how to pick up marks in your maths GCSE exam?	Mark Maximisation - Perceived Self Efficacy	Not at all Confident-Very Confident 5 point
12	How often does your teacher tell you that following their advice will help you achieve your target grade in your maths GCSE exam?	Reassurance - Perceived Frequency	Never-Every Lesson 5 point
12a	Do you think that following teacher's advice will help you achieve your target grade in your maths GCSE exam?	Reassurance - Perceived Response Efficacy	Strongly Disagree-Strongly Agree 5 point

12b	How confident do you feel following your teacher's advice in your maths GCSE exam?	Reassurance - Perceived Self Efficacy	Not at all Confident- Very Confident
			5 point

4.5 Cognitive Pretesting of the TEACHE

4.5.1 Introduction

The initial stage of assessing the validity and reliability of data collected from the TEACHE was to conduct cognitive pretesting. Cognitive pretesting is a method used to assess the developmental validity of questionnaire items (Wooley et al., 2004) and is particularly useful for assessing the validity of items for use with children (Woolley et al., 2006). Designing instruments for children can be problematic because assumptions can be made that children will interpret and respond in the same way adult designers intended, which is not always the case due to childrens' limited reading skills and cognitive capacity (Wooley et al., 2004). In order for an item to be developmentally valid, the cognitive demands to read, interpret, and respond to the item must not exceed the cognitive ability of the majority of the target age range (Wooley et al., 2004). This process of cognitive pretesting involves interviewing individuals whilst they read and respond to self-report items to obtain data about item comprehension, retrieval, judgement and response (Jobe & Mingay, 1989).

4.5.2 Method

4.5.2.1 Cognitive Pretesting Procedure

The cognitive pretesting procedure for the current study was adapted from the procedure proposed by Karabenick et al. (2007). Ethical approval was obtained from Liverpool John Moores University ethics committee (REC reference number: 17/EDN/001) (see Appendix F for copy of ethics approval).

Initially, the cognitive validity coding criteria was created which operationalised the intended meaning of each item (see Appendix G for an example of the coding criteria). This coding criteria provided a variety of possible responses which, if congruent with the participants' responses, would be deemed to be indicative that the participant interpreted and responded to the item in the way which was intended by the developer. Semi-structured interviews were conducted with participants from the target population. Six interviews were conducted (three male, three female) with Year 11 students, from two different schools. Interviews lasted between 20-30 minutes and followed the procedure

proposed by Bowen et al. (2004). For each item of the questionnaire, the interviewer was required to:

Ask the child to read the question out loud
Ask the child what the question means, or what the question is trying to find out from them
Ask the child to read the answer options and choose an answer
Ask the child to explain why they have chosen that answer

At the end of the interview, the respondents were briefly asked more generally about the questionnaire to gain further feedback and improvement suggestions from the target population.

Additional questions asked:

Is the questionnaire an appropriate length?
Is the questionnaire easy to understand?
Does the questionnaire cover what the teacher does in lessons?
Are the questions worded appropriately?
Would they feel happy to complete the questionnaire on their own?

4.5.2.2   1st Coder Analysis

The interviews were transcribed verbatim. For ease of coding, responses to each question were transferred into a table along with the coding criteria. For each response, the coder selected as many codes as were interpreted as relevant to the response given. If there were no relevant codes, this was coded as 'no match'. On some occasions, there were responses which did not necessarily fit with the codes provided (this was sometimes through lack of forethought for that interpretation when the codes were initially set; for others it was that the respondent had not been clear enough in their response, but it was apparent they understood the intended meaning of the question). For these occurrences, notes were provided alongside the codes given.

4.5.2.3   Inter-Rater Coding

The standard procedure for cognitive interviewing sets out a quantitative element to assessing interrater reliability (Karabenick et al., 2007; Woolley et al., 2006). However, the current research scaled down this procedure as the time and scope of the research could not extend to this. Instead,

a simpler approach was adopted with a second coder. A fellow doctoral candidate from the same department was recruited to provide a second coding of the interviews. Coder 2 was provided with a brief background to the purpose of the procedure and to the questionnaire. They used the same table which summarised the interviewees' responses to each question and completed the coding in the same format as coder 1. Following the completion of the second coding, responses from coders 1 and 2, for each interviewee, were added to a 'master' table, whereby the codes could be compared (see Appendix H for an example). For each response, the codes were compared and coded as 'Strong Match' (where the codes were exactly the same), 'Match' (where part of the codes matched), or 'No match' (where the coders provided differing codes).

4.5.3   Results

4.5.3.1   Results from the Inter-Rater Coding

The results of the inter-rater coding are provided in Table 4.4 below, showing how well the raters matched in their interpretation of the coding of students' responses to those set out in the coding criteria.

Table 4.4 *Results from Inter-Rater Coding for Cognitive Pretesting Procedure*

Interviewee	Strong Match (%)	Match (%)	No Match (%)
1	55.55	22.22	22.22
2	30	47.5	22.5
3	35.21	39.44	25.35
4	31.94	15.28	52.78
5	27.14	11.43	61.43
6	35	13.33	51.66

Despite a significant level of discrepancy between the inter-rater coding, due to the modified nature of the cognitive pre-testing procedure, these differences did not impede the improvement process of the TEACHE. The process of engaging in the cognitive pretesting and receiving feedback from participants about the items was valuable and resulted in improvements to the items. These are discussed below.

4.5.3.2 Consequences of the Cognitive Pretesting Process

A number of queries arose through the cognitive pre-testing process. When asked generally about the questionnaire, some of the respondents suggested the questionnaire was 'wordy' and repetitive. Several options to improve this were considered. For example, introducing a 'catch all' statement at the top of the questionnaire, highlighting all the questions were related to GCSE maths, thereby reducing some repetition. Alternatively, reordering the questions so that all frequency questions, all perceived self-efficacy questions, and all perceived response efficacy questions were grouped together, was considered as an option. However, after lengthy consideration, these alternatives were rejected, due to the possibility the questions may lose their meaning and participants would be confused. Instead, it was decided that adapting the visual format of the questionnaire may help to 'break up' the questionnaire, which may alleviate these issues. Therefore, grey scaling was used to separate the sub-scales within the categories. Furthermore, there were some groups of questions which were found to be problematic for several respondents, who often misinterpreted them in the same way. For example, the question, "How often does your teacher give you guidance on how you should spend your time effectively in your maths GCSE exam?" was often misinterpreted to be asking how often does your teacher tell you how to spend your time revising. In order to aid interpretation of these items, questions were revised to be more streamlined and explicit. Additionally, where possible, the questions were carefully reworded to streamline them, or made more explicit, if necessary (see Appendix I for a comparison of the original and updated items).

Another issue arose regarding several of the perceived self-efficacy questions. The marking criteria items will be used to highlight the problem.

7. How often does your teacher explain the marking criteria for your maths GCSE exam?	Every lesson	Most lessons	Some lessons	Rarely	Never
8. Do you think knowing the marking criteria for your maths GCSE exam will help you to achieve your target grade?	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
9. How confident do you feel using information from your teacher about the marking criteria in your maths GCSE exam?	Very confident	Confident	Neither	Not confident	Not at all confident

Several students answered question 7 with 'never'. When they came to answering question 9, which assumes their teacher does explain the marking criteria, they found it difficult to answer the question. Therefore, for the perceived self-efficacy questions, an additional answer option was added: "my teacher does not say this".

4.5.3.3   Summary

The cognitive pre-testing procedure provided a useful method to evaluate and refine the TEACHE. Observing how students read and interpreted the items, exploring which items were problematic and receiving general feedback on the questionnaire has improved its use with the target population. This process highlighted which items were not worded efficiently. Indeed, Wooley et al. (2004) propose that items with conditional statements (those which designate a specific time, place, or person in an item) are more cognitively demanding for children to process and therefore recommend keeping the number of conditional statements to a minimum. However, they acknowledge that some concepts cannot be measured without the use of conditional statements, and propose in these instances, item length and vocabulary should be carefully considered to minimise the already significant information-processing demands on respondents (Wooley et al., 2004). This issue was highlighted through the

cognitive interviews, therefore, it was important to improve the vocabulary and reduce item length where possible. In conclusion, the process of conducting the cognitive pre-testing has been valuable and has assisted the improvement of the TEACHE.

4.6 The Reliability and Validity of Data Obtained from the TEACHE

4.6.1 Introduction

Following the development and improvement of the TEACHE from the cognitive pre-testing phase, it was important to assess the reliability and validity of the data obtained from the TEACHE prior to using the TEACHE on a wider scale of exploration with other educational factors. Reliability refers to whether the scores produced by a measure are consistent and reproducible, and validity, to whether test scores provide information relevant to the inferences which will be made from them (Thorndike & Thorndike-Christ, 2013). In addition to evaluating the internal reliability of the data obtained from the TEACHE, theoretically related items from the Motivation and Engagement Scale (Martin, 2012a) and the Questionnaire on Teacher Interactions (Wubbels et al., 1985) were used to assess the convergent validity of data obtained from the TEACHE.

4.6.1.1 *Motivation and Engagement Scale*

The Motivation and Engagement Scale (MES) provides a measurement of motivation and engagement which are considered within the Motivation and Engagement Wheel (Martin, 2012a). The Motivation and Engagement Wheel integrates a number of theoretical perspectives on motivation and engagement into a framework which is both understandable for students, and actionable by educators (Martin, 2012b). The model refers to 'boosters', 'mufflers' and 'guzzlers'. Boosters reflect thoughts and behaviours which enhance motivation and engagement and are subdivided into 'booster thoughts' and 'booster behaviours'. Mufflers are thoughts and behaviours which reflect impeded motivation and engagement, whilst guzzlers are thoughts and behaviours which reduce motivation and engagement. In order to assess convergent validity with motivation and engagement variables, four constructs from the MES were explored: self-belief; uncertain control; persistence; anxiety.

4.6.1.1.1   Self-Belief

The self-belief construct, also termed 'self-efficacy' construct (Liem & Martin, 2012) is defined as "a students' belief and confidence in their ability to understand or do well in their schoolwork, to meet challenges they face, and to perform to the best of their ability" (Martin, 2012b, p. 39). Within Martin's Engagement Wheel, self-belief falls within 'booster thought', which relates to adaptive motivation. The self-belief construct was selected because it should theoretically be related to the perceived self-efficacy items from the TEACHE. In relation to the TEACHE, perceived self-efficacy items are based upon the definition of, "beliefs about one's ability to perform the recommended response to avert the threat" (Witte et al., 1996, p. 320). Therefore, both constructs focus upon students' belief in their ability, and therefore there should be a positive correlation between these items.

4.6.1.1.2   Uncertain Control

The uncertain control construct "assesses students' uncertainty about how to do well or how to avoid doing poorly" (Martin, 2012b, p. 40). Uncertain control falls within the 'muffler' section of the Engagement Wheel and relates to maladaptive motivation. The uncertain control construct was chosen as it should be linked to the perceived response efficacy items from the TEACHE. Perceived response efficacy items within the TEACHE are based upon the definition, "beliefs about the effectiveness of the recommended response in deterring the threat" (Witte et al., 1996, p. 320). Both of these constructs relate to beliefs about whether following certain actions will work and should therefore be negatively correlated.

4.6.1.1.3   Persistence

The persistence construct is defined as "how much students keep trying to work out an answer or to understand a problem even when that problem is difficult or is challenging" (Martin, 2012b, p. 39). Within Martin's Engagement Wheel, persistence falls within 'booster behaviour', which relates to adaptive engagement. The persistence construct was selected because it should be theoretically related to the perceived self-efficacy items from the TEACHE. It would be anticipated that students scoring higher within the persistence construct of the MES, would score higher on the perceived self-efficacy construct of the TEACHE, as both are related to belief in own ability to succeed at a task.

4.6.1.1.4   Anxiety

The anxiety construct "comprises items reflecting feeling nervous and worrying. Feeling nervous is the uneasy or sick feeling students get when they think about their schoolwork, assignments, or exams. Worrying is their fear about not doing very well in their schoolwork, assignments or exams" (Martin, 2012b, p. 39). Anxiety falls within the 'muffler' section of the Engagement Wheel, which relates to maladaptive motivation. The anxiety construct was chosen, as it should be related to the perceived self-efficacy items of the TEACHE. If students have fears about not doing very well in their exams, they are more likely to have lower beliefs in their ability to follow their teacher's recommendations. It would be anticipated that students scoring higher on the anxiety construct of the MES, would score lower on the perceived self-efficacy construct of the TEACHE.

4.6.1.2   The Questionnaire on Teacher Interaction (QTI)

The QTI (Wubbels et al., 1985) was based upon Leary (1957) theory of interpersonal behaviour and was designed as a way to measure the extent to which students' perceive teachers' affiliation with them and their control over classroom processes. It is proposed that these are important factors in explaining the effectiveness of classrooms for student learning (Davis, 2003). The level of control and affiliation teachers have within the classroom, is presented within a model called the 'Teacher Interpersonal Circle'. Research using the Teacher Interpersonal Circle suggests that students who perceive greater levels of control and affiliation from their teacher show greater cognitive achievement, greater engagement and more positive subject-related attitudes than students who perceive their teachers to perform lower on these dimensions (Brekelmans et al., 2000; Den Brok et al., 2004; Wubbels et al., 2006). The major use of the QTI has been to provide feedback to teachers about students' perceptions of their teaching style (Mellor & Moore, 2003). The 'leadership' construct of the QTI was considered to be useful for exploring the construct validity of teachers' frequency of efficacy appeals. Typical behaviours of a teacher receiving a high score on the 'leadership' scale would include: noticing what is happening; organising; giving instructions; setting tasks; determining clear procedures; structuring lessons; explaining; holding students' attention; acting confidently; and showing enthusiasm about their subject. As the leadership construct from the QTI focuses on students'

perceptions of teaching behaviours which are strongly related to being in control of the class and what the students need for their learning, setting tasks and confidently explaining things, it would be expected that there would be a positive correlation between higher levels of the leadership construct from the QTI, and higher levels of perceived frequency on the TEACHE.

4.6.2 Hypotheses

There are eight predicted hypothesised interactions between sub-scales on the TEACHE, with the constructs taken from the MES and QTI:

4.6.2.1 Efficacy Appeal Frequency Hypotheses

Hypothesis 1: There will be a positive relation between frequency of efficacy appeals and teacher classroom leadership. This relation is predicted as it is believed that if the student regards their teacher to hold strong leadership qualities, then they will be more likely to provide information about how to prepare for the exam.

4.6.2.2 Response Efficacy Hypotheses

Hypothesis 2: There will be a positive relation between perceived response efficacy and teacher interaction - leadership. If a student perceives their teacher to hold strong leadership qualities, then they will be more likely to perceive the advice the teacher provides would be helpful.

Hypothesis 3: There will be a negative relation between perceived response efficacy and uncertain control. If students are uncertain about how to do well, then they may be uncertain about whether the responses the teacher recommends will be helpful.

Hypothesis 4: There will be a positive relation between perceived response efficacy and persistence. It is hypothesised that if a student believes that a recommended response will be effective then they would be more likely to persist with it.

4.6.2.3 Self-Efficacy Hypotheses

Hypothesis 5: There will be a positive relation between perceived self-efficacy and self-belief. Both these measures relate to students' levels of self-efficacy (self-efficacy relating to maths tasks, and self-

efficacy regarding preparing for exams), and therefore, there should be a positive relationship between the measures.

Hypothesis 6: There will be a negative relation between perceived self-efficacy and uncertain control. If students are uncertain about how to do well in their maths class, then they may perceive their ability to perform the recommended response as low.

Hypothesis 7: There will be a positive relation between perceived self-efficacy and persistence. If students' believe that they can perform the recommended response, then they would be more likely to persist with it.

Hypothesis 8: There will be a negative relation between perceived self-efficacy and anxiety. This prediction is supposed as it is believed that if a student feels anxious, then they will be less likely to perceive their ability to perform the recommended response will be effective.

4.6.2.4   Relations between TEACHE Scales

It is also hypothesised that there will be significant intercorrelated relations between the sub-scales of the TEACHE. It is hypothesised that there will be a positive relationship between frequency of efficacy appeals and perceived response efficacy, a positive correlation between frequency of efficacy appeals and perceived self-efficacy, and a positive relationship between perceived response efficacy and perceived self-efficacy.

4.6.3   Method

4.6.3.1   Participants

A total of 236 Year 10 students, studying the GCSE programme of study, recruited from two English secondary schools took part in the study. There were 104 males, 113 females, four reported as other and 15 unreported. The mean age of the participants was 14.89, *SD*=.32. Participants' ethnic background was White (83.5%), Asian (4.2%), Other (4.2%), Black (2.5%), Black/White (1.7%), White/Other (0.8%), Not reported (3%).

4.6.3.2 Measures

4.6.3.2.1 The Teachers' Use of Efficacy Appeals in the Classroom prior to High-stake Exams

Following the cognitive pre-testing procedure, the revised TEACHE questionnaire contained 36 items, covering nine domains: Importance of Preparatory Practice; Mark Allocation (two sets of questions); Exam Content; Specific Answers (two sets of questions); Exam Strategy; Revision Tips; Time Spent in Exam (two sets of questions); Mark Maximisation; Reassurance. For each domain there were three items: perceived frequency of the efficacy appeal; perceived response efficacy; and perceived self-efficacy. Items were focused on Maths GCSE and measured on a 5-point Likert scale.

4.6.3.2.2 The Motivation and Engagement Scale

The MES consists of 11 motivation and engagement subscales, reflecting the first order factors from the Motivation and Engagement Wheel. Each construct contains four items, rated on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree) and has strong psychometric properties (Liem & Martin, 2012; Martin et al., 2010). Sixteen items were drawn from the MES to explore the convergent validity of items from the TEACHE. Four items from the following four constructs were used: self-belief; uncertain control; persistence; anxiety. Items were adapted to be domain specific for maths, following Martin's protocol (Martin, 2012b). Example items include: "If I try hard, I believe I can do my work in maths well" (self-belief); "When I don't do so well in my maths class, I'm often not sure how to avoid that happening again" (uncertain control); "If I can't understand my math work at first, I keep going over it until I do" (persistence); "When exams and assignments in math are coming up, I worry a lot" (anxiety).

4.6.3.2.3 The Questionnaire on Teacher Interaction (QTI)

The QTI consists of eight sub-scales, reflecting constructs within the 'Teacher Interpersonal Circle' (Wubbels et al., 1985). The QTI has been shown to demonstrate reliable and valid data (Wubbels & Brekelmans, 2005). Six items were drawn from the 'leadership' construct of the QTI and adopted to be domain specific to the student's math teacher. An example of a leadership item from the QTI is "my maths teacher talks enthusiastically about maths". Items were rated on a 5-point Likert scale ranging from 0 (never) to 4 (always).

4.6.3.3   Procedure

Ethical Approval was obtained from Liverpool John Moores University ethics committee (REC reference number: 17/EDN/001) (see Appendix F for copy of ethics approval). School gatekeepers provided consent for the research to be undertaken on the school premises and they facilitated the opt-out consent process from parents. Parents were provided with information about the study and were provided with two weeks to inform the school if they wished their child not to be involved in the study. Students undertook the paper-based questionnaire within form-time as to avoid missing learning activities. Form teachers were provided with a script to read to students (See Appendix J) which provided instructions for completion of the questionnaire. Questionnaires were presented in one pack, which included an information sheet and consent form for students to provide opt-in consent (see Appendix K for copy of participant material).

4.6.3.4   Analytical Approach

Confirmatory factor analysis (CFA) was conducted in M*plus* v.8 software (L. Muthén & B. Muthén, 2017) to explore the factorial validity of the TEACHE questionnaire. Model fit was established by the root mean square error of approximation (RMSEA), standardized root mean square residual (SRMR), comparative fit index (CFI) and Tucker-Lewis index (TLI). Guidelines suggest that an acceptable fitting model would typically have RMSEA $\leq$ .08 and SRMR values of $\leq$ .05, and CFI and TLI values $\geq$.90 (Marsh et al., 2005; Marsh et al., 2004; Martin et al., 2010). Results from the CFA led to the trimming of the TEACHE items. Following this, it was important to assess the potential hierarchical structure of the data as is common in educational psychology research (Raudenbush & Bryk, 2002). Class-mean-centred data and the class aggregated data were computed using IBM SPSS statistics (version 27) to provide within-level and between-level data for each of the three factors of the TEACHE. The intra-class correlation coefficients (ICC1) were then estimated to explore how much variation in the measure was attributable to the class level (Marsh et al., 2012). Data were then explored within a multi-level CFA model using M*plus* v.8 software (L. Muthén & B. Muthén, 2017) a priori structures were subject to ML-CFA to test whether the presented models fitted the data at the individual and class level (Martin et al., 2010).   The descriptive statistics of the revised TEACHE, QTI and MES were

explored, and scale reliability was assessed using Cronbach's α. CFAs were also conducted on the QTI and MES, which were then added to a measurement model with the revised TEACHE items. Finally, bivariate correlations of this measurement model were used to assess the convergent validity of the TEACHE scales with the predicted congruent constructs from the QTI and MES.

4.6.4   Results

4.6.4.1   *Refining the TEACHE*

4.6.4.1.1   TEACHE Item Descriptive Statistics

Descriptive statistics for each item of the TEACHE are provided in Table 4.5.   Items were within acceptable levels of skewness and kurtosis (between -1.5 and 1.5) (Tabachnick & Fidell, 2013).

Table 4.5 *Descriptive Statistics of TEACHE Items*

Target Factor	Item	Range	Mean	S.D.	Skewness	Kurtosis
Importance of Preparatory Practice Frequency	How often does your teacher tell you that it is important to prepare for your maths GCSE exam?	1-5	3.83	.90	-.81	1.02
Importance of Preparatory Practice Response Efficacy	Do you think if you prepare for your Maths GCSE exam you can achieve your target grade?	1-5	4.21	.88	-1.11	1.03
Importance of Preparatory Practice Self-Efficacy	How confident do you feel preparing for your Maths GCSE exam?	1-5	3.03	1.00	-.47	-.51
Mark Allocation Frequency	How often does your teacher explain how marks are awarded in your maths GCSE exam?	1-5	3.06	1.08	-.06	-.66
Mark Allocation Response Efficacy	Do you think knowing how marks are awarded in your maths GCSE exam will help you to achieve your target grade?	1-5	3.88	.99	-.69	-.06
Mark Allocation Self-Efficacy	How confident do you feel using information from your teacher about how marks are awarded in your maths GCSE exam?	1-5	3.46	.89	-.35	.04
Mark Allocation Frequency	How often does your teacher explain the marking criteria for your maths GCSE exam?	1-5	2.85	1.02	-.11	-.61
Mark Allocation Response Efficacy	Do you think knowing the marking criteria for your maths GCSE exam will help you to achieve your target grade?	1-5	3.68	.97	-.61	.06
Mark Allocation Self-Efficacy	How confident do you feel using information from your teacher about the marking criteria in your maths GCSE exam?	1-5	3.31	.85	-.34	.19

Exam Content Frequency	How often does your teacher say that certain questions or topics may come up on your maths GCSE exam?	1-5	3.88	.98	-.72	.17
Exam Content Response Efficacy	Do you think receiving advice on what questions or topics may come up on your maths GCSE exam will help you to achieve your target grade?	1-5	4.17	.79	-.94	1.16
Exam Content Self-Efficacy	How confident do you feel using information from your teacher on possible exam questions and topics for your maths GCSE exam?	1-5	3.71	.84	-.72	.84
Specific Answers Frequency	How often do you go through practice GCSE questions in your maths class?	1-5	3.38	1.08	-.19	-.65
Specific Answers Response Efficacy	Do you think that practising GCSE questions in your maths class will help you to achieve your target grade?	1-5	4.22	.86	-1.02	.84
Specific Answers Self-Efficacy	How confident do you feel that practising GCSE questions will help you in your maths exam?	1-5	4.09	.92	-.94	.63
Specific Answers Frequency	How often does your teacher explain how you should answer questions if they come up in your maths GCSE exam?	1-5	3.66	.95	-.39	.07
Specific Answers Response Efficacy	Do you think that following teacher's recommended answers will help you to achieve your target grade in your maths GCSE exam?	1-5	3.66	.90	-.49	.12
Specific Answers Self-Efficacy	How confident do you feel reproducing your teacher's recommended answers in your maths GCSE exam?	1-5	3.26	.90	-.25	.08
Exam Strategy Frequency	How often does your teacher give you hints and tips on how to achieve your target grade in your maths GCSE exam?	1-5	3.37	1.06	-.42	-.51

Exam Strategy Response Efficacy	Do you think following teacher's hints and tips will help you achieve your target grade in your maths GCSE exam?	1-5	3.82	.89	-.50	-.07
Exam Strategy Self Efficacy	How confident do you feel following your teacher's hints and tips for your maths GCSE exam?	1-5	3.49	.95	-.34	-.12
Revision Tips Frequency	How often does your teacher give you revision tips for preparing for your maths GCSE exam?	1-5	3.21	1.09	-.31	-.51
Revision Tips Response Efficacy	Do you think following teacher's revision tips will help you to achieve your target grade in your maths GCSE exam?	1-5	3.72	.94	-.78	.50
Revision Tips Self Efficacy	How confident do you feel following your teacher's revision tips when preparing for your maths GCSE exam?	1-5	3.42	.96	-.37	-.32
Time Spent in Exam Frequency (specific answers)	How often does your teacher explain how long to spend on specific questions in your maths GCSE exam?	1-5	2.93	1.15	-.18	-.83
Time Spent in Exam Response (specific answers)	Do you think knowing how long you should spend on specific questions in your maths GCSE exam will help you to achieve your target grade?	1-5	3.69	.99	-.65	.21
Time Spent in Exam Self Efficacy (specific answers?	How confident do you feel using information from your teacher about how long to spend on specific questions in your maths GCSE exam?	1-5	3.32	1.04	-.46	-.24
Time Spent in Exam Frequency (effective time)	How often does your teacher give you advice on how to spend your time effectively during your maths GCSE exam?	1-5	2.90	1.07	-.30	-.72

Time Spent in Exam Response (effective time)	Do you think that knowing how to use your time effectively during your maths GCSE exam will help you to achieve your target grade?	1-5	3.77	.93	-.59	-.02
Time Spent in Exam Self Efficacy (effective time)	How confident do you feel using information from your teacher about how to spend your time effectively during your maths GCSE exam?	1-5	3.38	1.01	-.43	-.44
Mark Maximisation Frequency	How often does your teacher explain how you can pick up marks in your maths GCSE exam?	1-5	3.48	1.06	-.42	-.42
Mark Maximisation Response Efficacy	Do you think knowing where you can pick marks up in your maths GCSE exam will help you to achieve your target grade?	1-5	4.06	.92	-1.00	.98
Mark Maximisation Self Efficacy	How confident do you feel using information from your teacher about how to pick up marks in your maths GCSE exam?	1-5	3.51	1.02	-.59	-.07
Reassurance Frequency	How often does your teacher tell you that following their advice will help you achieve your target grade in your maths GCSE exam?	1-5	3.27	1.06	-.20	-.30
Reassurance Response Efficacy	Do you think that following teacher's advice will help you achieve your target grade in your maths GCSE exam?	1-5	3.71	1.00	-.85	.54
Reassurance Self Efficacy	How confident do you feel following your teacher's advice in your maths GCSE exam?	1-5	3.46	.97	-.41	-.08

4.6.4.1.2   CFA of TEACHE

Confirmatory factor analysis (CFA) was conducted on all the 36 items from the TEACHE. The data proved a poor fit to the model (see Model 1 in table 4.6).

Table 4.6 *Model Fit Statistics of CFA of TEACHE Items*

Model	χ^2 (df)	RMSEA	SRMR	CFI	TLI
1	3441.46 (630)	.138	.282	0	0
2	2593.93 (594)	.119	.27	.289	.246
3	1756.817 (324)	.137	.265	.287	.228
4	279.329 (225)	.032	.057	.963	.954
5	141.96 (114)	.032	.055	.972	.962

In order to improve the model fit, multiple model options were tried (see table 4.6 for model fit statistics for each), including the following options: (2) correlating the residual variance for all items; (3) correlating the residual variance and removing the items which were deemed to be about preparation on a more general level rather than explicit actions recommended from the teacher (items 1-3 (importance of preparatory practice); 19-21 (exam strategy); 34-36 (reassurance)); (4) correlating the residual variance and removing one set of items corresponding to either the frequency, response efficacy or self-efficacy parts of the question, from those domains of instructional practices that contained multiple items (e.g. time spent in exam).

Although model 4 provided acceptable statistics, another model (5) was tried which combined the ideas of model (3) and (4). Within model 5, items about preparation on a more general level and one of the duplicate sets of items from each domain were removed. Table 4.7 shows items which were omitted and retained (items highlighted in grey scale have been retained, those in white, omitted).

Table 4.7 *Items removed and retained for updated TEACHE questionnaire*

Sub-Scale	Item
Importance of Preparatory Practice - Perceived Frequency	How often does your teacher tell you that it is important to prepare for your maths GCSE exam?
Importance of Preparatory Practice - Perceived Response Efficacy	Do you think if you prepare for your Maths GCSE exam you can achieve your target grade?
Importance of Preparatory Practice - Perceived Self Efficacy	How confident do you feel preparing for your Maths GCSE exam?
Mark Allocation - Perceived Frequency	How often does your teacher explain how marks are awarded in your maths GCSE exam?
Mark Allocation – Perceived Response Efficacy	Do you think knowing how marks are awarded in your maths GCSE exam will help you to achieve your target grade?
Mark Allocation – Perceived Self-Efficacy	How confident do you feel using information from your teacher about how marks are awarded in your maths GCSE exam?
Mark Allocation - Perceived Frequency	How often does your teacher explain the marking criteria for your maths GCSE exam?
Mark Allocation – Perceived Response Efficacy	Do you think knowing the marking criteria for your maths GCSE exam will help you to achieve your target grade?
Mark Allocation – Perceived Self-Efficacy	How confident do you feel using information from your teacher about the marking criteria in your maths GCSE exam?
Exam Content - Perceived Frequency	How often does your teacher say that certain questions or topics may come up on your maths GCSE exam?
Exam Content - Perceived Response Efficacy	Do you think receiving advice on what questions or topics may come up on your maths GCSE exam will help you to achieve your target grade?

Exam Content - Perceived Self Efficacy	How confident do you feel using information from your teacher on possible exam questions and topics for your maths GCSE exam?
Specific Answers - Perceived Frequency	How often do you go through practice GCSE questions in your maths class?
Specific Answers - Perceived Response Efficacy	Do you think that practising GCSE questions in your maths class will help you to achieve your target grade?
Specific Answers - Perceived Self Efficacy	How confident do you feel that practising GCSE questions will help you in your maths exam?
Specific Answers - Perceived Frequency	How often does your teacher explain how you should answer questions if they come up in your maths GCSE exam?
Specific Answers - Perceived Response Efficacy	Do you think that following teacher's recommended answers will help you to achieve your target grade in your maths GCSE exam?
Specific Answers - Perceived Self Efficacy	How confident do you feel reproducing your teacher's recommended answers in your maths GCSE exam?
Exam Strategy - Perceived Frequency	How often does your teacher give you hints and tips on how to achieve your target grade in your maths GCSE exam?
Exam Strategy - Perceived Response Efficacy	Do you think following teacher's hints and tips will help you achieve your target grade in your maths GCSE exam?
Exam Strategy - Perceived Self Efficacy	How confident do you feel following your teacher's hints and tips for your maths GCSE exam?
Revision Tips - Perceived Frequency	How often does your teacher give you revision tips for preparing for your maths GCSE exam?
Revision Tips - Perceived Response Efficacy	Do you think following teacher's revision tips will help you to achieve your target grade in your maths GCSE exam?
Revision Tips - Perceived Self Efficacy	How confident do you feel following your teacher's revision tips when preparing for your maths GCSE exam?
Time Spent in Exam - Perceived Frequency	How often does your teacher explain how long to spend on specific questions in your maths GCSE exam?

Time Spent in Exam - Perceived Response Efficacy	Do you think knowing how long you should spend on specific questions in your maths GCSE exam will help you to achieve your target grade?
Time Spent in Exam - Perceived Self Efficacy	How confident do you feel using information from your teacher about how long to spend on specific questions in your maths GCSE exam?
Time Spent in Exam - Perceived Frequency	How often does your teacher give you advice on how to spend your time effectively during your maths GCSE exam?
Time Spent in Exam - Perceived Response Efficacy	Do you think that knowing how to use your time effectively during your maths GCSE exam will help you to achieve your target grade?
Time Spent in Exam - Perceived Self Efficacy	How confident do you feel using information from your teacher about how to spend your time effectively during your maths GCSE exam?
Mark Maximisation - Perceived Frequency	How often does your teacher explain how you can pick up marks in your maths GCSE exam?
Mark Maximisation - Perceived Response Efficacy	Do you think knowing where you can pick marks up in your maths GCSE exam will help you to achieve your target grade?
Mark Maximisation - Perceived Self Efficacy	How confident do you feel using information from your teacher about how to pick up marks in your maths GCSE exam?
Reassurance - Perceived Frequency	How often does your teacher tell you that following their advice will help you achieve your target grade in your maths GCSE exam?
Reassurance - Perceived Response Efficacy	Do you think that following teacher's advice will help you achieve your target grade in your maths GCSE exam?
Reassurance - Perceived Self Efficacy	How confident do you feel following your teacher's advice in your maths GCSE exam?

Note. Greyscale items retained in the 18-item model; White items removed

Model 5 presented an 18-item version, where the residual variance for each frequency, response efficacy and self-efficacy item per instructional practice was correlated. The model showed a good fit to the data and retained the predominant core theoretical elements of the questionnaire. The model had three factors: Factor One: Frequency; Factor Two: Response Efficacy, Factor Three: Self-efficacy. Each factor contained six items. Table 4.8 presents the items within this model and displays the factor loadings for these items.

Table 4.8 *Factor loadings and reliability coefficients of the 18-item TEACHE*

Item	Frequency	Response Efficacy	Self-Efficacy
1 How often does your teacher explain the marking criteria for your maths GCSE exam?	.60		
2 Do you think knowing the marking criteria for your maths GCSE exam will help you to achieve your target grade?		.53	
3 How confident do you feel using information from your teacher about the marking criteria in your maths GCSE exam?			.67
4 How often does your teacher say that certain questions or topics may come up on your maths GCSE exam?	.41		
5 Do you think receiving advice on what questions or topics may come up on your maths GCSE exam will help you to achieve your target grade?		.44	
6 How confident do you feel using information from your teacher on possible exam questions and topics for your maths GCSE exam?			.54
7 How often does your teacher explain how you should answer questions if they come up in your maths GCSE exam?	.60		
8 Do you think that following teacher's recommended answers will help you to achieve your target grade in your maths GCSE exam?		.60	
9 How confident do you feel reproducing your teacher's recommended answers in your maths GCSE exam?			.68
10 How often does your teacher give you revision tips for preparing for your maths GCSE exam?	.77		
11 Do you think following teacher's revision tips will help you to achieve your target grade in your maths GCSE exam?		.67	

12 How confident do you feel following your teacher's revision tips when preparing for your maths GCSE exam?			.67

13 How often does your teacher explain how long to spend on specific questions in your maths GCSE exam?	.72		
14 Do you think knowing how long you should spend on specific questions in your maths GCSE exam will help you to achieve your target grade?		.62	
15 How confident do you feel using information from your teacher about how long to spend on specific questions in your maths GCSE exam?			.65

16 How often does your teacher explain how you can pick up marks in your maths GCSE exam?	.64		
17 Do you think knowing where you can pick marks up in your maths GCSE exam will help you to achieve your target grade?		.62	
18 How confident do you feel using information from your teacher about how to pick up marks in your maths GCSE exam?			.79
α	.78	.73	.81

4.6.4.1.3   Multi-level Modelling of TEACHE data

Often within educational psychology research, variables have a hierarchical structure (Raudenbush & Bryk, 2002). In order to explore the potential wider contextual influences on students' responses to the efficacy appeal questions, the data was also explored at the class-level. This can help to explore how much variance within individual-level responses is explained by the students' classroom (Marsh et al., 2012).

4.6.4.1.3.1   Intra-Class Variance

Initially the intra-class correlation coefficients (ICC1) were estimated. The ICC1 indicates the proportion of total variance that can be attributed to between-class differences, i.e. how much variation in the measure could be attributed to the class level (Marsh et al., 2012). Results from the ICC1 indices help to guide feasible options for multi-level models which would account for the levels

of variance at the individual or the class level. The intra-class correlation coefficients (ICC1) were estimated at 6.7% for efficacy appeal frequency, 6.7% for response efficacy and 0% for self-efficacy.

4.6.4.1.3.2   Multi-Level CFA

Data from the TEACHE was then assessed within a multi-level CFA model using M*plus* v.8 software (Muthén & Muthén, 2017a). Multi-level CFAs can be helpful to estimate the stability of models at individual and group levels simultaneously (Martin et al., 2010). In multi-level CFAs, a priori structures are posited and the CFA tests the ability of the solution presented to fit the data at the individual and class level (Martin et al., 2010).

Firstly, Model 1, was a multi-level model which included Frequency, Response efficacy and Self-efficacy at the within level, and Frequency and Response efficacy at the between level. This model was attempted, based upon the results from the ICC1 (i.e., self-efficacy only modelled at the individual level due to low ICC1 indices; efficacy appeal frequency and response efficacy modelled at both levels due to higher ICC1 indices). However, this model provided poor model fit statistics (see Model 1 in Table 4.9 for model fit statistics).

Secondly, Model 2, was a multi-level model which included Response efficacy and Self efficacy at the within level, and Frequency at the between level. This model was tested due to the theoretical proposition that Frequency items are generally considered a climate construct as they are most often used as communications to the class as a whole (Putwain, Remedios, et al., 2016). Whereas response efficacy and self-efficacy may be considered more individualistic in nature due to the appraisal processes involved. This model provided good model fit statistics (see Model 2 in Table 4.9 for model fit statistics).

Model 3 was a multi-level model which included Frequency, Response efficacy and Self-efficacy at the within level, and just Frequency at the between level. Modelling frequency at the individual level is considered to relate to the amount an individual attends to fear communications from their teacher (relative to their classmates) (Putwain et al., 2022). Therefore, modelling this variable at both levels could be advantageous for understanding the use of and attention to efficacy appeals in the classroom.

This model provided good model fit statistics (see Model 3 in Table 4.9 for model fit statistics). Model 3 was gauged to be the most appropriate model, given its superior model fit statistics and the ability to allow frequency to be modelled at both the class and individual level.

Table 4.9 *Model Fit Statistics of Multi-level CFA of TEACHE Items*

Model	χ^2 (df)	RMSEA	SRMR within	SRMR between	CFI	TLI
1	342.75 (161)	.077	.057	.554	.844	.788
2	62.15 (56)	.024	.046	.066	.989	.984
3	153.96 (123)	.036	.057	.066	.966	.953

4.6.4.2 Descriptive Statistics

Table 4.10 provides the descriptive statistics, internal consistencies, and ICC1 for the QTI, MES and updated TEACHE sub-scales. The 18-item, three factor model of the TEACHE provided acceptable levels of internal reliability for the sub-scales (above .70 is considered acceptable; Cortina (1993). The Cronbach's α for frequency was .78; for response efficacy was .73; and for self-efficacy was .81. The sub-scales for the QTI and MES also had good levels of reliability, as well as acceptable levels of skewness and kurtosis (Tabachnick & Fidell, 2013).

Table 4.10 *Descriptive statistics for the scales from the QTI, MES and 18-item trimmed TEACHE*

Sub-Scale	Range	Mean	S.D.	ICC1	Internal Consistency	Skewness	Kurtosis
Efficacy Appeal Frequency	1-5	3.33	.72	.067	.78	-.23	-.44
Perceived Response Efficacy	1-5	3.82	.61	.067	.73	-.49	.22
Perceived Self-efficacy	1-5	3.42	.69	0	.81	-.43	-.26
Engagement: Self-belief	1-7	5.23	1.08	.032	.80	-.27	-.57
Engagement: Persistence	1-7	4.45	1.16	.029	.79	-.21	-.05
Engagement: Uncertain Control	1-7	4.42	1.34	.006	.82	-.27	-.34
Engagement: Anxiety	1-7	4.66	1.65	.018	.88	-.39	-.73
Teacher Interaction: Leadership	0-4	2.82	.88	.161	.86	-.86	.58

4.6.4.3 Confirmatory Factor Analysis

4.6.4.3.1 CFA of MES

A CFA was conducted on the MES scales. A 4-factor model, with each subscale representing a factor. This model provided an acceptable fit to the data: $\chi^2(98) = 186.60$, $p<.001$, RMSEA=.063, SRMR=.059, CFI=945, and TLI=.933. The factor loadings for the anxiety factor ranged from .67-.86 for anxiety; 52-.80 for persistence; .66-77 for self-belief; 59-.80 for uncertain control.

4.6.4.3.2   CFA of QTI

A one-factor CFA was conducted for the QTI items, the model was deemed an acceptable fit (despite a poor RMSEA): $\chi^2(9) = 29.35$, $p<.001$, RMSEA=.103, SRMR=.035, CFI=958, and TLI=.931. The factor loadings for the QTI items ranged from .58-.84.

4.6.4.3.3   CFA including TEACHE, MES and QTI Scales

To estimate latent bivariate correlations (see Table 4.11), the MES and the QTI were added to the measurement model. A confirmatory factor analysis showed acceptable model fit to the data: $\chi^2(694) = 970.33$, $p<.001$, RMSEA=.044, SRMR=.062, CFI=914, and TLI=.904.

4.6.4.3.4   An Alternative Model

An exploratory structural equation model (ESEM) was conducted (which accounts for cross-loadings for items to load on non-target factors) to explore whether this would improve the model fit statistics. An eight-factor model (three TEACHE factors, four MES factors, one QTI factor) was performed. However, there were several uninterpretable factors produced and it did not provide a better model fit: $\chi^2(470) = 655.72$, $p<.001$, RMSEA=.041, SRMR=.028, CFI=944, and TLI=.907. Therefore, this model was rejected, and the previous CFA model was accepted.

4.6.4.4   Convergent Validity

4.6.4.4.1   Latent Bivariate Correlations

In order to explore the convergent validity of the three TEACHE scales (frequency, response efficacy and self-efficacy) with theoretically related constructs from the MES and QTI, latent bivariate correlations were conducted using the measurement model set out in . Table 4.11 presents the results.

4.6.4.4.2   Supported Hypothesises

Six of the eight predicted hypothesises were supported from the data.

4.6.4.4.2.1   Efficacy Appeal Frequency Hypotheses

Hypothesis 1 was supported as there was a positive correlation between efficacy appeal frequency and teacher interaction ($r = .45$, $p <.001$).

4.6.4.4.2.2   Response Efficacy Hypotheses

Hypothesis 2 was supported as there was a positive correlation between perceived response efficacy and teacher interaction *(r = .33, p <.001)*.

Hypothesis 4 was supported as a positive correlation was found between perceived response efficacy and persistence *(r = .31, p <.001)*.

4.6.4.4.2.3   Self-Efficacy Hypotheses

Hypothesis 5 was supported as perceived self-efficacy was positively correlated with self-belief *(r = .33, p <.001)*.

Hypothesis 6 was supported as there was a negative correlation between perceived self-efficacy and uncertain control *(r = -.23, p <.001)*.

Hypothesis 7 was supported as there was a positive correlation between perceived self-efficacy and persistence *(r = .35, p <.001)*.

4.6.4.4.3   Unsupported Hypothesises

There were two predicted hypothesised relationships which were not supported by the data. Hypothesis 3 was unsupported as perceived response efficacy was not significantly negatively correlated with uncertain control *(r = -.04)* and hypothesis 8 was unsupported as perceived self-efficacy was not significantly negatively correlated with anxiety *(r = -.07)*.

Table 4.11 *Bivariate Correlations of TEACHE, QTI and MES*

	Efficacy Appeal Frequency	Perceived Response Efficacy	Perceived Self Efficacy	Teacher Interaction	Engagement Uncertain Control	Engagement Anxiety	Engagement Persistence	Engagement Self Belief
Efficacy Appeal Frequency	-	.33***	.59***	.45***	-.10	.09	.26***	.16*
Perceived Response Efficacy		-	.50***	.33***	-.04	.07	.31***	.49***
Perceived Self Efficacy			-	.51***	-.23**	-.07	.35***	.33***
Teacher Interaction				-	-.06	-.01	.35***	.29***
Engagement Uncertain Control					-	.65***	-.06	-.21**
Engagement Anxiety						-	.09	.02
Engagement Persistence							-	.52***
Engagement Self Belief								-

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

4.6.4.4.4   Unpredicted Relations

Additionally, there were four significant correlations between the TEACHE subscales and the MES and QTI, which were not predicted. Firstly, there was a significant correlation between perceived response efficacy and self-belief ($r = .49$, $p < .001$). Also, a significant correlation between perceived self-efficacy and teacher leadership *($r = .51$, $p < .001$)* was found. There was a significant correlation between frequency of efficacy appeals and persistence ($r = .26$, $p < .001$). Finally, a significant correlation between efficacy appeal frequency and self-belief was found ($r = .16$, $p < .05$).

4.6.4.4.5   Relations between TEACHE Scales

It was also hypothesised that there would be significant intercorrelated relations between the sub-scales of the TEACHE. It was hypothesised that there would be positive relations between frequency of efficacy appeals and perceived response efficacy; this relationship was supported ($r = .33$, $p < .001$). Additionally, it was hypothesised that there would be a positive relationship between frequency of efficacy appeals and perceived self-efficacy, which was supported ($r = .59$, $p < .001$). It was also hypothesised that there would be a positive relationship between perceived response efficacy and perceived self-efficacy; this relationship was supported ($r = .50$, $p < .001$).

4.6.5   Discussion

Efficacy appeals were identified from observational analysis as a key type of communication that teachers used with students relating to their forthcoming GCSE exams. This study aimed to develop an effective method of measuring efficacy appeals within the GCSE classroom and test whether this method provides reliable and valid data. The TEACHE was designed based upon empirical and theoretical evidence and underwent a rigorous process of development.

4.6.5.1   Trimming of the TEACHE

Following a process of item trimming, an 18-item version of the TEACHE was established, by removing items which asked about exam preparation on a more general level and removing one of the set of questions where there were multiple items for a sub-scale. This 18-item version of the TEACHE consisted of three factors, each containing six items. Items correlated to areas of exam preparation:

mark allocation; exam content; specific answers; revision tips; time spent in exam; mark maximisation. For each item, there was a question relating to each of the three factors: frequency; response efficacy; self-efficacy. This 18-item version underwent confirmatory factor analysis. When residual variance for frequency, response efficacy and self-efficacy items per instructional practice was correlated, the data achieved good model fit statistics. The 18-item version provided acceptable levels of internal reliability for the three factors and all items yielded acceptable factor loadings.

4.6.5.2 *Multi-Level Modelling of the TEACHE*

The intra-class correlation coefficients (ICC1) were estimated at 6.7% for frequency; 6.7% for response efficacy and 0% for self-efficacy. Literature on the use and appraisal of fear appeal communications, typically holds that frequency of fear appeal communications receives class level variance ranging between 19% to 46% (Putwain & Remedios, 2014a, 2014b; Putwain, Remedios, et al., 2016; Putwain, Symes, et al., 2017). Whilst challenge or threat appraisal of fear appeals typically yields between 14% to 23% (Nicholson & Putwain, 2019; Putwain, Nicholson, et al., 2016; Putwain, Remedios, et al., 2016; Putwain, Symes, et al., 2017).

The difference in class-level variance of efficacy appeal frequency compared to those typically found in fear appeal frequency may be due to the relatively small sample size used within the present study; a total of 236 students in 13 classes across two schools. Multi-level models (MLMs) perform less desirably with smaller sample sizes, particularly if the number of clusters is small (McNeish & Stapleton, 2016). There is debate as to appropriate sample sizes, with authors offering differing recommended guidelines. For example, Snijders and Bosker (1993) advise against the use of MLMs if there are less than 10 clusters, whereas Kreft (1996) proposes a minimum of 30 clusters with a cluster size of 30. However, these guidelines are not always adhered to. Dedrick et al. (2009) reviewed 99 education-based studies using MLM and found that 21% had sample sizes which did not meet the recommendation for Kreft's 30/30 guidelines. Indeed, McNeish and Stapleton (2016) acknowledge the difficulty in gaining these sample sizes within educational research, as recruiting large amounts of schools can be exceedingly difficult. McNeish and Stapleton (2016) suggest that even though models with small sample sizes can converge to a solution and produce parametre estimates, these may contain bias which can

affect interpretation. They therefore advise caution, proposing that researchers acknoweldge the potential untrustworthiness present when using MLMs in a small sample size. Study Three will deploy a much larger sample size and therefore ICC1 data will be estimated across a larger sample of schools and classes to provide a more reliable consideration of the multi-level nature of these constructs.

It was anticipated there would be some level of class-level variance of self-efficacy due to previous findings from the exam communication literature estimating academic self-efficacy to have variance ranging from 5% (Putwain & Remedios, 2014a) to 14% (Putwain, Remedios, et al., 2016). However, studies outside of the teacher communication field have found lower degree of class-level variance of academic self-efficacy, for example, Diseth et al. (2012) calculated class-level self-efficacy as 1%. Exploring the ICC1 with a larger sample in Study Three is recommended in order to more accurately assess the potential hierarchical nature of this construct due to the potential issues a small sample size may have on these estimations (McNeish & Stapleton, 2016).

Despite not reaching the best model fit statistics of the models tested, Model 3, which included Frequency, Response efficacy and Self-efficacy at the within level, and just Frequency at the between level, was viewed to be the most appropriate model. This model achieved acceptable model fit statistics, whilst also allowing for the greatest level of future analysis at the next stage of the research, as frequency could be assessed at the class and the individual level. Frequency of exam communications at the individual level relates to students' attention to their teachers communications, relative to those of their classmates (Putwain et al., 2022). Whilst frequency of exam communications at the class level is considered a climate variable, exploring students' assessments of the frequency of teachers' communication within each class. Therefore, modelling efficacy appeal frequency at both of these levels gives rise for further exploration about the nature of these communications and how they affect students, as well as allowing for the exploration of cross-level interaction effects (Bryk & Raudenbush, 1992).

4.6.5.3   Convergent Validity

Bivariate correlations were conducted with theoretically related items from the MES and the QTI in order to explore convergent validity of the TEACHE. Convergent validity looks at whether measures of similar constructs are highly correlated. There were eight hypothesised interactions between sub-scales on the TEACHE, with the MES and QTI were predicted; six of these were supported. Efficacy appeal frequency was positively related to teacher interaction. Response efficacy was positively related to teacher interaction and persistence. Self-efficacy was positively related to self-belief and persistence and negatively related to uncertain control. These will be briefly discussed in turn.

4.6.5.3.1   Efficacy Appeal Frequency

A positive relation was found between efficacy appeal frequency and teacher interaction, indicating that when students perceive their teachers to have strong leadership qualities, they are more likely to attend to their communications about how to prepare for the exam. Research indicates that students' perceptions of positive relationships with their teacher to be associated with their behavioural and motivational engagement (Lee, 2012; Pöysä et al., 2019), meaning they may be more likely to attend to their teachers' messages about exam preparation strategies.

4.6.5.3.2   Response Efficacy

Response efficacy was positively related to teacher interaction, indicating that if a student perceives their teacher to have effective leadership qualities, then they are more likely to consider the advice that the teacher makes to be useful. Indeed, Brown and Woods (2022) systematic review indicated that students' reflections of teacher behaviours which supported them through their GCSEs included: clear instruction and direction on improvement, encouragement and positive comments on work. This is suggestive that these characteristics in a teacher are considered helpful when preparing for exams and may strengthen students' perceptions of the effectiveness of their recommendations.

There was also a positive relation between response efficacy and persistence. If a student perceives the teachers' recommended response in relation to preparing for their exams as effective, then they are more likely to persist with this action. Research indicates that teachers' use of preparation

strategies can boost students' confidence (Daly et al., 2012) which would be expected to increase their engagement with the intended action.

4.6.5.3.3   Self-Efficacy

Self-efficacy was positively related to self-belief; both of these constructs relate to students' perceptions of their ability (self-efficacy in relation to preparing for exams, and self-belief relating to ability to succeed in maths tasks). As both relate to students' competence beliefs within the maths domain, their correlation would be expected (Ferla et al., 2009). There was also a positive relation found between self-efficacy and persistence, indicating that if a student believes that they can perform the recommended response then they would be more likely to persist with it. This is reflective of findings in the wider motivational literature; with self-efficacy being found to demonstrate convergent validity with persistence (Bandura, 1997) and is suggested to play a causal role in motivation (Zimmerman, 2000). When exploring relations between the MES subscales, self-belief (akin to self-efficacy) and persistence are found to be strongly positively correlated ($r = .68$) (Martin, 2012b).

Self-efficacy was negatively related to uncertain control, suggesting that if students are uncertain about how to do well in their maths class, they may perceive their ability to perform the recommended response as low. When the sub-scales of the MES have been explored for correlations, self-belief (akin to self-efficacy) and uncertain control are found to be negatively correlated ($r = -.34$) (Martin, 2012b) providing support for the ascertain that these constructs would be negatively related.

4.6.5.3.4   Unsupported Hypothesises

There were two hypothesised relationships which were unsupported. Firstly, perceived response efficacy was not significantly negatively related to uncertain control. Although both sets of items relate to the process of how to attain success, the uncertain control items are on a much broader level, relating to being generally unsure how to succeed, whereas the response efficacy items are very specific in relation to whether certain methods will be effective. This specific versus global focus of these constructs may therefore account for the non-significant relationship between the sub-scales.

Secondly, perceived self-efficacy was not significantly negatively related to anxiety. It was anticipated that there would be a negative relationship between these sub-scales; if a student did not feel capable of performing a recommended response, then they would have higher levels of anxiety about maths study and exams. Indeed, previous research has found negative relationships between academic self-efficacy and test anxiety (Pintrich & De Groot, 1990; Preiss et al., 2006; Zimmerman & Bandura, 1994). However, this inconsistent finding may relate to the distinction of self-efficacy of performing the recommended response, rather than a students' global or maths self-efficacy. Thereby, this may provide support for the specific nature of the self-efficacy items being focused on feelings of competence relating to test preparation strategies. Alternatively, these findings may simply represent an anomaly in this specific set of data collected.

4.6.5.3.5   Unpredicted Relations

There were four significant interactions between the TEACHE, with the MES and QTI, which were not hypothesised. Firstly, efficacy appeal frequency was positively related to persistence and self-belief. The items within the Frequency subscale are envisaged to be delivered as motivational communications; delivering an action for students to follow to support the achievement of their target grade. Therefore, it is a logical assertion that the use of these messages would increase positive elements of student engagement such as persistence and self-belief, as this is the intention of these communications. Additionally, a significant relationship between perceived response efficacy and self-belief was found. Self-belief is defined within the MES as the level of 'students' beliefs and confidence in their ability to do well within their learning' (Liem & Martin, 2012 p. 5). Therefore, a significant relationship between these variables is unsurprising given the significant interaction found between response efficacy and self-efficacy from the TEACHE scale. Finally, there was a significant relationship between perceived self-efficacy and teacher leadership. Previous research supports a positive relationship between teacher-student interactions and students' self-efficacy (Li & Yang, 2021). This finding may be substantiated by considering the impact of social persuasion upon self-efficacy. Bandura (1997) asserts social persuasion as one of the four ways in which self-efficacy can be enhanced. Within the current context, social persuasion relates to respondents feeling assured that they can succeed by

another. Teachers' verbal persuasions to students, emphasising positive feedback on students' effort have been related to increased levels of self-efficacy in students (Schunk, 1984; Won et al., 2017). However, these persuasions must come from a credible source; persuaders who are viewed as credible, knowledgeable and competent are more powerful in enhancing the self-efficacy of listeners (Bandura, 1997). Students' perception of the credibility of their teachers, has been found to be a mediating factor when considering the impact of teachers' social persuasions on their academic self-efficacy beliefs (Won et al., 2017).

4.6.5.3.6   Summary

As most of the expected relationships were found be significant, this suggests the TEACHE has good convergent validity, providing support for it being an effective way to measure the constructs of efficacy appeal frequency, response efficacy and self-efficacy.

4.7   Chapter Summary

Study Two aimed to charter the development and refinement of the Teacher's Use of Efficacy Appeals within the Classroom prior to High-stakes Examinations questionnaire and explore its psychometric properties. The TEACHE was developed in line with theoretical and empirical evidence, and underwent a cognitive pre-testing process, which helped to refine the items of the questionnaire in line with feedback from the target audience. Following the improvement of items, the TEACHE was used, alongside other related educational scales, across a larger sample, to explore the reliability and validity of data obtained from the TEACHE. Following confirmatory factor analysis, the TEACHE items were refined from 36 to 18 items, containing three factors; frequency, perceived response efficacy, perceived self-efficacy. The 18-item version displayed good psychometric properties in relation to internal reliability and convergent validity. Therefore, the 18-item version of the TEACHE can now be used to explore the impact of efficacy appeals within the classroom in relation to other educational variables to explore the impact the appraisal of these communications will have.

5 Chapter Five: Study Three: Fear and Efficacy Appeals in the Classroom: Relationships with Engagement and Teacher-Student Relationship

5.1 Chapter Overview

Study Two (see Chapter 4) detailed the conceptualisation of efficacy appeals within the educational setting and developed a questionnaire to be able to measure teachers' use of these communications as well as how students appraised these communications. Data from the questionnaire demonstrated good psychometric properties in relation to internal reliability and convergent validity. Study Three sets out to use this questionnaire to explore how teachers' use of efficacy appeals and students' appraisal of these communications relate to other educational variables.

5.2 Introduction

A body of research has explored how teachers use fear appeals in the educational field, how students interpret these messages, and the variety of ways in which students' appraisals of these communications can influence educational outcomes (see Putwain et al., 2021 for review). However, little research to date has explored the effects of teachers' efficacy communications and the educational impact of how students interpret these messages, despite the important influence these communications have upon the appraisal process according to the Extended Parallel Process Model (Witte & Allen, 2000). This study aims to address this gap, along with considering the impact of wider classroom factors which may affect the use of, and appraisal, of these communications, which have also been neglected within previous literature. An overview of the literature on teachers' fear appeal communications within the educational field is provided, followed by discussion of how wider classroom factors may be important to study when considering fear and efficacy appeals, finally the rationale and research aims for the present study are outlined.

5.2.1   Efficacy Appeals in Education

Chapter 4 ([see section 4.2.2](#)) presents a comprehensive overview of the research to date on how efficacy appeals have been explored within the education field and the current conceptualisation of this construct.

5.2.2   Fear Appeals in Education

5.2.2.1   A Developing Concept

When the concept of fear appeals was initially translated into the educational literature, these communications were conceptualised as anti-social behaviour-alteration techniques (BATs) and were situated within research exploring compliance-gaining strategies (Sprinkle et al., 2006). Research on compliance-gaining strategies proposes that teachers use the power dynamic in the classroom to attempt to change students' attitudes, beliefs, or behaviours. Thereby suggesting that fear appeals may be used to "demonstrate the negative consequences students may face if they fail to comply with the teachers' request or desired behaviour change" (Sprinkle et al., 2006, p. 390). Within this preliminary piece of research, Sprinkle and colleagues conceptualised fear appeals as threats pertaining to poor grades in their course, negative views from others, and future negative consequences such as loss of financial aid or scholarship, or disqualification from future jobs.

Putwain and Roberts (2009) further developed the notion of fear appeals by extending the concept to teachers' attempts to manipulate students' behaviour by highlighting the negative consequences of particular actions, or courses of behaviour. They also establish the concept of appraisal of these communications being important in their impact for students. They draw upon the transactional model of anxiety (Zeidner, 1998), which proposes that the mere presence of a stressful event is not enough on its own to provoke the perception of threat, additional conditions such as predisposition to anxiety, self-efficacy and ability to cope are relevant in whether a stressful event is actually seen as threatening. Based upon this premise, it is suggested that students will differ in their appraisal of these messages as threatening based upon individual characteristics (Putwain & Roberts, 2009).

Based upon this conceptualisation, Putwain and Roberts (2009) developed an initial iteration of a measure of fear appeals (entitled the TUFAQ) which considered five domains and assessed the frequency of teachers' communications and students' appraisal for each one. However, as items did not perform as well as expected, alterations were made, including dropping items measuring reassurance, and ensuring that subject specificity was included in all questions (so that appraisals were being considered for one subject and teacher). Maths was chosen as the domain, due to the requirement that obtaining a pass grade in this subject is needed to access future educational and occupations opportunities. Therefore, the revised edition of this measure included factors of frequency of fear appeals, frequency of timing reminders and perceived threat response to fear appeals. Domains within these factors included aspects of: importance for accessing future education or obtaining a good job; failure; and requirements for certain pass grades.

Putwain and Symes (2011b) expanded this conceptualisation by proposing fear appeals to be attempts to motivate students by highlighting the possible threats to student's self-worth and/or educational and occupational aspirations arising from failure. They proposes that fear appeals have two salient characteristics: (1) they orientate students toward the demonstration, rather than the development of competence (2) they focus on failure, rather than achievement outcomes.

5.2.2.1.1   Extension to Include Challenge Appraisal

Following on from unexpected findings from research utilising the TUFAQ which suggested that some students experienced positive outcomes related to fear appeal communications (Putwain & Symes, 2011a, 2011b), Putwain and Symes (2014) extended the conceptualisation to include the notion of challenge appraisal, which was thought to take place when a student felt confident in their ability to perform behaviours which would result in it being likely to avoid failure. The consideration that fear appeals can be appraised in different ways was based upon reflections from the Transactional Model of Stress and Coping (Folkman, 2008) which posits that responses to threat rely on cognitive judgements about the situation and one's ability to respond to the situation. A primary appraisal is engaged where an individual considers whether they believe the situation to be stressful (i.e., requires action on part of the person), if they do then a secondary appraisal phase is engaged whereby the

individual considers their ability to cope and respond to the stressful situation. If they believe they can, then a challenge appraisal will be activated; if they believe they cannot then a threat appraisal is activated (Putwain & Symes, 2014). This updated model explains why some students experienced positive outcomes from fear appeal communications, and others did not. In a challenge appraisal, the fear appeal is viewed as an opportunity for personal growth and to obtain rewards and is associated with positive emotions and behaviour intentions, such as making an effort. Whereas when a student experiences a threat appraisal, the fear appeal is interpreted as a risk to their self-worth as failure is anticipated, and can be accompanied by negative emotions and self-worth protection strategies, such as withdrawal of effort (Putwain, Nicholson, et al., 2016).

This conceptual development led to the revised TUFAQ established by Putwain and Symes (2014) which contained: three items measuring frequency of timing communications (how close exams were); three items measuring frequency of consequence communications (negative impact of not passing exams); four items measuring students' feelings of threat response (conceptualised through the term worry) and four items measuring students' challenge response (conceptualised via words such as inspired, make an effort, motivated). Challenge and threat response were examined within the domains of: importance for accessing future education or obtaining a good job; failure; and requirements for certain pass grades.

5.2.2.1.2 Disregard/Irrelevant Appraisal

Although threat and challenge appraisals have been the chief focus, it is theoretically posited that some students will respond with a disregard appraisal (later retitled irrelevant appraisal; Putwain et al., 2021) whereby a student does not engage in a primary appraisal and therefore will not progress to the secondary appraisal level (Putwain, Remedios, et al., 2016). This appraisal is assumed if a student does not require the grade in their exam for future educational or career plans, or potentially in rare cases whereby a student feels so highly competent in a subject that there is no question as to whether they can achieve the proposed outcome of the message (Putwain et al., 2021).

Despite being considered within the fear appeal appraisal model, only a few studies have explored this type of appraisal. Instruments used to measure fear appeal appraisals have not included items to measure irrelevant evaluations. Instead, alternative methodologies such as vignettes have been deployed. One study found that an irrelevant appraisal of a fear appeal was most likely when a fictional student was reported to have low subjective task value and low expectancy of success (Putwain & Symes, 2016). Another, which deployed hypothetical loss (i.e., fear appeal) or gain framed messages found that students who reported low attainment-value had increased irrelevant appraisal, but this was unrelated to academic self-efficacy. Although these findings are in line with theory, the lack of naturalistic empirical research exploring the irrelevant appraisal means that this part of the theory lacks thorough supporting evidence and conclusions should be viewed tentatively.

5.2.2.1.3   *Value-Promoting Messages*

In a slight side-step from previous research, Putwain and Symes (2016) proposed a reconceptualization of fear appeals into a broader concept into 'value-promoting messages' (VPM). Defining VPMs as messages used by teachers which communicate the value and importance of upcoming exams with the aim to encourage students to adopt learning and study behaviours which would avoid failure and/or achieve success. VPMs which focus on the consequence of success are considered to be gain-framed; whereas those which target the consequence of failure are loss-framed. Fear appeals therefore, would be considered a loss-framed VPM.

Several studies explored potential outcomes in light of this conceptualisation. Putwain and Symes (2016) utilised a vignette methodology in which students were asked to rate the anticipated levels of challenge, threat, and disregard appraisal of fictional students. The fictional students were described in terms of their level of subjective task-value (high or low), their expectancy of success (high or low), and whether their teachers communicated a gain-framed or loss-framed message to them. It was anticipated that a challenge appraisal would be more likely following a gain-framed message. However, message frame was not found to be related to a challenge appraisal. Instead, a challenge appraisal was found to be more likely when subjective task value and expectancy of success were high no matter which type of message teachers were using. As predicted, the effect of loss-framed messages was

found to be related to threat appraisal, with a loss-framed message having a direct and additive effect on threat appraisal for fictional students portrayed as having a high subjective task-value and low expectancy of success.

In a more naturalistic methodology, Symes and Putwain (2016) explored how students appraised a hypothetical loss or gain framed message, depending upon their levels of self-reported attainment value and academic self-efficacy. Although relationships were found between students' attainment value and academic self-efficacy and their appraisal, message frame was not found to moderate these relationships. Thus leaving the researchers to conclude that message frame is not a key component within VPM appraisal. Instead, students' motivational and efficacy beliefs are more significant predictors, with Putwain et al. (2021) speculating that achieving success and avoiding failure are seen by students as different sides of the same coin. However, the methodology of these studies may account for differing findings than those hypothesised. For example, when teachers' actual use of gain and loss-framed messages were reported by students, it was found that gain framed messages showed stronger relations with student motivation compared to loss-framed messages (Santana-Monagas, Putwain, et al., 2022). Indeed, as demonstrated from the observational analysis in Study One, real-life communication from teachers regarding forthcoming exams are often presented in a more complex and nuanced manner with elements such as tone and dynamics involved within simple utterances which are likely to impact upon interpretation of these messages (Edwards et al., 2017).

5.2.2.1.4 Fear Appeals versus Timing Reminders
A further development to the conceptualisation of fear appeals within the education setting comes when considering the distinction between fear appeals and timing reminders. The potential difference in these concepts was initially questioned when empirical findings suggested that appraisals were found to be related to more frequent fear appeals focused upon the consequences of failure, but not for those pertaining to timing reminders; leading the authors to question whether they should be considered as the same type of message (Putwain & Remedios, 2014a; Putwain, Remedios, et al., 2016).

Putwain and von der Embse (2018) discuss the distinction between these types of communications, proposing that fear appeals are persuasive messages which highlight how failure can result in negative consequences for future educational attainment, occupational aspirations, students' self-worth, or social significances such as peers and parents. Whereas timing reminders, which notify students of the timing of forthcoming exams, or the amount of preparation time left, are better conceptualised as a self-regulatory behaviour prompt, in which indication of time until exam may emphasise a students' need to set goals and plan how to achieve this. Therefore, these self-regulatory prompts should be distinct from fear appeals as they do not draw upon the high-value and high-cost concept.

Indeed, in the most recent version of the TUFAQ, Putwain et al. (2019b) omit timing reminders entirely, reasoning that they should be considered as a different construct to fear appeals as they do not produce a value content or focus on failure; based on the Putwain and von der Embse (2018) conceptualisation that they should be considered as a regulatory prompt.

In addition to the removal of timing reminders, Putwain et al. (2019b) further revise the TUFAQ by providing a greater balance between emotional and cognitive/behavioural elements for challenge and threat appraisal, highlighting that the previous edition of the TUFAQ (Putwain & Symes, 2014) had threat items biased toward emotion, and challenge items biased toward cognition/behaviour. Their revised measure provided equal levels of emotion and cognitive/behavioural items for the challenge and threat appraisal sub-scales. The notion that fear appeals are appraised based upon their perceived personal significance and capacity for responding effectively to demands is maintained, along with the conception that a challenge appraisal is accompanied by positive emotions (e.g., optimism) and approach-orientated behaviours and cognitions (e.g., intention to engage in actions likely to facilitate success) and that a threat appraisal is accompanied by negative emotions (e.g., anxiety) and avoidance-orientated behaviours and cognitions (e.g., devaluing achievement or withdrawal of effort) (Putwain et al., 2019b) or the down-regulation of utility or achievement value in order to reduce the level of threat (Putwain et al., 2021).

Alongside a shift away from measuring timing reminder communications, Putwain et al. (2019b) also distinctly position fear appeals as a type of utility-value message. Typically, these messages highlight how a task/lesson/subject is relevant for obtaining an outcome separate from the task itself, characteristically relating to an individual's future plans (Wigfield & Eccles, 2000). This is furthered by the proposition that the fear appeal definition involves messages which focus on the utility value of avoiding failures (e.g., higher paid work) alongside communications about what behaviours contribute to failure (e.g., not preparing for exams) and/or how failure can be avoided (e.g., effort preparing for exams). This conceptualisation aligns with the more traditional fear appeal conceptualisation from the health literature, whereby fear appeals are viewed as persuasive messages highlighting the negative consequences of a particular course of action and how that negative course of action could be avoided with another course of actions (Witte et al., 1996). Contrarily, however, this latter part of the definition is, theoretically speaking, more reasonably aligned with a response efficacy communication, and is not included in the updated TUFAQ measure.

Indeed, throughout the development of the conceptualisation of fear appeal communications, there has been a presence of considerations of what could be reasoned as response and self-efficacy constructs within discussion of fear appeals definitions. For example, Putwain, Nicholson, et al. (2016) define fear appeals as a motivational tactic used by teachers to try and elicit an adaptive fear which will result in students making greater efforts to avoid failure by preparing thoroughly for forthcoming exams. Also stating that they should be viewed as a tactic used by teachers to encourage or persuade students to invest time and effort in preparing for forthcoming tests by highlighting the value to the student of success or failure. Additionally, Putwain and Symes (2014) discuss the extension of the definition of fear appeal communications to include commentary from teachers about behaviours which may increase the likelihood of failure (such as poor behaviour in class and lack of effort put into exam revision) and communications about behaviours which will reduce the likelihood of failure (such as effort placed in exam preparation and concentrating during lessons). This latter conceptualisation also sits further in line with efficacy communications. Despite outlining that these distinctions should be included within the conceptualisation of fear appeals, the updated TUFAQ did not include items to

measure this, and therefore have not been empirically explored in relation to the fear appeal appraisal model. The consideration throughout the literature indicates that efficacy appeals are seen as important within the fear appeal appraisal process but have not been as fully developed within the educational fear appeal theory.

5.2.2.2 *The Use of Fear Appeal Communications*

Fear appeals may be communicated to students via classroom teachers or school leaders (Putwain & Symes, 2014) and may be discursive in nature, made via instructional dialogue with students (Banks & Smyth, 2015) (also see section 3.5.1.1.2) taking place in lessons, assemblies and other learning-based meetings with students (Putwain et al., 2021). Fear appeal communications have been found to be widely endorsed by teachers. In a study exploring teachers' views of these messages, Putwain and Roberts (2012) found that 81.6% of teachers agreed or strongly agreed students should be reminded that they would fail if they did not thoroughly prepare for their exams; 76.5% agreed or strongly agreed students should be made aware that progression to further education would not be possible following failure, whilst only 36.3% agreed or strongly agreed students should be told they will not get a good job if they failed exams. These results indicate that there are differences in teachers' views about the use of these communications. Fear appeals have been found to be made more frequently in higher stakes subjects such as maths, compared to lower stakes subjects such as drama (Putwain, Remedios, et al., 2016).

5.2.2.2.1 Teacher-Reported vs Student-Reported

Numerous studies have found students to be reliable reporters of teachers' fear appeal communications (Putwain, Remedios, et al., 2016; Putwain, Symes, et al., 2017; Putwain et al., 2021; Symes et al., 2015). Exploring ICC2 figures of students' reported fear appeal frequency allows the establishment of the reliability of reports of these communications. The aforementioned studies report ICC2 figures ranging from .85-.95., indicating the homogeneity from reporting sources (Lüdtke et al., 2006) in relation to fear appeal communications.

Putwain, Remedios, et al. (2016) compared student-reported and teacher-reported use of fear appeals. Students' reports of fear appeal communications were aggregated at the classroom level; the ICC2 values indicated that students within classes were highly reliable in reporting frequency of these communications (.85 for consequence reminders; .95 for timing reminders). Students' frequency of fear appeal responses were aggregated per class and an average of 2.11 (scale ranging from 1-5) was reported; teacher-reported fear appeals was averaged at 2.26 on the same scale. Although the correlations between teacher-reported and student-reported fear appeals were significant and positive, there was only a small correlation found for consequence reminders (r=.37) and medium for timing reminders (r=.46). This is an interesting finding, given the strong level of reliability from students within the class about use of fear appeals, potentially indicating that teachers and students do not agree about the number of fear appeal communications the teacher makes. Putwain and colleagues (2016) posit that this does not necessarily indicate that teachers' reports are inaccurate or unreliable; but that they have a different perspective. The differences found here in relation to fear appeal frequency are in conjunction with those found in studies exploring differences between teacher and student perceptions of other educational variables, such as teacher control and classroom management (see Brok et al., 2006).

5.2.2.2.2 *Factors Affecting Teachers' use of Fear Appeal Communications*

As it has been established that there are differences between teachers in their use of fear appeal communications (Putwain, Remedios, et al., 2016; Putwain & Roberts, 2012); it is useful to consider why these variations may exist. Potential reasons have been categorised below in relation to the students, the teacher, and wider pressures.

5.2.2.2.2.1 The Students

Teachers may use fear appeals as a 'shock' tactic in order to encourage students to in engage with their studies (Putwain, 2009a; Putwain et al., 2021). This is supported by the finding that teachers' indicate greater use of fear appeal communications when they believe students' performance on the exam is paramount (Putwain & von der Embse, 2018) and when they believe these messages will be motivating for students (Putwain & Roberts, 2012). There is mixed findings in relation to teachers' use

of messages in regard to perceived perception of these communications. With some results indicating teachers are more likely to use fear appeals if they think students will view the message as threatening (Putwain & von der Embse, 2018), whilst others suggesting teachers are less likely to endorse the use of fear appeals if they think students will find these communications anxiety provoking (Putwain & Roberts, 2012). This discrepancy may be related to differences in sample population; with Putwain and von der Embse (2018) utilising responses from both primary and secondary teachers and Putwain and Roberts (2012) sample only including secondary school teachers. Additionally, it could be considered that the different phrases of 'worry' versus 'anxiety' utilised in the research may induce differing levels of acceptability to teachers. Worry may be considered a more acceptable feeling to induce in students, whereas anxiety may be more severe, particulary given the ascertion that worry relates to more adaptive coping strategies, whilst anxiety is considered maladpative (Davey et al., 1992). An alternative explanation is that due to the methodoligical procedures of these studies being in questionnaire form it did not allow for enough of an understanding of how teachers may use these types of communications diversly. Indeed, when interviewed about how they talk to students about their upcoming exams, teachers commented upon their targeted use of different types of language depending upon which student they are speaking to, stating they consider the best tactic for the student (Flintcroft et al., 2017). This suggests teachers engage in strategic use of language to best motivate students.

Class-level factors have also found to be related to teachers' use of fear appeal communications. Teachers have been found to use fear appeals more frequently in lower achieving classes (Putwain et al., 2022) and those where the teacher perceives class-level behavioural engagement to be low (Putwain, Nakhla, et al., 2017). Therefore, it could be suggested that fear appeal communications could be considered as attempts from teachers to use more controlling instructional approaches to motivate students who they perceive to be more disengaged (Putwain & Roberts, 2012; Putwain et al., 2021). This assertion is supported by findings from Study One in which the sub-theme of 'Adopting a Controlling Style' (see section 3.5.1.1) emerged to portray the finding that teachers were seen to be

communicating about exams in a manner to keep students on task or improve their engagement in the lesson.

Interestingly, frequency of fear appeals communication has only been found to be related to levels of behavioural engagement, not emotional engagement (Putwain, Nakhla, et al., 2017). These findings reflect research from the wider literature which indicates that teachers use more coercive behaviours when they perceive students to be less behaviourally engaged (Skinner & Belmont, 1993). The authors posit that this difference may be related to the distinction between the constructs of behavioural and emotional engagement; with overt behavioural engagement easier to judge for teachers, whereas emotional engagement, being a more private experience, is harder for teachers to accurately assess (Urhahne et al., 2011). Indeed, one study found that teacher reports of student emotional engagement was more highly correlated with student self-reported behavioural engagement that their self-reported emotional engagement (Skinner & Belmont, 1993), indicating teachers utilise students' behavioural cues to assess their emotional engagement. However, a plausible alternative may be that teachers may be more likely to make other types of communications, such as efficacy appeals, or communications with a more reassuring tone if they view that students' levels of emotional engagement is low. Notably, Skinner and Belmont (1993) found that when student behavioural engagement was controlled for, teachers responded to students expressing more negative emotions with increased levels of autonomy support and engaged in more coercive practices when they perceived behavioural engagement to be low.

5.2.2.2.2.2 The Teacher

Teachers' levels of efficacy in their ability to engage their students also appears relevant in their use of these communications, with evidence suggesting that fear appeals are less likely to be used when teachers feel more efficacious in their ability to engage the class (Embse, 2018). However, duration of teaching experience has not found to be related to use of fear appeal communications (Putwain & Roberts, 2012), so experience itself does not appear to be a key factor.

In an Australian sample of teachers, Belcher et al. (2022) found teachers' levels of anxiety to be the only variable significantly associated with their use of fear appeal communications, with higher levels of anxiety related to increased use of fear appeals. Contrary to hypotheses, teachers' years of experience, self-efficacy for teaching, levels of stress, depression and burnout were not found to be significantly related to their use of fear appeal communications. When these variables were added into a linear regression model, the model was only found to account for 13.1% of the variance of fear appeal use (with anxiety and teacher self-efficacy being the only significant positive predictors). This indicates that there are likely to be additional unexplored factors which are relevant to understanding why teachers may make more or less fear appeal communications. The authors propose that other factors such as personality, the subject the teacher teaches, school type and culture may all warrant further investigation.

5.2.2.2.2.3   Wider Pressures

Teachers reporting higher degree of stress from external sources have been found to be more likely to use fear appeal communications (Von der Embse et al., 2017). Putwain and Roberts (2012) considered that schools' performance may be related to frequency of fear appeal communications, due to increased pressure felt to improve student's exam performance in under-performing schools. However, no differences were found when looking at OFSTED grade of the teachers' schools. This finding may reflect that consideration that schools who are performing above average may already be immersed within a culture of increased fear appeal use and/or feel that the use of these communications is required to maintaining performance. However, when asked about their use of fear appeal communications, teachers indicated that they did not wish to pass on their own pressures relating from OFSTED or measures such as performance-related pay onto students (Flintcroft et al., 2017).

5.2.2.3   Antecedents of Fear Appeal Appraisal

Based upon the principle of universalism without uniformity (see Soenens et al., 2015) the mere presentation of a stimulus, such as a teacher fear appeal communication, does not mean that all those who hear the communication will respond in the same way. Individual differences in students such as

dispositions, interests, goals and prior educational experiences impact how students respond to fear appeal communications (Putwain et al., 2019b). To date, a number of potential attributing variables have been explored which may affect the appraisal process of these communications.

As previously discussed, Putwain and Symes (2014) appraisal model, based upon the Transactional Model of Coping and Stress (see Folkman, 2008) and Expectancy-value theory (see Wigfield & Eccles, 2000) set forth the importance of whether an individual believes the situation to be personally relevant (primary appraisal), and whether they think they can respond effectively to the situation (secondary appraisal). When considering these appraisals, the authors naturally turned to the variables of perceived value for the primary appraisal and self-efficacy for the secondary appraisal. Therefore, when exploring antecedents of fear appeal appraisals, these variables have received the most prevalent empirical attention.

5.2.2.3.1   *Self-Efficacy and Perceived Value*

The expectancy-value theory posits that students' levels of expectation of success (self-efficacy) and the extent to which they value the task (perceived value) are important indictors of students' achievement-related choices (Wigfield & Eccles, 2000). These variables have been utilised to explore whether they are pertinent antecedents of students' fear appeal appraisal processes. Academic self-efficacy has been found to be a predictor of fear appeal appraisal, with higher levels of academic self-efficacy predicting a challenge appraisal (Putwain & Symes, 2014; Putwain et al., 2015) and lower levels relating to threat appraisal (Putwain & Remedios, 2014b; Putwain & Symes, 2014; Putwain et al., 2015).

Wigfield and Eccles (1992) posit a variety of types of perceived task value. Attainment value is considered to be related to the importance of doing well on a task for one's sense of self. Utility value relates to whether a task is instrumental for reaching future goals, and intrinsic value considers the enjoyment gained from engaging in an activity or the interest an individual has in a subject (Wigfield & Eccles, 1992). Varying elements of perceived value have been examined in relation to fear appeal appraisal. Higher levels of attainment value have been found to be related to greater challenge appraisal (Putwain, Symes, et al., 2016; Putwain et al., 2015), with lower levels associated with higher threat

appraisal (Putwain et al., 2015). Higher levels of utility value have been found to be related to stronger threat appraisal, but unrelated to challenge appraisal (Putwain, Symes, et al., 2016). Whilst intrinsic value has not been found to be a significant predictor of either threat or challenge appraisal (Putwain, Symes, et al., 2016). When exploring self-efficacy and perceived value at the individual and class level, Putwain and Remedios (2014a) found self-efficacy to be an individual predictor of threat, but perceived value was not; instead this was considered to be a contextual predictor of threat appraisal, with classes comprising of lower intrinsic and higher extrinsic value reporting fear appeals to be more threatening.

Although there have been some mixed findings into the differing elements of perceived value, Putwain and Symes (2014) summarise by suggesting that students who find fear appeal messages to be personally meaningful and significant (high value) and who expected to perform well (high academic self-efficacy) appraise messages as a challenge, whereas, students who find fear appeal messages to be personally meaningful and significant (high value) and do not expect to perform well (low academic self-efficacy) appraise messages as threatening.

5.2.2.3.2   *Student Engagement and Academic Buoyancy*

Although not as widely investigated, a number of other variables have been explored to see whether they are involved in students' fear appeal appraisals. Several studies have explored how students' levels of engagement impact their appraisal of fear appeal communications. Students with higher prior levels of behavioural engagement have been found to appraise fear appeals as more of a challenge (Putwain, Nicholson, et al., 2016) and subsequently perform better in exams (Putwain, Symes, et al., 2017). Furthermore, students' levels of emotional engagement has been found to predict reduced levels of threat appraisal (Nicholson & Putwain, 2019; Putwain, Nicholson, et al., 2016).

Academic buoyancy has also been found to relate to fear appeal appraisal (Symes et al., 2015). Academic buoyancy refers to students' ability to cope with academic setbacks and challenges typically related to the ordinary course of school life, such as exam pressures, competing deadlines and poor grades (Martin & Marsh, 2008). When looking at students' threat appraisals, students with low academic buoyancy were found to appraise fear appeal consequence reminders as more threatening,

irrespective of the frequency of these communications. In relation to challenge appraisal, students high in academic buoyancy reacted more positively to fear appeal communications as they responded with a greater level of challenge appraisal. Although academic buoyancy was not found to relate directly to challenge appraisals, it was found to moderate the magnitude of the relationship between consequence reminders and challenge appraisal, with the effect being larger when frequency was high (Symes et al., 2015).

5.2.2.3.3   Attentional Bias

Putwain and Best (2012) found that primary school students with higher levels of trait test anxiety reported more frequent use of teacher fear appeals compared to students with lower levels of trait test anxiety in the same condition group. These findings indicate the potential for there to be differences in the ways in which fear communications are attended to by students. One mechanism which could be involved to explain this difference is that of attentional bias.

Attentional bias is the phenomenon whereby a greater allocation of information processing resources is given to one type of stimuli relative to another (MacLeod & Mathews, 1988). There are a variety of cognitive mechanisms found to be involved with attentional bias (see Cisler & Koster, 2010). Firstly, is the process of facilitated attention to threat which involves the speed and ease to which attention is drawn to a threatening stimulus. Secondly, is difficulty disengaging attention away from threat, this involves the degree to which a threat stimulus captures and holds attention away from a threat compared to another stimulus. Additionally, is the process of attentional avoidance of threat, whereby attention is preferentially allocated away from threat cues.

The concept of attentional bias has received a wealth of empirical support in relation to generalised anxiety disorders (see Bar-Haim et al., 2007 for meta-analysis) as well as research more specifically focusing upon school-related anxiety (Scrimin et al., 2018) and test-anxiety (Jastrowski Mano et al., 2018; Keogh & French, 2001; Putwain et al., 2011; Putwain et al., 2020). Multiple studies demonstrate that highly test anxious students are more prone to engaging in attentional bias than non-anxious peers (Jastrowski Mano, Gibler, Mano, & Beckmann, 2018; Keogh & French, 2001; Putwain, Symes, Coxon,

& Gallard, 2020; Putwain, Langdale, Woods, & Nicholson, 2011). Research suggests that this bias is only associated with academic threat as highly test-anxious students demonstrate more attentional bias for academic threat conditions, but not toward social threat or neutral school conditions (Jastrowski Mano et al., 2018).

Some findings indicate the need for there to be a specific performance-evaluation element in order to invoke an attentional bias in highly test-anxious students (Keogh & French, 2001; Putwain et al., 2011). In a real-life context, these performance-evaluation conditions may be triggered by teacher commentary about exams, such as providing notice of a forthcoming exam or instructions provided by an exam paper (Putwain et al., 2020). However, the effect of attentional bias has also been found without the need for stress-inducement techniques (Jastrowski Mano et al., 2018). These differing findings may be related to varying methodological procedures, with Jastrowski and colleagues utilising an image-based procedure, which has been found to typically elicit greater attentional bias compared to word-based procedures (used within the other studies) (Pishyar et al., 2004). Due to the ethical and practical issues with this type of study, most studies utilise experimental procedures and therefore research to explore findings in the naturalistic classroom setting has not yet been thoroughly investigated.

Although it appears there is a general consensus that students with higher-levels of school or test anxiety do demonstrate an attentional bias to threatening academic stimuli, research which has explored these mechanisms involved in this bias provides conflicting findings. Putwain et al. (2020) found that students with high test anxiety showed a bias to supraliminal presentation of test-related stimuli but not subliminal presentations, indicating students demonstrate a difficulty disengaging from threat but not facilitated attention to threat. Whereas Dong et al. (2017) found support for the role of attentional avoidance of threat.

Increased attentional bias toward academic stressors has been linked to poorer grades and increased emotional and behavioural problems (Scrimin et al., 2018). However, this finding was only seen in students who experienced a negative classroom climate (characterised by poor emotional connections

and increased tension between teacher and students, and strict discipline by the teacher). These findings led the authors to conclude that poor classroom climate exacerbates the negative effects of students' attentional biases. The extension of exploration of additional school-related factors to the process of attentional bias provides a step towards understanding the phenomenon of attentional bias within the classroom environment. When viewing fear appeals communications as a threatening stimulus, these findings may indicate that students with a predisposition to test anxiety are more likely to report increased frequency of teachers' use of these communications (Putwain & Best, 2012). It may be that these students are not necessarily more vigilant to fear appeal communications, but their increased time ruminating on these communications may cause them to view teachers as making these messages more frequently than their non high-test anxious peers (Putwain et al., 2020). Interestingly, increased report of teacher frequency of fear appeals was not found to have negative educational consequences for these students, despite these students also viewing these communications as more threatening than non-highly-test anxious peers, as it did not lead to an increased level of state test anxiety or poorer test performance (Putwain & Best, 2012) . Combined with the findings from Scrimin and colleagues (2018), which found that classroom climate mediated the relationship between a tendency to engage in attentional bias and negative educational outcomes, this may indicate that there may be more factors which are involved in the process of attending to threatening messages and their subsequent appraisal and outcome. School and test anxiety have been explored in relation to attentional bias processes, but there may also be other contributing factors which may make students more susceptible to engaging in attentional bias to fear appeal communications by teachers.

5.2.2.3.4   Summary of Antecedents

To summarise, the appraisal model to date considers that a student's appraisal of fear appeal communications are based upon their perceived personal significance (how much they value the outcome of the exam) and their capacity for responding effectively to demands (based upon beliefs about their capacity to achieve subjectively defined success on the exam, grounded within perceptions of academic self-efficacy, levels of academic buoyancy and expectancy of success) (Putwain et al., 2019b). Other factors have been explored to some degree, but more research into other potential

antecedents to fear appeal appraisal would be useful in order to fully understand the mechanisms involved.

5.2.2.4   Outcomes of Fear Appeal Appraisals

5.2.2.4.1   Fear Appeal Frequency

Fear appeals have not been found to have a direct effect upon outcomes such as engagement (Putwain, Nakhla, et al., 2017), academic performance (Putwain, Nakhla, et al., 2017), goal orientation (Putwain & Symes, 2011b) test anxiety (Putwain & Symes, 2011b), academic self-efficacy and subjective task value (Putwain, Symes, et al., 2016). However, a consistent finding within the literature has been that increased frequency of fear appeal communications results in greater levels of challenge and threat appraisals (Putwain, Nakhla, et al., 2017; Putwain, Remedios, et al., 2016; Putwain, Symes, et al., 2016; Putwain et al., 2022; Symes et al., 2015). Thereby denoting the appraisal of fear appeal communications as a mediator between frequency of fear appeal communications and educational outcomes (Putwain, Remedios, et al., 2016; Putwain et al., 2022; Putwain et al., 2021). Therefore, it is theorised that fear appeals act as a reflective prompt for students, causing them to reflect upon their perceived value and competence beliefs. When fear appeals are used more frequently by teachers, students will engage in these reflective processes more regularly, strengthening the cognitive judgements which underpin fear appeal appraisal. Thereby, more frequent use of fear appeals results in stronger challenge and threat evaluations (Putwain et al., 2021). One study did find a link between frequency of fear appeal communications and educational outcomes, finding that students who reported higher frequency of fear appeals reported higher levels of depression and anxiety, and this relationship was amplified for students with lower levels of academic self-efficacy (Belcher et al., 2022). However, this study relied upon correlational analysis, reducing the ability to assess causality. Therefore alternatively, this finding may be interpreted in the reverse; students who are more anxious may be more likely to attend to fear appeal communications, supporting the potential impact of attentional bias, discussed previously.

5.2.2.4.2   Threat-Only Model

Preliminary conceptualisations of fear appeal appraisal models explored only the impact of a threat appraisal. These findings will be discussed initially, before presenting research which relates to threat when challenge was also measured within the model.

5.2.2.4.2.1   Test Anxiety

Perceived threat has been found to be related to the worry and tension components of test anxiety (Putwain & Symes, 2011b), autonomic reactions (Putwain & Best, 2011) and state anxiety (Putwain & Best, 2012). As test anxiety is consistently related to negative educational outcomes (see von der Embse et al., 2018) students who interpret fear appeal communications as a threat may additionally incur wider negative educational consequences.

5.2.2.4.2.2   Motivation

The perception of fear appeals as threatening has been found to be related to lower intrinsic and identified motivation, but unrelated to introjected and external forms of self-determined motivation (Putwain & Remedios, 2014b). Intrinsic and identified motivation are considered to be more determined forms of motivation; meaning an individual is more self-motivated to engage in behaviours. Whereas, external and introjected motivation are the least self-motivated forms, with behaviours often undertaken due to external sources (Niemiec & Ryan, 2009).

Fear appeal communications have also been explored in relation to achievement goals. Achievement goals relate to how an individual views their purpose for engaging in study behaviour and can impact how they think, feel and behave in school (Scherrer et al., 2020). When prior achievement goals were accounted for, the interpretation of fear appeals as threatening was found to increase performance-avoidance and mastery approach goals (Putwain & Symes, 2011b). The finding that increased perception of fear was related to mastery approach goals is unexpected due to the inherent nature of this type of achievement goal, with its positive focus to develop competence by improving knowledge and abilities, and its positive relationship with academic achievement (Scherrer et al., 2020).

5.2.2.4.2.3   Academic Performance

The majority of research supports the proposition that fear appeal appraisals are likely to have negative consequences on students' academic performance. Studies find that students who perceive fear appeal communications to be more threatening perform worse on low-stakes (Putwain & Best, 2012; Putwain & Best, 2011) and high-stakes exams, such as GCSEs (Putwain & Remedios, 2014b).

5.2.2.4.3   Challenge and Threat Model

The findings that for some students, fear appeal communications were related to positive educational outcomes, led to the consideration that there may be alternative appraisals, therefore following the updated appraisal model (Putwain & Symes, 2014) (see section 5.2.2.1.1). Subsequent studies therefore explored the outcomes of both fear and challenge appraisals.

5.2.2.4.4   Threat

5.2.2.4.4.1   Self-Efficacy and Perceived Value

In addition to self-efficacy and perceived value being antecedents to a threat appraisal, they have also been explored as outcome variables. Threat appraisal has been found to be related to lower academic self-efficacy, higher attainment value (Putwain, Remedios, et al., 2016; Putwain, Symes, et al., 2016; Putwain et al., 2015) and higher extrinsic value (Putwain, Remedios, et al., 2016). Taken together, this research indicates a bidirectional relationship between fear appeal appraisal, academic self-efficacy and perceived value.

5.2.2.4.4.2   Engagement

Threat appraisals have been found to be correlated with behavioural disaffection (Nicholson et al., 2019), emotional engagement and emotional disaffection (Nicholson & Putwain, 2019; Nicholson et al., 2019), but not significantly related to behavioural engagement (Nicholson et al., 2019). When exploring the predictive nature of a threat appraisal, it has been found to predict lower behavioural engagement (Putwain, Nakhla, et al., 2017; Putwain, Nicholson, et al., 2016; Putwain, Symes, et al., 2017) and lower emotional engagement (Putwain, Nakhla, et al., 2017; Putwain, Nicholson, et al., 2016). However, these studies adopted a cross-sectional design, preventing the ability to control for

concurrent relationships, assess the stability of relationships over time, or make inferences about the direction of effects. To combat this, Nicholson and Putwain (2019) adopted a cross-lagged panel design, allowing for exploration of concurrent relationships and reciprocal models to be tested. They found that threat appraisal predicted subsequent reduced emotional engagement and increased emotional disaffection but was not significantly related to behavioural engagement or disaffection. In a similarly sophisticated research design, Putwain et al. (2022) found that threat was not related to subsequent student behavioural engagement. The authors posit that this may indicate that threat evaluations may be more strongly related with achievement-related emotions rather than behaviour, potentially due to the dual effect of threat (Pekrun & Linnenbrink-Garcia, 2012). This dual process indicates that a degree of anxiety can be productive as it can lead to people increasing effort in order to avoid failure. However, it can also form maladaptive habits when people feel compelled to reduce anxiety by engaging in behavioural and cognitive avoidance, resulting in reduced effort (Putwain, Nicholson, et al., 2016).

5.2.2.4.4.3   Academic Performance

Threat appraisals have been found to be related to reduced exam grades via lower behavioural engagement over and above variance accounted for by performance on a prior test (Putwain, Symes, et al., 2017). However, it is useful to note that with this study, exam performance was taken from a mock exam paper rather than actual GCSE grade. Often, students attend to and apply themselves differently to tests with different perceived consequences (Wolf & Smith, 1995) such as mock exams, resulting in potentially differing performances between mock exam and final exams. Nevertheless, this finding has also been subsequently supported with high-stakes exams, with threat appraisals being a direct negative predictor of GCSE grade (Putwain et al., 2022).

5.2.2.4.5   *Challenge*

5.2.2.4.5.1   Self-Efficacy and Perceived Value

As well as antecedent of a challenge appraisal, self-efficacy, and perceived value, have also been found to be outcomes. A challenge appraisal has found to be related to higher self-efficacy (Putwain, Symes, et al., 2016; Putwain et al., 2015) and higher attainment and extrinsic value (Putwain, Remedios, et al.,

2016; Putwain, Symes, et al., 2016). These results also provide support for the bidirectional relationship between fear appeal appraisal, academic self-efficacy, and perceived value.

5.2.2.4.5.2   Engagement

Challenge appraisals have been found to be positively correlated to behavioural engagement and emotional engagement, whilst negatively related to behavioural disaffection (Nicholson & Putwain, 2019; Nicholson et al., 2019), however no significant relationship has been found with emotional disaffection (Nicholson et al., 2019). Challenge appraisal predicted greater behavioural engagement (Putwain, Nakhla, et al., 2017; Putwain, Nicholson, et al., 2016; Putwain, Symes, et al., 2017) and emotional engagement (Putwain, Nakhla, et al., 2017; Putwain, Nicholson, et al., 2016), over and above the variance of prior engagement.

However, these findings were not replicated when a more robust, cross-lagged panel design was adopted, which allows for the exploration of concurrent relationships and reciprocal model testing (Nicholson & Putwain, 2019). This study found that challenge appraisal predicted subsequent reduced behavioural disaffection but was not significantly related to behavioural or emotional engagement or behavioural disaffection (Nicholson & Putwain, 2019). However, in a similar methodological design, Putwain et al. (2022) found that students who had higher levels of challenge appraisal had increased subsequent behavioural engagement. The inconsistency in these findings indicates that further research needs to be conducted in order to fully understand the mechanisms by which challenge appraisals impact students' engagement.

5.2.2.4.5.3   Academic Performance

Challenge appraisal has not been found to directly relate to performance, but indirect relationships have been found, mediated via increased engagement (Putwain, Symes, et al., 2017; Putwain et al., 2022). The authors posit that fear appeal appraisals would not be expected to impact upon performance directly, but indirectly via adaptive study and exam-related behaviours. As challenge appraisal has a mastery focus and is associated with positive emotions and increased effort, the finding

that this relationship is mediated by engagement is consistent with this assertion (Putwain, Symes, et al., 2017).

5.2.2.5 Classroom-Level Effects

With the educational fear appeal literature being grounded within the socio-cognitive perspective, whereby the outcome of an environmental event is cognitively mediated by the individual (Putwain & Remedios, 2014b), it would be naive to assume that the appraisal model of fear appeals is a solely individual process. Educational research across an array of constructs acknowledges the environmental impact upon individual appraisals and outcomes. Classroom climate and contextual factors explore whether group-level characteristics such as school, classroom or teacher contribute to student-level outcomes beyond what is explained by individual student characteristics (Marsh et al., 2012). There are two types of classroom effect: climate and contextual. Although both are viewed as group-level constructs, there is a distinction between how climate and contextual factors are comprised. Within a climate construct, the referent is the teacher/classroom, with students rating an aspect of the classroom or teacher. Whereas, for a contextual factor, the referent is the individual student, with the construct being comprised of an aggregation of the different students' characteristics (Marsh et al., 2012). Within the present context, the appraisal of fear appeal communications would therefore be a contextual factor, whereas the frequency of fear appeals a climate factor.

Indeed, the frequency of fear appeal communications has been seen as a substantial classroom environment variable, with class level variance ranging between 19% to 46% (Putwain & Remedios, 2014a, 2014b; Putwain, Remedios, et al., 2016; Putwain, Symes, et al., 2017), compared to challenge or threat appraisal of fear appeals yielding typically between 14% to 23% (Nicholson & Putwain, 2019; Putwain, Nicholson, et al., 2016; Putwain, Remedios, et al., 2016; Putwain, Symes, et al., 2017). It still remains that fear appeal appraisals are an individual-level construct, but also that appraisals may be influenced by the composition of the class (Putwain, Nicholson, et al., 2016; Putwain & Remedios, 2014b). Indeed, there does seem to be class-level impact upon appraisal, documented through a number of studies. When exploring the impact of students' subjective task value on threat appraisal, Putwain and Remedios (2014a) observed that students' individual levels of intrinsic, attainment and

extrinsic values were unrelated to a threat appraisal. However at the class-level, in classes which were comprised of lower intrinsic but higher extrinsic value, students reported fear appeals to be more threatening. Research into broader educational factors, such as the big-fish-little-pond effect echoes this finding; differences can be seen between individual-level appraisal and class-level appraisal within the same population (Trautwein et al., 2009; Zimprich et al., 2005).

Putwain, Nicholson, et al. (2016) established that the appraisal of fear appeals was found to vary between classes, and this effect predicted class-level behavioural engagement. Higher class-average challenge appraisal was found to be related to greater class-average behavioural engagement, whilst higher class-average threat appraisal was related to lower class-average behavioural engagement; but neither were related to emotional engagement. The authors postulated that this may be related to the fact that classes were placed in sets according to ability, and therefore class-level appraisal may be related to students (actual or perceived) ability. This could be considered in relation to students' perceptions about their standing within the class or compared to other classes, such as is seen within the phenomenon of big-fish-little-pond effect (Marsh et al., 2008); whereby students' levels of self-concept are influenced using classmates as a frame of reference for their own self-perceptions. Alternatively, there could be broader factors involved, such as the influence of the general class composition such as average ability, altering the instructional practices used by the teacher between different classes (Hutchison, 2003).

Contrary to predictions and previous findings, Putwain et al. (2022) found that challenge and threat appraisals were not found to predict subsequent behavioural engagement at the class-level. Additionally, threat appraisal was found to be a negative predictor of subsequent grade; and this was also found to mediate the relationship between prior achievement and GCSE grade. This means that, after removing individual level variance, there was lower GCSE grades in classes with higher than average threat evaluations. It was anticipated that this relationship would be mediated via lower behavioural engagement, rather than a direct relationship. The authors speculate that this may be due to only including a measure of behavioural engagement, as threat appraisal is more often related to

emotional engagement; if this was included in the model, the relationship may be mediated by this variable.

Previous research indicates that more frequent fear appeals result in greater challenge and threat appraisals (Putwain, Nakhla, et al., 2017; Putwain, Remedios, et al., 2016; Putwain, Symes, et al., 2016; Putwain et al., 2022; Symes et al., 2015). However, this finding was not replicated when exploring this relationship at the classroom level. No concurrent or time-lagged relations were found between class aggregated fear appeals and threat or challenge appraisals (Putwain et al., 2022). The authors posit that in fact these findings do support previous research; with students who respond with greater challenge, and those responding with greater threat 'netting each other out' when the class scores are aggregated. This is in-keeping with the theoretical premise that fear appeals although made to a whole class, are appraised differently. An alternative explanation is that fear appeals at a class level do not prompt evaluations, and these may depend upon other factors such as classroom climate. Despite mixed findings, research indicates that individual fear appeal appraisals may be influenced by the composition of the class, however further research to explore these intricacies is warranted.

5.2.2.6   *Person-Centred Research*

Several studies have explored the appraisal of fear appeal communications in a person-centred analytical method, whereby the individual, rather than the variable is the focus of analysis (Hart et al., 2003). This approach allows for exploration of variables which may combine at the individual level, and how differing profiles may relate to outcomes variables (Corpus & Wormington, 2014). Cluster analysis by Putwain, Nakhla, et al. (2017) found that clusters of students who reported higher challenge appraisals accompanied with low or moderate/high threat reported higher behavioural and emotional engagement (Putwain, Nakhla, et al., 2017).

Nicholson et al. (2019) report findings from several studies utilising cluster analysis to explore student threat and challenge profiles. Within their first study, data were collected at two time points to explore whether there were changes in clusters over time. When students completed questionnaires in October, two distinct profiles emerged: low threat/moderate challenge and moderate threat/high

challenge. These clusters significantly differed in their engagement levels, with students in the low threat/moderate challenge group scoring lower on behavioural engagement, emotional engagement, and emotional disaffection and higher on behavioural disaffection than students in the moderate threat/high challenge group. However, as the academic year progressed, a wider range of fear appeal evaluation combinations emerged. When students were asked about their experiences four months later, four profiles emerged (low threat/high challenge; low threat/low challenge; moderate threat/moderate challenge; high threat/high challenge). Looking at the engagement outcomes relating to these four profiles, it transpired that students in the low threat/high challenge group were most engaged and least disaffected, whereas those in the moderate threat/moderate challenge group were the least engaged and most disaffected. Contrary to predictions, students in the high threat/high challenge group represented the second most optimal profile (despite scoring highest on emotional disaffection), indicating that students with high levels of threat could still produce adaptive engagement responses if they also had high levels of challenge. Nicholson et al. (2019) also established that movement between groups between different time points had a tangible impact upon levels of engagement.

In their second study, Nicholson et al. (2019) established that previous exam performance and gender were significant predictors of cluster membership; with females more likely to report moderate threat/moderate challenge, and higher previous exam score more likely to report low threat and moderate challenge. Within this study, two marked clusters emerged: low threat/moderate challenge and moderate threat/moderate challenge. Interestingly, these clusters only differed in their levels of emotional disaffection. Results from these studies indicate that students seem to evaluate fear appeals as both threatening and challenging, pointing to the assertion that threat and challenge are not the opposite ends of a continuum, but are distinct concepts which can coexist (Nicholson et al., 2019). It was also interesting to note that all the clusters were comprised of higher or equivalent levels of challenge than threat; indicating favourable profiles for most students.

5.2.2.7 Qualitative Experiences of Fear Appeals

There is an absence of qualitative data directly exploring students' experiences and perceptions of fear appeal communications. However, there have been several studies which have focused on other related issues, whereby fear appeals have arisen as a topic of discussion.

In a study utilising focus groups to explore A-level students' experiences of test anxiety, participants expressed frustration with teachers' repeated commentary about forthcoming exams and the emphasis they place on the importance of exam outcomes. Participants stated that the intensity of these messages grew in frequency as the exam period neared and they felt these communications were "unhelpful and unnecessary" (Chamberlain et al., 2011, p. 198). Students felt that these messages did not have a positive effect because they were already well aware of the consequences of exam failure. The authors did note that the participants involved in the focus groups appeared to be relatively well-motivated individuals with clear aspirations which depended upon their success in their exams, therefore, this may not be representative of all students' perceptions of exam communications. However, similar findings were found with a younger population of students with high levels of test anxiety; with students commenting upon teachers' use of exam timing messages, as well as educational and occupational aspirations arising from failure (Putwain, 2009b).

In another focus group study, with students sitting the Irish equivalent of A-Level examinations, Banks and Smyth (2015) explored the individual and school factors influencing academic stress. Students indicated that teachers acted as stress amplifiers by speaking about the exam too frequently and placing too much emphasis on them. Students also commented that they felt teachers were trying to frighten them about the importance of passing their exam. In addition to specific commentary about the impact of teachers' direct communications, students also highlighted the pressure they place upon themselves for good performance in high-stakes exams. They suggested this was due to the consequences of failure on their educational and occupational aspirations, and the notion that they felt these consequences were important for the rest of their lives, rather than just related to the post-school period; with one student commenting "your whole life depends on it" (Banks & Smyth, 2015, p. 605). These experiences may be driven from a variety of factors, such as teacher communications, school

climate, or the perceptions of societal or parental expectations, but they do highlight the internalised views students hold about the importance of exam results on their future life trajectory.

In a study exploring student and teacher views on teachers' communications prior to exams, Flintcroft et al. (2017) observed that students differed in their preferences of what they would find helpful and motivating. Some students indicated they valued optimistic communications from teachers which focused upon their ability to succeed; whereas others suggested they preferred fear appeal communications, as they valued how these motivated their studies.

These snippets from qualitative research seem to echo the findings from the field. Students commented that teachers do make these types of communications, with some students finding them useful and motivating, whilst others finding them stressful and unhelpful. However, the intricacies of the appraisal process and potential antecedents and outcomes could be deeper explored through qualitative research. Indeed, in a recent review paper, authors called for specific qualitative research to be conducted within the field of fear appeal communications as it may be beneficial in exploring the complexities of students' fear appeal evaluations (Putwain et al., 2021).

5.2.2.8   Summary

The conceptualisation of fear appeals in the educational field has been a developing avenue of research. There is a general assumption that these communications are used as a motivational tactic by teachers to try and elicit an adaptive fear response from students, in order to engage them to make greater efforts to avoid failure, by preparing thoroughly for their exams (Putwain, Nicholson, et al., 2016). Both qualitative and quantitative research has demonstrated the use of these communications within the high-stakes classroom, and that not all students feel the same way about these communications. Some welcoming them as increasing their motivation, whilst some view them as stressful and unnecessary. It has been established that there is an appraisal process involved with the interpretation of these communications, whereby the mere presence of a fear appeal communication does not trigger particular outcomes; it is dependent upon how these communications are cognitively appraised by students (Putwain & Symes, 2014). Indeed, "threat and challenge evaluations exhibit distinct

antecedents and relate to different academic outcomes" (Nicholson et al., 2019 , p.2). A challenge appraisal is considered to be associated with positive emotions and behaviour intentions, whereas threat appraisals can be accompanied by negative emotions and self-worth protection strategies (Putwain, Nicholson, et al., 2016). Although not as robustly explored, an irrelevant appraisal would not be expected to result in any particular outcomes as these students would not find the fear appeal relevant and so the secondary cognitive appraisal process is not activated (Putwain, Remedios, et al., 2016). To date, the key considerations within the appraisal process have been focused upon whether students perceive the task/outcome to be of value to them (perceived value) and whether they think that they can respond effectively to the demands required (self-efficacy) (Putwain, Symes, et al., 2016; Putwain et al., 2015). Other variables such as levels of students' engagement and academic buoyancy have been explored, but not in as much depth to warrant clear understanding to add to the appraisal model. Therefore, the current appraisal model considers that students who find fear appeal messages to be personally meaningful and significant and who expect to perform well appraise messages as a challenge, whereas, students who find fear appeal messages to be personally meaningful and significant but do not expect to perform well will appraise messages as threatening (Putwain & Symes, 2014). However, this dichotomous principle has been challenged when utilising person-centred methods, in which the individual is the focus of the analysis (Nicholson et al., 2019). Results from this study considered that students could belong to both groups, such as having both a high threat and high challenge response; leading authors to consider that threat and challenge appraisals are distinct concepts which can coexist rather than opposite ends of a continuum.

Challenge appraisals are generally considered to be related to positive educational outcomes such as: higher self-efficacy (Putwain, Symes, et al., 2016; Putwain et al., 2015); greater engagement (Putwain, Nakhla, et al., 2017; Putwain, Nicholson, et al., 2016; Putwain, Symes, et al., 2017) and increased exam performance (mediated via increased engagement) (Putwain, Symes, et al., 2017; Putwain et al., 2022). Conversely, threat appraisals are often associated with negative educational outcomes such as: increased test anxiety (Putwain & Symes, 2011b; Putwain & Best, 2012); lower academic self-efficacy (Putwain, Remedios, et al., 2016; Putwain, Symes, et al., 2016; Putwain et al., 2015); inefficient

motivation styles (Putwain & Remedios, 2014b); lower engagement (Putwain, Nakhla, et al., 2017; Putwain, Nicholson, et al., 2016; Putwain, Symes, et al., 2017) and poorer exam performance (Putwain & Remedios, 2014b; Putwain, Symes, et al., 2017; Putwain & Best, 2012; Putwain & Best, 2011; Putwain et al., 2022). The research to-date has provided strong insight into how fear appeal communications are appraised by students and the educational outcomes they can have. However, more research into the complexities of this appraisal process and how other communications from teachers, such as efficacy statements, could impact upon this appraisal process is warranted. Furthermore, research has predominantly focused upon personal influences on student appraisal of communications and has neglected to consider potential environmental effects upon this appraisal process.

Students' classroom experiences do not occur within a vacuum, and there are a variety of external influences upon them, such as is considered within Bronfenbrenner's ecological systems theory (Bronfenbrenner, 1979). By taking an ecological perspective, this allows for simultaneously considering individual and contextual processes and the relations between these systems (Eriksson et al., 2018). Indeed, Wentzel et al. (2017) assert the importance of considering the wider ecological perspective when considering students' classroom experiences; outlining that classrooms are complex learning environments with students' educational experiences affected by not just their own beliefs and experiences, but also by those around them. Furthermore, classroom processes have been found to be a significant predictor of student learning (Hattie & Anderman, 2013). Whilst Putwain and Remedios (2014b) posit that educational fear appeal literature is grounded within a socio-cognitive perspective and studies have considered the appraisal of fear appeals at the classroom level (Nicholson & Putwain, 2019; Putwain, Nicholson, et al., 2016; Putwain, Remedios, et al., 2016; Putwain, Symes, et al., 2017), there has been a lack of consideration within the literature exploring particular environmental factors and how these may interact with students' individual appraisals. One such factor, which would be of key consideration, would be students' perception of the quality of their relationship with their teacher.

5.2.3 Teacher-Student Relationships

Positive teacher-student relationships have been found to be related to a variety of educational outcomes such as: student motivation; engagement and resilience (Den Brok et al., 2004; Furrer & Skinner, 2003; Lee, 2012; Roorda et al., 2011; Scales et al., 2020); students' effort, passion and perseverance in learning (Ruiz-Alfonso & León, 2017; Wentzel, 2009; Wentzel et al., 2017); students' self-esteem (Martin et al., 2007); and academic performance (Den Brok et al., 2004; Lee, 2012; Roorda et al., 2017; Roorda et al., 2011; Scales et al., 2020).

The concept of teacher-student relationship is diverse, with a plethora of research exploring a variety of aspects of teacher-student relationships with differing theoretical conceptualisations and measurement methods (Barch, 2015). Hamre and Pianta (2007) consider teacher-student relationships within three core domains: emotional support, classroom organisation, and instructional support. Emotional support considers how teachers support students' social and emotional functioning; classroom organisation relates to how teachers organise classroom time, student behaviour and attention; and instructional support refers to the use of teaching strategies to enhance student development of core cognitive skills (Pianta et al., 2012). As students report teachers to be an important source of both emotional and educational support for their motivation and attainment during their GCSE studies (Brown & Woods, 2022), consideration of emotional support and instructional support are considered to be principal areas of focus for the present research.

5.2.3.1 Emotional Support

Teachers' emotional support relates to how they support students' social and emotional functioning (Pianta et al., 2012). Positive emotional classroom climate is related to other positive classroom factors for students, such as having more positive relationships with their peers, increased opportunities to exercise autonomy (Ruzek et al., 2016) and increased levels of motivation (Skinner et al., 1998). In classrooms where teachers are considered to be emotionally supportive, there is a general consensus that students feel more engaged (Furrer & Skinner, 2003; Hughes et al., 2008; Lee, 2012; O'Connor & McCartney, 2007).

Some research also finds teachers' emotional support to be a direct predictor of students' academic achievement (Lee, 2012; Reyes et al., 2012); further underscored by findings from a meta-analytical review conducted by Roorda et al. (2017). However, other research has failed to find a significant impact of teachers' emotional support on students' academic achievement (Hamre & Pianta, 2005; Mashburn et al., 2008). Others posit that this relationship is noted when modelled with student engagement as a mediator between positive classroom emotional climate and academic achievement (Hughes et al., 2008; O'Connor & McCartney, 2007; Reyes et al., 2012).

5.2.3.2   Instructional Support

The term instructional support relates to how teachers utilise strategies to enhance students' development of core cognitive skills (Pianta et al., 2012). Although researchers vary on the specific components of instructional support which they measure, generally, positive teacher instructional behaviours include concepts such as: setting clear expectations and instructions; providing positive feedback and strategic help; explaining the usefulness of content; and encouraging student responsibility (Hamre & Pianta, 2005; Ruiz-Alfonso & León, 2017; Skinner & Belmont, 1993; Vansteenkiste et al., 2012). Teachers' use of instructional support has been found to influence students' motivation, engagement, persistence, and passion toward their studies (Lee, 2012; Ruiz-Alfonso & León, 2017; Skinner & Belmont, 1993). However, it is typically not found to be a significant predictor of students' academic achievement (Hamre & Pianta, 2005; Lee, 2012; Reyes et al., 2012).

5.2.3.3   Emotional and Instructional Support

The differing impacts of emotional and instructional support upon academic achievement is also supported by results from a meta-analysis, concluding that emotional aspects of teacher-student relationships are more strongly associated with students' school outcomes than teachers' instructional behaviours (Cornelious-White, 2007). However, when exploring the interaction of emotional support (via teachers' autonomy-supportive practices) and instructional support (via the setting of high expectations), Vansteenkiste et al. (2012) utilised a cluster analysis approach to consider how teachers' differing use of these methods would result in different profiles and how these may relate to educational outcomes. Results indicated that students in the high autonomy and high expectations

group reported greater engagement in self-regulated learning staretegies (such as time-management, concentraion, deep-level learning, and persistence) and lower anxiety, whereas, students in the low autonomy and vague expectations group showed more maladaptive learning patterns. This indicates that both these types of teacher support are important in relation to students' adaptive learning strategies.

5.2.3.4 Classroom Context

Teachers' instructional behaviours can also have wider classroom-level effects. For example, Strati, Schmidt, & Maier (2017) found that teachers' use of unhelpful comments (such as teasing or using sarcasm) towards any particular student in the class, resulted in lower engagement at the class-level; indicating that comments made to individual students had an impact on the rest of the class. Results suggested that the negative effect on engagement levels did vary across students, but this variance was not accounted for by gender or age. Vollet et al. (2017) also posit the importance of consideration of other inter-personal relationship dynamics within the classroom in relation to students' relationships with their teacher. They explored the interaction between students' perceptions of relationships with their teacher and peers within class and found a cumulative effect of teacher and peer relationships upon students' engagement. Results indicated that teacher involvement partially buffered students from the motivational costs of belonging to a disaffected peer group, and having a positive peer group partially buffered students' engagement if they had a negative relationship with their teacher (Vollet et al., 2017). This highlights the importance of both types of relationship within the classroom setting.

5.2.3.5 Summary

Research indicates the far-reaching impacts for students from having positive relationships with their teachers, with positive emotional support from teachers appearing to have a stronger impact upon academic achievement than good instructional support. As students' level of engagement is a commonly explored variable when considering the educational impact of teacher-student relationships (Furrer & Skinner, 2003; Hughes et al., 2008; Lee, 2012; O'Connor & McCartney, 2007; Roorda et al., 2011; Skinner & Belmont, 1993), further consideration to this concept will now be presented.

5.2.4   Student Engagement

Students' level of engagement in their school work or in the classroom setting is generally considered to be associated with desirable academic, social and emotional learning outcomes (Klem & Connell, 2004). Engaged students exert more effort and persistence towards their learning, enjoy learning and challenging themselves to succeed, and engage in self-regulatory behaviours to achieve their goals (Klem & Connell, 2004). Engagement is also generally considered to be a significant predictor of academic achievement (Klem & Connell, 2004; Leon et al., 2017; Reyes et al., 2012). Indeed, a study by Leon et al. (2017) estimated that students' level of engagement predicted 28% of the variance of their maths grade. Student engagement levels are linked to school attendance (Klem & Connell, 2004) and engagement in homework activities (Collie et al., 2019). Students with lower levels of engagement demonstrate reduced aspriations for their educational goals and attain lower academic grades (Kaplan et al., 1997).

There is much debate as to the exact definition of engagement within the literature, but it is generally thought of as a commitment or investment to learning activities (Fredricks et al., 2004). Engagement is a multi-faceted construct, with discussion around its components, but is often considered within a tripartite framework, having three facets: behavioural, emotional and cognitive (see Fredricks et al., 2004 for review). Despite all three components retaining theoretical and practical importance, emotional and cognitive components of engagement are less strongly correlated with academic performance than behavioural engagement (Klem & Connell, 2004), whilst behavioural engagement is considered a strong predictor of academic achievement (Fredricks et al., 2004). This indicates that there are perhaps more practical implications through the exploration of behavioural engagement for the purposes of the current study. Furthermore, as Putwain, Symes, et al. (2017) assert that fear appeal appraisals do not impact exam performance directly, but indirectly through more or less adaptive study and exam-related behaviours, this underscores the utility of focusing upon behavioural aspects of engagement in the present research. The conceptualisation of efficacy appeals developed within this body of work, is based upon the Extended Parallel Process model (Witte, 1992), which considers that the effectiveness of a fear or efficacy communication is measured through corresponding behaviour

change (Witte & Allen, 2000). Therefore, students' levels of engagement in associated exam-related preparation activities would be an appropriate outcome variable to measure the effectiveness of these communications. Given the amount of variance of different factors involved in students' exam result (Wiliam, 2010), it seems conducive to consider students' behavioural engagement as an appropriate outcome variable rather than students' grade in the present study, particularly given the explorative nature of the research into how these variables may relate to one another. By using academic engagement as an outcome, this provides more dependable data about the explicit effects of students' appraisal of fear and efficacy communication upon related behaviour change.

5.2.5   Interaction between Teacher-Student Relationships and Engagement

When students believe their teachers to be emotionally supportive and provide effective instructional support, students are more engaged (Furrer & Skinner, 2003; Hughes et al., 2008; Lee, 2012; O'Connor & McCartney, 2007; Skinner & Belmont, 1993). As Klem and Connell conclude, "students who perceive teachers as creating a caring, well-structured learning environment in which expectations are high, clear and fair, are more likely to report engagement in school" (p. 270) (Klem & Connell, 2004 p. 270). When considering that the association between positive teacher-student relationships and engagement is stronger for students at secondary school due to students becoming naturally less engaged as they get older (Roorda et al., 2017), this may highlight the importance of good quality of teacher-student relationships for students at this age, particularly those at greater academic risk due to their lower engagement (Hamre & Pianta, 2001).

Longitudinal effects of a positive relationship between teacher-student relationship and engagement have also been noted. For example, Ruzek et al. (2016) found that when teachers are seen as emotionally supportive at the beginning of the year, students reported increased behavioural engagement at the end of the year. Furthermore, although Furrer and Skinner (2003) acknowledge that students high in feelings of relatedness began the year with higher engagement than those low in feelings of relatedness, they found that this relationship compounded over the course of year; namely students with greater feelings of relatedness further increased their engagement over time, whilst

those low in relatedness declined in their engagement over the year, indicating the influential role of teacher-student relationship upon engagement across time.

Given that engagement has been found to mediate the relationships between students' perspectives of their relationship with their teacher and their academic achievement (Furrer & Skinner, 2003; Hughes et al., 2008), nurturing good quality relationships between teachers and students seems pertinant. However, the dynamics of the relationship between positive teacher-student relationships and students' levels of engagement can be complex due to the intricacies of the social systems in the classroom (Pianta et al., 2012). For example, Skinner and Belmont (1993) found that teachers' interactions with students predicted students' behavioural and emotional engagement, both directly and also mediated via students' perceptions of their interactions with the teacher (Skinner & Belmont, 1993). The dynamic nature of this relationship was compounded furthermore by the finding that teachers responded to students who expressed more negative emotions with increased levels of autonomy supportive behaviours (such as providing more choice in classroom activities), leading the authors to consider that teachers attempted to compensate for students' negative emotional engagement (Skinner & Belmont, 1993). The complexities of these interactions is further highlighted by findings from Martin and Collie (2019) exploring how the number of positive relationships students had with multiple teachers affected their levels of engagement. Mirroring previous research, positive relationships with teachers predicted greater engagement, and negative relationships with teachers was linked to reduced engagement. Moreover, their research design allowed them to explore the extent to which the number of positive and negative relationships with teachers impacted students' engagement levels. Positive teacher-student relationships seemed to have a cumulative effect on students' engagement; namely students became more engaged the greater number of positive relationships they had. Whereas, negative relationships were found to decrease students' engagement when these interactions outweighed positive reactions, but students did not get less engaged the more negative relationships they had, i.e., there was no cumulative effect of negative relationships, but once there were more negative interactions than positives ones, students' engagement would decline.

5.2.6 Fear and Efficacy Appeal Appraisal, Teacher-Student Relationship and Student Engagement

Research has provided an understanding of a variety of individual student factors (such as self-efficacy, perceived value, academic buoyancy, test anxiety) upon students' appraisal of communications about their exams (Putwain & Remedios, 2014b; Putwain & Symes, 2014; Putwain & Best, 2012; Putwain et al., 2015; Symes et al., 2015), but little has been explored in relation to how the wider environmental context may affect this appraisal process. Given the extent of research demonstrating the importance of teacher-student relationships upon a variety of educational outcomes, this would appear to be a relevant avenue to pursue. Particularly given findings from the wider fields of self-efficacy and fear appeal literature regarding the importance that the source of a fear and efficacy communication can have. For example, Bandura (1997) posits that self-efficacy can be enhanced via social persuasion, whereby respondents are convinced that they can succeed by another. However, the presence of this information alone does not automatically increase self-efficacy; messages must be believable and from a credible source (Pajares, 1996). The importance of source credibility is also highlighted within literature from the health field, with research exploring the impact of the credibility of the message source on the persuasiveness of fear and efficacy appeal communications. Whilst there is some evidence that source credibility is an important factor in the appraisal of fear appeal communications (see Higbee, 1969 for review), more recent research fails to find any significant relationships (Umeh, 2012). Findings from Tormala et al. (2006) adds additional layers of complexity to this relationship, finding that argument strength from the source also plays an important role in how messages are appraised. If a credible source uses a weak argument, then this can produce more unfavourable results than if the same weak message was used by a less credible source. As these studies utilise artificial manipulation methods in relation to health communications, these findings may not be appropriately translated to the naturalistic educational environment where teachers and students build relationships in a reciprocal manner over the course of time.

An additional consideration to warrant the importance of studying the relationship between these variables is findings from research exploring the effect of accountability measures upon teaching

practices. Teachers report that accountability measures from high-stakes exams impact the quality of the relationship they have with their students, in part due to feeling like they are pushing them to succeed (Hutchings, 2015). As increased feelings of accountability also result in teachers' increased adoption of fear appeal communications (Von der Embse et al., 2017), this leads to the consideration that it is important to explore the dynamics of the relationships between the frequency of fear and efficacy communications made by teachers and students' perceptions of the quality of their relationship with their teacher. If a teacher feels pressure to push their students to succeed, and this pressure may result in more frequent fear and efficacy communications and poorer relationships with their students, understanding the role which the quality of teacher-student relationship has upon the amount of fear and efficacy appeals they make, and students' appraisals of these communications is important to understand.

One study which explicitly explored the link between teachers' motivational messages and how this relates to teacher-student relationship adopted the theoretical framework of Self-Determination Theory (Santana-Monagas, Núñez, et al., 2022). Students' perceptions of their relationships with their teacher were measured through feelings of relatedness and teachers' motivational messages were conceptualised in relation to how they instilled feelings of control and autonomy in their students. Gain-framed messages (which focus on the positive outcomes of engaging in certain behaviours) emphasising students' control over their learning were found to be a more consistent predictor of feelings of relatedness with the teacher, compared to gain-framed communications emphasising students' autonomy over their learning. Loss-framed messages (which focus on the negative outcomes of engaging in certain behaviours) and focused on autonomy (such as 'my teacher tells me that if I don't work hard, I will miss the opportunity to learn interesting facts') was found to be negatively related to students' feelings of relatedness with their teacher. Unexpectedly, loss-framed controlled messages (such as 'my teacher tells me that if I don't work hard I will feel sad') were found to be a positive predictor of students' feelings of relatedness with their teacher, suggesting that if teachers adopt controlling behaviours, students will feel more positively about their relationship with their teacher. Although an unexpected finding, the authors posited that this relationship may result from

the consideration that if a teacher relies on loss-controlled messages less frequently, when they do use them, they are viewed by students as a sense of concern, leading students to think the teacher is desiring the best for them, which in turn leads to positive feelings of relatedness toward them. The study also found a mediating role of teacher-student relationship between teachers' use of engaging messages and students' feelings of vitality (conceptualised as energy and enthusiasm of a task, so could be considered in a similar vein to engagement). The authors posit that teachers who demonstrate care toward students by using messages which try to engage them in school tasks and advise them on actions to succeed, may fulfil students' needs of relatedness as they feel supported.

However, this study only measured the frequency of teachers' communications (in relation to loss and gain-framed autonomous messages and loss and gain-framed controlled messages) and did not consider the appraisal of these messages. Given the body of evidence to suggest that students' appraisal of communications is the important consideration in relation to outcomes, rather than their frequency (Putwain, Remedios, et al., 2016; Putwain et al., 2022; Putwain et al., 2021), more research needs to be conducted on exploring the potential relationship between teachers' use of motivational messages and students' appraisal of these communications alongside students' perceptions of their relationship with their teacher. Furthermore, the conceptualisation of teachers' motivational messages is significantly theoretically driven, in line with Self-Determination Theory, and could be critiqued for a lack of validity in the classroom environment. For example, analysis from Study One failed to find any communications from teachers highlighting that students may feel sad if they did not work hard or would miss the opportunity to learn interesting fact. Therefore, without an empirical basis for teachers' use of these communications, the measure may lack validity. Despite the criticisms of the methodology adopted within this study, the findings that students' views of their teacher-student relationships mediated the relationship between teachers' use of engaging messages and students' feelings of vitality indicates that there may be significant relationships between these variables which would warrant further exploration.

5.3 Research Aims

5.3.1 Rationale

To date, there has been a number of studies exploring the process of students' appraisal of teachers' fear appeal messages in the educational context, however, very little research has been undertaken exploring efficacy appeals, despite calls from researchers for the need for this (Belcher et al., 2022; Putwain & Roberts, 2012; Putwain & Symes, 2011a, 2011b). The research undertaken thus far which explores efficacy appeals in the educational setting (e.g. Putwain & Roberts, 2012; Sprinkle et al., 2006; von der Embse et al., 2015) has a variety of theoretical and methodological limitations (see section 4.2.2.4 for discussion). The development of a measure of students' appraisal of efficacy appeals in Study Two (see Chapter 4) allows for the exploration of teachers' use of these communications and how students appraise them.

Although research exploring the impact of teachers' fear appeal messages traditionally considers student grade as a core outcome variable (e.g. Putwain, Symes, et al., 2017; Putwain et al., 2022), Putwain, Symes, et al. (2017) posit that theoretically, fear appeal appraisals would not be expected to impact exam performance directly, but indirectly through more or less adaptive study and exam-related behaviours. Therefore students' level of engagement in relation to their planning, persistence and managing of study tasks would be considered as a viable outcome variables. Furthermore, given that students' levels of engagement in the educational setting is associated with a variety of desirable learning outcomes (Klem & Connell, 2004), engagement can be a useful outcome to study in its own right. Indeed, Putwain et al. (2022) recommend that the inclusion of alternative forms of engagement measures may potentially reveal more nuanced relationships with fear appeal appraisals. Furthermore, as the study is theoretically underpinned by the EPPM (Witte, 1992), which asserts that the effectiveness of fear and efficacy appeals is measured via related behaviour change (Witte & Allen, 2000), students' levels of engagement in appropriate exam-related preparation activities would be an appropriate outcome variable to explore this.

Considering that the source of fear and efficacy appeal communications can be an important factor in the appraisal of fear appeal communications (Higbee, 1969), having a positive relationship with their teacher would be considered to have a positive effect on how students appraised these communications, as they would be expected to consider the source of communications to be more credible. Indeed, within the educational context, Sprinkle and colleagues (2006) advocated that future research should consider the effects of fear and efficacy appeals in relation to students' perceptions of teacher credibility. Although Putwain et al. (2021) propose that teacher-student relationships would be considered to have a substantial bearing upon the appraisal of fear appeal messages (whereby students with positive relationships with their teacher would be more receptive to influence from their teacher, and those with poorer relationships may be more averse to them), this is yet to be empirically investigated.

Therefore, this research aims to explore how teachers' use of fear and efficacy appeals, and students' appraisals of these communications affect their academic engagement. Furthermore, whether students' perceptions of their relationship with their teacher affect this relationship. Class-level effects of fear and efficacy communications and their appraisal upon student engagement will also be explored.

5.3.2   Research Questions

RQ1: What is the relationship between student-level fear appeal appraisal and student engagement?

RQ2: Are there class-level relations between fear appeals and student engagement?

RQ3: How does teacher-student relationship relate to student engagement in consideration of the fear appeal appraisal model?

RQ4: Does the class-level frequency of teachers' fear appeals moderate student-level relationships between fear appeals and student engagement?

RQ5: What is the relationship between student-level efficacy appeal appraisal and student engagement?

RQ6: Are there class-level relations between efficacy appeals and student engagement?

RQ7: How does teacher-student relationship relate to student engagement in consideration of the efficacy appeal appraisal model?

RQ8: Does the class-level frequency of teachers' efficacy appeals moderate student-level relationships between efficacy appeals and student engagement?

5.4 Method

5.4.1 Participants

A convenience sampling approach was adopted to obtain participants. 1062 Year 11 students from seven schools in the North of England took part in the study. The sample contained an even mix of gender, with 500 participants reporting their gender as male, 519 as female, 19 as other, and 24 did not state their gender. Participants had a mean age of 15.14 (*SD*=.36). Students reported their ethnic background as: 69.7% White; 15.9% Asian; 2.4 % Black; 3.5% Mixed Heritage; 4.6% Other; 4.6% Not reported. The sample is fairly representative of the ethnic background of students studying across the UK in the academic year of 2019-2020: 72.3% White; 11.6% Asian; 6.1% Black; 5.8% Mixed Heritage Characteristics (DfE, 2020).

5.4.2 Measures

Following the specificity matching principle, whereby specific predictors should be used to predict specific behaviour (see Swann Jr et al., 2007), all measures were adapted to ask students to focus on their responses in relation to maths. The majority of research conducted to date on fear appeals within the educational setting has been specified to maths, meaning findings from the current study can be more easily compared to findings from previous research. Maths has traditionally been utilised within the literature due to it being a compulsory subject for students and its high-stakes nature (Putwain, Nakhla, et al., 2017), as students often need to obtain a pass grade to access further education or entry into the job market (Baird & Lee-Kelley, 2009; Putwain & Symes, 2014).

5.4.2.1 Teachers' Use of Fear Appeals Questionnaire

Students' appraisals of fear appeals were measured using the Teachers Use of Fear Appeals Questionnaire (Modified Version) (TUFAQ) (Putwain et al., 2019a). This is the third version of the

questionnaire, making advancements from the original TUFAQ (Putwain & Roberts, 2009) and the second revised addition (Putwain & Symes, 2014). The updated version addresses several concerns with the previous measures. Firstly, it provides a balance between cognitive, behavioural and emotional items and removes the items relating to timing of future exams, due to them not being focused upon fear or containing a value prompt (see section 5.2.2.1.4 for discussion). The TUFAQ measures students' perceived frequency of teachers' use of fear appeals prior to high-stakes examinations and their appraisal of these messages as either a challenge or a threat. The TUFAQ contains a total of 15 items, all measured on a 5-point Likert scale, ranging from 1 (never) to 5 (most of the time).

5.4.2.1.1   Fear Appeal Frequency

Fear appeal communications within the educational environment, relate to fear-eliciting messages used prior to high-stakes exams (Putwain & Symes, 2014). These communications from teachers may highlight to students how their GCSE grades may influence their future life trajectory, such as educational and occupational aspirations (Putwain et al., 2022). The TUFAQ contains three items to measure the frequency of messages regarding failure or its consequences. These items focus on the domains of: access to further education; access to job market; and failure of current exams. An example question measuring the domain of access for further education is: 'How often does your Maths teacher tell your class that unless you work hard you will not get a grade C in maths GCSE and be able to go to college or 6th form?'. The fear appeal frequency factor has been found to have acceptable internal consistency; with Cronbach's α of .72 and .76 (Putwain et al., 2019b) and McDonald ω of .81 (Putwain et al., 2022).

5.4.2.1.2   Threat Appraisal

A threat appraisal is defined by the anticipation of potential loss or harm, with a focus on self-worth protection. This type of appraisal is accompanied by avoidance-oriented cognitions and behaviours (e.g. withdrawal of effort or devaluing achievement) and negative emotions (e.g. anxiety) (Putwain et al., 2019b). The TUFAQ contains six items to measure threat appraisal. For each of the three domain areas (access to further education; access to job market; and failure of current exams), there are two threat appraisal items, one measuring cognition-behaviour (e.g., thoughts about failure) and one

measuring emotion-behaviour (e.g., feelings of worry). An example question which measures the emotion-behaviour response in the domain of access to the job market, after students are initially asked to respond to the frequency item of 'How often does your maths teacher tell your class that you will find it difficult to get a good job if you fail GCSE maths', they are then asked 'if your maths teacher says this, do you feel worried about failing GCSE maths'. This factor has been found to have good internal consistency with a Cronbach's α of .86 and .85 (Putwain et al., 2019b) and McDonald ω of .81 (Putwain et al., 2022).

5.4.2.1.3   Challenge Appraisal

A challenge appraisal is defined as being growth and mastery focused, with the view that with effort, a successful outcome could be achieved. This appraisal is accompanied by approach-orientated cognitions and behaviours (e.g. intending to engage in actions which are likely to facilitative success), and positive emotions (e.g. hope and optimism) (Putwain et al., 2019a). The TUFAQ contains six items to measure challenge appraisal. For each of the three domain areas (access to further education; access to job market; and failure of current exams) there are two challenge appraisal items, one measuring cognition-behaviour (e.g., thoughts about success and effort) and one measuring emotion-behaviour (e.g., feelings of inspiration, encouragement, and hope). An example question which measures the cognition-behaviour response in the domain of failure of current exams, students are initially asked to respond to the frequency item of 'How often does your maths teacher tell your class that unless you work hard you will fail your maths GCSE', and then are asked to respond to 'if your maths teacher says this, do you think if I make an effort I will pass GCSE maths'. This factor has been found to have good internal consistency, with Cronbach's α of .86 and .95 (Putwain et al., 2019b) and McDonald ω of .89 (Putwain et al., 2022).

5.4.2.2   Teachers' Use of Efficacy Appeals in the Classroom Prior to High-Stakes Exams Questionnaire

Efficacy appeals were measured using the Teachers' use of Efficacy Appeals in the Classroom Prior to High-Stakes Exams (TEACHE) Questionnaire. Study Two (see Chapter 4) details the development, refinement and validation process of the data obtained from this questionnaire. Within the current

data, the three sub-scales of the measure provide acceptable levels of internal consistency: Efficacy Appeal frequency (Cronbach's α of .74; McDonald ω of .75); Perceived Response Efficacy (Cronbach's α of .73; McDonald ω of .74); and Perceived Self-Efficacy (Cronbach's α of .79; McDonald ω of .79).

5.4.2.3   *Motivation and Engagement scale*

Student engagement was measured using three sub-scales, comprising of 12 items from the Motivation and Engagement Scale (MES; Martin, 2012). The MES is comprised of 44 items which relates to Martin's (2012) Motivation and Engagement Wheel. The Motivation and Engagement Wheel provides a framework which integrates a number of theoretical perspectives on motivation and engagement and combines them into a tool which, although represents a complex aggregation of theory, is presented in a way which is useful for both students and educators to understand and use (Martin, 2012a).

The Motivation and Engagement Wheel is represented by four first-order factors: Booster behaviours; Booster thoughts; Mufflers and Guzzlers. The effect of participant insufficient effort responding (whereby participants respond to instruments with low motivation, or provide inaccurate results (Huang et al., 2012)) can be reduced by decreasing survey length (Nguyen, 2017). Therefore, in order to reduce the potential of this occurrence, it was decided that for the current research, there should be a focus on one element from the MES due to an already lengthy number of items from the other measures. For the purposes of the current study, the items relating to booster behaviours were utilised. Booster behaviours relates to adaptive engagement and is comprised of three facets: Persistence, Planning, Task management. This construct was selected because of its relationships with other educational outcomes, such as: academic achievement; educational aspirations; class participation; homework completion; and class enjoyment (Martin, 2012b). More generally, these sub-scales are based upon the concepts of self-regulation and persistence, which have been found through meta-analysis data to be related to academic achievement (Dent & Koenka, 2016; Ergen & Kanadli, 2017), interpersonal behaviours and employment (Robson et al., 2020). The three subscales each had four items. All items were adapted to be specific to math which is appropriate in order to consider factors at a domain-specific level (Green et al., 2007). Participants responded to all items on a 7-point Likert scale (1 = disagree strongly, 4 = neither agree nor disagree, 7 = agree strongly).

Persistence refers to how much students keep trying to work out an answer or to understand a problem even when that problem is difficult or is challenging. An example item for persistence asks, 'If I can't understand my math work at first, I keep going until I do'. Planning relates to how much students plan their schoolwork, assignments, and study, and how much they keep track of their progress as they are doing them. An example of a question for the planning sub-scale is: 'Before I start an assignment in maths, I plan out how I'm going to do it'. Task Management refers to the way students use their study time, organise their study timetable, and choose and arrange when they study. An example item for this scale is: 'When I study for maths, I usually study in places where I can concentrate'.

Prior research has established the construct validity, convergent validity and discriminant validity of data collected using the full version of the scale (Liem & Martin, 2012; Martin et al., 2010). When focusing specifically on the adaptive engagement first-order factor, good factor loadings are demonstrated for both the three sub-scales as a whole, and the items within these sub-scales (Martin, 2012b). The internal reliability of these subscales have also been demonstrated, with Cronbach's α for Persistence at .81; Planning .77; and Task Management .82 (Martin, 2012b).

5.4.2.4 Classroom Life Measure

In order to measure teacher-student relationship, items were selected from the Classroom Life Instrument (CLI) (Johnson et al., 1983). The CLI was developed to measure levels of cooperative learning and social support within the classroom environment (Johnson et al., 1985). The CLI is comprised of 12 factors. For the current study, two of the factors were utilised: Teacher Academic Support (four items) and Teacher Personal Support (four items). These items are measured on a 5-point Likert scale from 'Strongly Disagree' to 'Strongly Agree', and items were adapted to focus students' to reflect on their maths teacher.

Teacher Academic Support items focus on the extent to which students feel their teachers provide support with their learning, e.g. 'My maths teachers cares about how much I learn' and 'My maths teacher wants me to do my best maths work'. This subscale has been found to have acceptable levels

of internal reliability with Cronbach's α of .78 (Johnson et al., 1983; Johnson et al., 1985). Teacher Personal Support items focus on how students feel their teacher cares for them and interacts with them interpersonally, e.g. 'My maths teacher really cares about me' and 'My maths teacher treats me in a friendly manner'. This subscale has been found to have good levels of internal reliability with Cronbach's α of .80 (Johnson et al., 1983; Johnson et al., 1985).

5.4.3   Procedure

Ethical approval was provided from the ethics committee at Liverpool John Moores University (REC reference number: 19/EDC/010) (see Appendix L for ethics approval letter). Consent was sought from school gatekeepers to undertake the research within school grounds and time. School gatekeepers facilitated the opt-out consent process from parents. Parents were provided with information about the study and had two weeks to inform the school if they wished their child not to be involved in the study. Students undertook the paper-based questionnaire within form-time as to avoid missing learning activities. Form teachers were provided with a script to read to students (See Appendix J) which provided instructions for completion of the questionnaire. Questionnaires were presented in one pack, which included an information sheet and consent form for students to provide opt-in consent (see Appendix M for Participant Materials). To minimise order effects, there were two variations of the questionnaire, with the order of the scales differing in each.

5.4.4   Analytical Approach

Analyses were conducted using M*plus* v.8 software (Muthén & Muthén, 2017a). Model fit was established by the root mean square error of approximation (RMSEA), standardized root mean square residual (SRMR), comparative fit index (CFI) and Tucker-Lewis index (TLI). Guidelines suggest that an acceptable fitting model would typically have RMSEA $\leq$ .08 and SRMR values of $\leq$ .05, and CFI and TLI values $\geq$.95 (Marsh et al., 2005; Marsh et al., 2004; Martin et al., 2010). However, a degree of leniency should be applied when working with real-world data (Heene et al., 2011).

5.4.4.1 Scale Reliability

Reliability analysis was conducted to explore the data generated by the measures. Although Cronbach's α is the dominant approach used to measure internal consistency of data from multi-item measurement scales (McNeish, 2018), it requires a rigid set of assumptions which are unlikely to be met in many measurement situations, particularly when using psychological data (McNeish, 2018; Hayes & Coutts, 2020). McNeish (2018) outlines four assumptions upon which Cronbach's α is based. These assumptions and their implications in relation to psychological multi-item measurement scales are outlined presently. Firstly, scales must adhere to tau equivalence, meaning each item on a scale contributes equally to the total scale score. When using well-established measures, items with low factor loadings are already likely to have been purged from the scale (and therefore may be more likely to have tau-equivalence). However, when developing new measures or using measures which are constructed ad hoc for use in a specific study, items with smaller factor loadings may be used which may increase the chances of violating tau-equivalence (Hayes & Coutts, 2020). Most scales used in empirical research using multi-item measurement scales are congeneric and therefore violate tau equivalence (Hayes & Coutts, 2020). Secondly, scale items are assumed to be on a continual scale and normally distributed. It is commonplace for psychological scales to use discrete measurement scales such as Likert scales, which violates this assumption. Thirdly, Cronbach's α assumes that errors of scale items do not covary; this occurs when sources other than the construct being measured cause item responses to be related to one another. Finally, the scale needs to be unidimensional, meaning items all measure the same underlying construct. Within the current study, several of the measures used have been modified, with only certain sub-scales from the full measure utilised (MES; Martin, 2012; Teacher-Student Relationship; Johnson, Johnson & Anderson, 1983) and therefore may be more likely to violate tau-equivalence. Additionally, all of the scales used utilise discrete items in the form of a Likert scale, rather than a continual scale. Therefore, it would be prudent to acknowledge the potential that the current dataset may have violated some of these assumptions. Due to these highlighted issues, which are invariably common within psychological multi- item measurement scales, there is growing suggestion in the literature for a shift to alternative measures. McDonald Omega (ω)

is an often-cited superior method (Hayes & Coutt, 2020; Zinbarg, 2005). For completeness, both Cronbach's α and McDonald Omega ω were undertaken.

5.4.4.2 Confirmatory Factor Analyses

Confirmatory factor analyses (CFA) were conducted in M*plus* v.8 software (Muthén & Muthén, 2017a), to explore the factorial validity of the scales used. Maximum-likelihood with robustness to non-normality (MLR) (Muthén & Muthén, 2017a) was used as a method of estimation due to the high kurtosis value of TSR. Clusters of students within classes was adjusted for using the 'cluster' command under the 'complex' method in M*plus;* allowing for the adjustment of standard errors to not bias significance tests (Muthén & Muthén, 2017a).

5.4.4.3 Intra-Class Correlations

Intra-class correlations were used to explore the percentage of variance of variables attributable to the classroom level in order to inform how to model data at the individual and class level. As it is important to consider the potential wider contextual influences upon students' responses, such as class membership, teacher and attainment-level setting, the data were modelled at the individual-level and class-level. Level 1 (L1) variables are variables at the individual/student level. They indicate individual-level perceptions of the classroom environment giving insight to cognitive, behavioural or motivational outcomes; providing awareness to the phenomenology of the student (Lüdtke et al., 2009). Level 2 (L2) variables are those at the class level. L2 variables can be calculated either at true L2 level measures (i.e., objective measure of the L2 variable), or by aggregating L1 variable responses to yield a measure of the shared perception of the environment (Lüdtke et al., 2009). These aggregated student perceptions of the classroom environment can provide insight as to how different environments affect student outcomes in different classes (Lüdtke et al., 2009) and how much variance within individual-level responses is explained by the students' classroom (Marsh et al., 2012). L2 variables can be contextual or climate constructs. Contextual constructs are those which are L2 aggregates of L1 characteristics which are specific to each person in the class. Contextual effects occur when there are group level effects beyond those explained by individual characteristics (Marsh, Lüdtke, Robitzsch, et al., 2009). Whereas, climate constructs are L2 aggregates of ratings by students, in which

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students are asked to rate a characteristic of the group which is common to all students; in other words, where all the students in the same class rate the same classroom climate and students are directly rating the L2 construct (Marsh et al., 2012). Therefore, the use of individual student ratings (L1) allows for analysis at an individual and a group level. However, it is necessary to settle on an appropriate procedure for this hierarchical data based upon a conceptual perspective (Lüdtke et al., 2009). In the present study, the frequency of fear appeals, and frequency of efficacy appeals can be theoretically considered as a L2 variable because they are climate constructs i.e., all students in the same class are rating their teachers' frequency of efficacy and fear appeals.

After theoretical considerations for individual or class level decisions have been made, it is important to assess whether the aggregated student responses provide a psychometrically sound measure of the construct. A simple way to assert whether aggregated individual-level ratings are a reliable indicator of group-level constructs is to use intra-class correlations: ICC1 and ICC2 (Lüdtke et al., 2009). The ICC1 indicates the proportion of total variance that can be attributed to between-class differences, i.e. how much variation in the measure could be attributed to the class level (Marsh et al., 2012). It can be used as a measure of an effect size indicating the extent to which individual ratings are affected by the learning environment (e.g. being in different classes) (Lüdtke et al., 2009). A higher ICC1 indicates large systematic difference between classes, implying that there is more agreement amongst students within the same class than between students from different classes. However, if the ICC1 is close to 0, this indicates there is little differentiation between classes in relation to the climate construct (Marsh et al., 2012). There are no specified cut offs for considering ICC1 values, with some researchers positing typical ranges between .05 and .25 (Hedges & Hedberg, 2007; Lüdtke et al., 2006; Voss et al., 2022). Whilst others suggest that within educational research, typical ICC1 values for climate variables are typically above .10 and rarely greater than .30 (Bliese, 2000), however, this can be larger for contextual variables (Marsh, Lüdtke, Trautwein, et al., 2009).

The ICC2 indicates the degree of agreement from participants of the scale (Lüdtke et al., 2009). In other words, whether there is a sufficiently large enough number of students in each class to ensure the differences noted between classes in the ICC1 are reliable (Marsh et al., 2012). Values between

.70 and .85 generally indicate acceptable levels of reliability for ICC2 (Lüdtke et al., 2006). By considering variables with an individual and class-level approach, this can allow for multi-level modelling (MLM) approaches to be adopted, which allows for the effects of individual students' perceptions and class-average perceptions of the learning environment to be modelled at the individual-level, class-level, or simultaneously at both.

5.4.4.4 *Multi-Level Confirmatory Factor Analyses*

When exploring Multi-level CFAs (ML-CFAs) a doubly latent approach was attempted. The doubly latent approach can be advantageous as it controls for sampling error, however when there are a small number of participants, this can result in this approach having convergence problems or unstable model estimates (Marsh, Lüdtke, Robitzsch, et al., 2009). Some of the ML measurement models were not well modelled via a doubly latent approach, therefore latent manifest models were adopted throughout for consistency. Whilst latent manifest models control for sampling error in relation to the aggregation of L1 constructs to L2 constructs, unlike a doubly latent approach, they don't correct for the measurement error due to the sampling of items (Marsh, Lüdtke, Robitzsch, et al., 2009). Multilevel confirmatory factor analytic model (ML-CFA) was then utilised to explore the utility of measurement models (one for Fear Appeals, TSR and Engagement; another for Efficacy Appeals, TSR and Engagement) utilising these latent factors. Bivariate correlations within each measurement model were then explored.

5.4.4.5 *Latent Interaction Structural Equation Modelling*

In order to further explore the relationships between Fear Appeals, Teacher-Student Relationships and Engagement, and Efficacy Appeals, Teacher-Student Relationships and Engagement, latent moderated structural equation modelling (LMS) (Klein & Moosbrugger, 2000) was deployed. This approach is advantageous to explore these relationships due to its statistical efficiency, its simple implementation and its ability to be estimated in commercial software such as M*plus* (Maslowsky et al., 2015). To undertake this analysis, the method advocated by Maslowsky et al. (2015) was adopted. This method involves two stages. Firstly, a measurement model without the interaction term (Model 0) is estimated in order to provide absolute model fit indices (RMSEA, SRMR, CFI, and TLI). These

model fit indices remain the same for the interaction models. The second stage involves estimating the model with the inclusion of the interaction terms to assess the advantage of the model with the interaction terms included. This is assessed through the relative fit indices of: Akaike Information Criterion (AIC), sample-size adjusted Bayesian information (aBIC) and the likelihood ratio test (*D*). A statistically significant *D* indicates a relatively worse model fit for the model without the interaction term. Smaller AIC and aBIC indicates a relatively better fitting model (Hix-Small et al., 2004).

5.4.4.6 *Multi-Level Structural Equation Modelling*

Multi-level structural equation modelling (ML-SEM) was used to explore the predictive nature of Fear and Efficacy variables and TSR on Engagement variables, at both the individual and student level. ML-CFA results guided which variables were modelled at the individual and student level.

5.4.4.7 *Cross-Level Interactions*

In order to explore whether increased class-level frequency of fear and efficacy appeal communications affected the relationship between individual level appraisals upon engagement, cross-level interactions were conducted; followed by simple slopes to explore interactions. For fear appeal communications, nine models were tested. L1 Fear Appeal Frequency, Threat Appraisal and Challenge Appraisal were modelled as predictors, with L2 Fear Appeal Frequency as a moderator, and L1 Engagement variables modelled as outcome variables. For efficacy appeal communications, nine models were tested. L1 Efficacy Appeal Frequency, Response Efficacy and Self-efficacy were modelled as predictors, with L2 Efficacy Appeal Frequency as a moderator, and L1 Engagement variables modelled as outcome variables.

5.5   Results

5.5.1   Descriptive Statistics

Table 5.1 provides descriptive statistics of the sub-scales used within Study 3. Most subscales were within acceptable levels of skewness and kurtosis: between -1.5 and 1.5 (Tabachnick & Fidell, 2013), apart from the Academic subscale of TSR scale, which demonstrated a slight kurtosis (2.22). Therefore,

subsequent analysis utilised the MLR function in M*plus*, to account for any deviations in distribution (Muthén & Muthén, 2017b).

5.5.2   Scale Reliability

Results for Cronbach's α and McDonald Omega ω are presented in Table 5.1. In line with Hayes and Coutts (2020) argument, although McDonald Omega ω is a methodologically superior method to Cronbach's α, in reality, the two measures typically produce similar estimates when applied to real data. All but one scale reached an adequate (>.70), good (>.80) or excellent (>.90) level of internal reliability (Cortina, 1993). The Planning sub-scale from the MES fell short of an adequate level of reliability (.67). This is likely due to an error in the data collection process, whereby an item from this scale was missed off the questionnaire. This meant that this scale comprised of three items rather than four. Therefore, it is likely that the reduced three items for the sub-scale is the reason for the lower internal consistency scores, as the construct was not appropriately measured with three items alone.

Hierarchical omega (h) was conducted for the teacher-student relationship scale due to this being modelled as a higher order factor in the following CFAs, comprised of lower-order personal and academic relationship subscales. This higher order factor did not show a good level of internal reliability, despite individual sub-scales of personal T-S relationship and academic T-S relationship receiving good levels of reliability (.85 and .89, respectively). Although some authors indicate a value above .80 indicates unidimensionality of the scales (Rodriguez et al., 2016), there is debate about the appropriateness of utilising this figure as a cut-off (Garcia-Garzon et al., 2021). These findings may indicate that use of the scales together as a general measure of teacher-student relationship may not be ideal in relation to the reliability of the scales. However, the higher order model was deemed to be a superior method to model this data when undertaking a confirmatory factor analysis (see section 5.4.3.2) and therefore further models have proceeded with this higher order approach.

Table 5.1 *Descriptive statistics of sub-scales*

Sub-Scale	Range	Mean	SD	ICC1	Cronbach Alpha (α)	McDonald Omega (ω)	Skewness	Kurtosis
Efficacy Appeal Frequency	1-5	3.61	0.68	.13	.74	.75	-0.57	-.46
Perceived Response Efficacy	1-5	4.02	0.62	.04	.73	.74	-0.96	1.46
Perceived Self-efficacy	1-5	3.61	0.78	.09	.79	.79	-0.75	0.85
Engagement: Planning (MES)	1-7	3.67	1.32	.02	.67	.67	0.06	-0.52
Engagement: Persistence (MES)	1-7	4.80	1.23	.07	.81	.81	-0.58	0.19
Engagement: Task Management (MES)	1-7	4.50	1.44	.01	.84	.84	-0.42	-0.42
Teacher-Student Relationship (Personal)	1-5	3.70	.89	.14	.85	.85	-0.48	-0.05
Teacher-Student Relationship (Academic)	1-5	4.25	.75	.09	.89	.89	-1.23	2.22
Teacher-Student Relationship (Total)	1-5	3.98	.76	.12	—	.56*	-0.74	0.76
TUFAQ Frequency	1-5	2.68	1.18	.28	.80	.80	0.23	-1.01
TUFAQ Challenge	1-5	3.52	.80	.02	.78	.80	-0.43	0.14
TUFAQ Threat	1-5	2.70	1.06	.16	.87	.87	0.16	0.15

Note. * indicates Hierarchical McDonald Omega (h)

5.5.3   Individual and Class-Level Factors (ICC1 and ICC2)

5.5.3.1   ICC1

ICC1 figures for all sub-scales are provided in Table 5.1. Of particular interest is that of Fear Appeal Frequency and Efficacy Appeal Frequency as these are theoretically climate constructs. The ICC1 for fear appeal frequency is .28; meaning 28% of the total variance of teacher fear appeal communications is attributable to between class differences. Typically, within the educational fear appeal literature, the class-level variance of Fear Appeal Frequency ranges between 19% to 46% (Putwain & Remedios, 2014a, 2014b; Putwain, Remedios, et al., 2016; Putwain, Symes, et al., 2017).   The current findings therefore appear congruent with previous literature. The ICC1 for efficacy appeal frequency is .13; meaning 13% of the total variance of teacher efficacy appeal communications is attributable to between class differences. Within Study Two the ICC1 for efficacy appeal frequency was calculated at 6.7%, therefore this study found higher differences between classes; likely due to an increased number of classes and schools utilised within Study Three compared to Study Two (see discussion in section 4.6.5.2). These findings also appear congruent with consideration of the typically ranging ICC1 values for climate variables within educational research (0.1- 0.3) (Bliese, 2000). ICC1 results informed the nature of how multi-level confirmatory factor analyses were modelled for each construct and are further discussed below.

5.5.3.2   ICC2

The ICC2 value for Fear Appeal Frequency was .86, indicating a good level of internal consistency. For Efficacy Appeal Frequency the ICC2 was calculated at .69, falling just short of the acceptable range of internal consistency. This means that there are a sufficiently large enough number of students in each class to ensure that the differences noted between the classes in the ICC1 for these classroom-level constructs are reliable (Marsh et al., 2012).

5.5.4 Confirmatory Factor Analysis

5.5.4.1 The Motivation and Engagement Scale

5.5.4.1.1 Single-Level CFA

Engagement was measured by three subscales: Persistence, Planning and Task Management. A lower order model and a higher order model were conducted to explore whether it was more effective to model the sub-scales individually (lower order) or within a broader concept of 'Positive Engagement' (higher order). Table 5.2 presents the model fit statistics for these models.

Table 5.2 *Model fit statistics for the single-level lower and higher order MES CFAs*

Model	χ^2 (df)	RMSEA	SRMR	CFI	TLI	Factor Loadings
Lower order	192.827 (41)	.060	.041	.954	.938	.659-.828
Higher order	341.487 (43)	.082	.088	.910	.884	.540-.911

The model fit statistics for the higher order model did not perform as well as the lower order model. In order to explore whether the difference between these models was statistically significant, a Chi-Squared Difference Test using the Santorra-Bentler Scaled Chi-Square was performed. The Santorra-Bentler Scaled Chi Square Difference Test calculated that the models were significantly different; $\Delta\chi^2$ (2) = 106.29, p < .001. Thereby indicating that the lower order model provides a better fit to the data (Werner & Schermelleh-Engel, 2010) and so, the items should not be used in a higher order model of 'Positive Engagement', and instead should be used as three lower order factors.

Research exploring the factor structure of the MES generally suggests that when considering all four aspects of the MES (positive engagement, negative engagement, positive motivation, negative motivation), a higher-order model provides an acceptable model and yields relatively similar model fit statistics to a lower order model (Martin et al., 2017; Schardt, 2019). However, Schardt (2019) did

not provide TLI figures and used the less strict criteria of .08 for SRMR model fit, thereby querying the reliability of these findings. Results from the current study may indicate that for a successful higher order MES model, all four factors of the MES are required. Data from the current study indicated that a lower order model would be more appropriate, particularly considering the need to build upon this measurement model for further analysis, so a stronger fitting model would be advantageous.

5.5.4.1.2 Multi-Level CFA

A latent manifest multi-level (ML) model was conducted to explore the measurement model of the MES at both the between and within level. Although there are no set thresholds when assessing ICC coefficients, a general consensus within the educational literature indicate that ICC1s should be close to, or higher than 0.1 (Lüdtke et al., 2008) and typically range between .05 and .25 (Hedges & Hedberg, 2007; Lüdtke et al., 2006; Voss et al., 2022). The ICC1 coefficient for the Planning and Task Management sub-scales were .02 and .01, respectfully. Therefore, it was deemed inappropriate to model these at the between level due to minimal variation at the higher level. The Persistence sub-scale had an ICC1 of .07, thereby falling within more typically expected ranges. Consequently, the ML Model was specified with all three sub-scales modelled at the within level and only the Persistence sub-scale measured at the between level. This model provided acceptable model fit statistics: χ^2 (43) = 170.862, RMSEA = .054, SRMRW = .039, SRMRB = .016, CFI = .958, and TLI = .940, factor loadings for within ranging from .569 to .866 and between .530 to .946.

5.5.4.2 Teacher-Student Relationship Scale

5.5.4.2.1 Single-Level CFA

Teacher-Student Relationship was measured by two subscales: Academic and Personal. A lower order model and a higher order model were tested to explore whether it was more effective to model the sub-scales individually or within one general factor of Teacher-Student Relationship. Within the higher order model, a number of model constraints were applied in order to allow the model to converge: the factor loadings for both factors were constrained to 1; the covariance between the personal and academic factors was constrained to 0; and the residual variance for the academic subscale was constrained to above 0 (due to the model displaying negative residual variance likely due to strong

covariance between the residuals for the 2 lower order factors). Table 5.3 presents the model fit statistics for the higher order and lower order models.

It was not possible to conduct a Chi-Squared Difference Test to compare the models due to the models containing the same degree of freedom, therefore the AIC and BIC figures were used to explore the advantageousness of the models. The lower order model offered an AIC of 17927.175 and BIC of 18050.922 and the higher order model provided an AIC of 17497.461 and BIC of 17620.650. When comparing AIC and BIC, the model with a minimal value of AIC or BIC indicates a more optimal model fit (Lin et al., 2017) and a change of 10 or higher indicates a substantially better model fit (Raferty, 1995). Therefore, the higher order model was deemed a more acceptable model for the Teacher-Student Relationship scale.

Table 5.3 *Model fit statistics for the single-level lower and higher order TSR CFAs*

Model	χ² (df)	RMSEA	SRMR	CFI	TLI	Factor Loadings
Lower order	120.003 (19)	.072	.038	.961	.942	.721-.843
Higher order	114.358 (19)	.070	.041	.963	.946	.719-.843

5.5.4.2.2   Multi-Level CFA

The ICC1 for both TSR constructs are considered within the typically range for a climate variable (Hedges & Hedberg, 2007; Lüdtke et al., 2006; Voss et al., 2022). Therefore, a latent manifest model was conducted to explore the measurement model of the TSR at the between and within level. Initially a model was tested which contained both academic and personal scales at both the within and between level, but this did not provide a good model fit: χ^2 (38) = 482.306, RMSEA = .106, SRMRW = .039, SRMRB = .102, CFI = .845, and TLI = .772, factor loadings for within ranging from .708 to .831 and between .412 to .951. Subsequently, a multi-level exploratory factor analysis (ML-EFA) was undertaken to explore the factor structure of the items at both levels. The ML-EFA indicated that a two-factor

structure was appropriate for the within-level portion of the model, but at the between-level portion, TSR was more appropriately modelled within one factor and a reduction of items. It is not uncommon for there to be a different factor structure across level one and level two (Marsh, Lüdtke, Robitzsch, et al., 2009; Zimprich et al., 2005). Zimprich et al. (2005) propose this can be for a multitude of reasons. For example, when considering the nature of the classroom as a social context, this may provide a characteristic set of experiences for members within a class; these shared experiences may then be actively interpreted by individuals when considering the variable at hand. Alternatively, there may be mutual influences of classmates, with individual students comparing themselves to peers. This may be relevant in the current research, with students' experiences of relationships with their teacher being impacted by their perception of their classmates' relationships with the teacher.

Utilising results from the ML-EFA, an alternative model was explored whereby at the within level there was a higher order model comprised of two subscales of personal and academic (with covariance between the sub-scales constrained to 0 and factor loadings constrained to 1) and at the between level, one factor was created to measure teacher-student relationship generally, using 5 items from the scale (items 1,3,4,5,8). The factor loadings for the Personal and Academic subscales on the higher order Teacher-Student Relationship scale were .836 and 1.007 respectfully. This model provided acceptable model fit statistics: χ^2 (23) = 132.595, RMSEA = .068, SRMRW = .039, SRMRB = .024, CFI = .957, and TLI = .932, factor loadings for within ranging from .708 to .831 and between .766 to .942. Therefore, this alternative model was utilised in the measurement model.

5.5.4.3 Teachers' Use of Fear Appeals Scale

5.5.4.3.1 Single-Level CFA

Initially, CFAs were conducted on the individual subscales: Frequency, Threat, and Challenge. The Frequency subscale demonstrated good model fit statistics: χ^2 (1) = 5.191, RMSEA = .064, SRMR = .034, CFI = .998, and TLI = .994, factor loadings ranging from .711 - .802. However, the Threat and Challenge subscales provided poor model statistics, even with optimising options such as correlating the residual variance between items or removing items with poor factor loadings.

In order to try and better understand the data, an exploratory factor analysis (EFA) was performed on the Challenge and Threat sub-scales. The results indicated that the emotion items within the subscales performed well, but the cognitive items did not. Therefore, an alternative model was produced which utilised the three Challenge emotion items, and three Threat emotion items as two sub-scales (with the residuals correlated at the domain levels); this provided good model fit statistics χ^2 (5) = 11.424, RMSEA = .036, SRMR = .025, CFI = .995, and TLI = .984, factor loadings ranging from .675 to .901. When combining the emotion Threat, emotion Challenge and Frequency items (with the residuals correlated at the domain level) into one lower order model, this provided good model fit statistics: χ^2 (15) = 29.847, RMSEA = .031, SRMR = .025, CFI = .993, and TLI = .984, factor loadings ranging from .608 to .902.

5.5.4.3.2 Multi-Level CFA

The ICC1 coefficients for Fear Appeal Frequency, Challenge Appraisal and Threat Appraisal were .28, .02, and .16, respectfully. Despite Challenge Appraisal being lower than the typical range for a climate variable (.05 to .25) (Hedges & Hedberg, 2007; Lüdtke et al., 2006; Voss et al., 2022), all constructs were modelled at the between and within level, in line with previous research in the field (Putwain, Nicholson, et al., 2016; Putwain & Remedios, 2014b). A latent manifest multi-level model was conducted using the three Frequency items, the 3-item Threat emotion items, and the 3-item Challenge emotion items (with residual variance correlated at the domain level) at both the between and within level. This provided good model fit statistics: statistics χ^2 (30) = 33.837, RMSEA = .011, SRMRW = .021, SRMRB = .046, CFI = .998, and TLI = .996, factor loadings for within ranging from .620 to .906, and between .585 to .918.

5.5.4.4 Teachers' Use of Efficacy Scale

5.5.4.4.1 Single-Level CFA

The TEACHE utilised three sub-scales: Frequency, Response Efficacy and Self-Efficacy. When these sub-scales were modelled in a single-level model (with the residuals for the domain items between the

subscales correlated); this model demonstrated an acceptable model fit: χ^2 (114) = 252.079, RMSEA = .034, SRMR = .036, CFI = .969, and TLI = .958, factor loadings ranging from .458 to .713.

5.5.4.4.2   Multi-Level CFA

Latent manifest multi-level modelling was undertaken to explore the measurement model at the within and between level. Within all models, all items for the three sub-scales were included and residual variance were correlated at the domain level. Model fit statistics for the various models are presented in Table 5.4.

Table 5.4 *Model fit statistics for the ML TEACHE CFAs*

Model	χ^2 (df)	RMSEA	SRMR within	SRMR between	CFI	TLI	Factor Loadings within	Factor Loadings between
1	527.379 (228)	.036	.034	.110	.938	.916	.459-.687	.313-.862
2	337.256 (161)	.032	.034	.087	.958	.943	.471-.687	.307-.860
3	238.991 (123)	.030	.034	.084	.970	.959	.459-.687	.292-.852

In Model 1, all sub-scales were modelled at both the between and within level, but model fit statistics indicated a poor fit at the between level. In Model 2, Frequency and Self-efficacy were modelled at both the between and within levels, and Response efficacy at the within level only. This model was theorised based upon the ICC data, where the class level variance for Frequency, Self-efficacy and Response Efficacy was 13%, 9% and 4% respectively. This hypothesis was data-driven, using the larger ICC1 (using the typical ranges of .05 to .25 (Hedges & Hedberg, 2007; Lüdtke et al., 2006; Voss et al., 2022)) to indicate that the Frequency and Self-efficacy variables may be more appropriately modelled at both the within and between levels due to the greater level of variance amongst students in the same class, signifying that there is the potential to view these variables as a climate construct. Typically, the SRMR figure would be expected to be below 0.6 for an acceptable model fit (Marsh et al., 2005; Marsh et al., 2004; Martin et al., 2010). However, in their discussion about model fit statistics for

indication of appropriate model fit in multi-level CFAs, Padgett and Morgan (2021) propose that the performance of model-fit indices for between-level variables can be impeded when the sample size of classes is below 100 (within the present study there are 73). Therefore, based upon their assertion that if the other model fit statistics are well fitting, then a higher SRMRB figure can be deemed acceptable.

In Model 3, only the Frequency sub-scale was modelled at both the between and within levels, and Self-efficacy and Response efficacy were modelled at the within level only. This model was proposed based upon theoretical considerations of the nature of the variables. Frequency items are, in nature, a climate construct, as they are most often used as communications to the class as a whole (Putwain, Remedios, et al., 2016). However, with Self-efficacy and Response Efficacy, where the appraisal of these communications is individualistic in nature (i.e., do *I* think this will work?; do *I* think *I* can do this?), these variables may be more appropriately modelled at the within level only. It is appreciated that these constructs are not solely individualistic. Indeed as Bandura asserts 'people do not live their lives autonomously' (Bandura, 2006p. 316), and the classroom environment is anticipated to hold some level of group-level effects (Hutchinson, 2003). However, given the nature of these constructs, which focus on beliefs about one's ability and whether they believe a response to be effective (Bandura, 2006; Witte et al., 1996), the appraisal process is individualistic in nature. In their study exploring the individual and group level nature of motivation and engagement constructs, Martin and Marsh (2005) found no significant class-level or school-level effects of self-efficacy, whereas this was present in other constructs, such as teacher-student relationship, leading them to assert that constructs which relate more explicitly to class and teacher factors have more class-level variance.

Out of these two variables, Response Efficacy would be anticipated to gain a higher-level class variance than self-efficacy. Response Efficacy appraisals, although individual in nature, could be anticipated to be impacted by contextual factors, such as the method of transmission of these comments from the teacher, which would be expected at a class level (Martin & Marsh, 2005). Indeed, as Martin and Marsh assert, 'the more mentalistic or intrapsychic dimensions there exists more variance at the student level, and as the construct involves factors external to the individual, the context plays more of a role'

(2005, pp. 331). The data-driven approach of Model 2 therefore causes some misalignment with theoretical expectations. As Marsh asserts, 'it is recommended that theory be the basis for the design/selection of measured variables, the formulation of hierarchical models, and the evaluation of results in hierarchical confirmatory factor analysis' (Marsh, 1987 p. 36). Therefore, although using Model 3 does limit the ability to analyse cross-level interactions to just the Frequency sub-scale (Bryk & Raudenbush, 1992) this model does provide a superior model fit, is supported by the modelling of the data within Study 2 (see section 4.6.4.1.3.2) and it seems more appropriate to adopt a model which is supported by theoretical justification. Therefore, Model 3 was utilised in subsequent analysis.

5.5.5 Fear Appeal Interactions

5.5.5.1 *Measurement Model to Explore Fear Appeal Interactions*

A ML-CFA was used to explore the effectiveness of the measurement model using latent factors. At the within-level of the model, engagement was measured by a lower order model with 3 subscales: Persistence, Planning and Task Management (see section 5.3.3.1.1). Fear Appeals were measured by a lower order model with 3 subscales: Fear Appeal Frequency, Challenge (emotion items only), Threat (emotion items only) (residual variance was correlated at the domain level) (see section 5.5.3.3.1). Teacher-student relationship was modelled as a higher order model with 2 subscales: Personal and Academic (with the covariance between the sub-scales constrained to 0, and factor loadings for the sub-scales constrained to 1) (see section 5.5.3.2.1).

At the between-level of the model, engagement was modelled by the Persistence sub-scale only (see section 5.5.3.1.2 for discussion). At the between level, fear appeals were modelled by Frequency, Challenge (emotion items only) and Threat (emotion items only) (with residual variance correlated at the domain level) (see section 5.5.3.3.2). Teacher-student relationship was measured on one scale with reduced items (see section 5.4.3.2.2 for discussion). The measurement model generally demonstrated good model fit indices; χ^2 (486) = 1056.298, RMSEA = .034, SRMRW = .037, SRMRB = .074, CFI = .947, and TLI = .936, factor loadings for within ranging from .565 to .993 and between .567 to .943.

5.5.5.2 Bivariate Correlations of Measurement Model

Bivariate correlations for the measurement model can be found within Table 5.5. At the within level, all the Fear Appeal sub-scales were correlated with each other, as were the Engagement subscales. Teacher-Student Relationship and Challenge were correlated with all the engagement sub-scales, whilst Threat was only correlated with the Task Management sub-scale. At the between level, there was a strong correlation between Fear Appeal Frequency and Threat, but it was not related to Challenge; whilst Challenge and Threat were correlated more strongly than they were at Level 1. Teacher-Student Relationship and Engagement Persistence were significantly related to Challenge, but not related to Frequency or Threat. Age was not related to any of the variables and therefore was not included as a covariate in the measurement model. Gender was found to be significantly related to Challenge and Threat and was therefore included as a covariate in subsequent analysis.

5.5.5.3 Latent Interaction Structural Equation Modelling

In order to further explore the relationships between Fear Appeals, Teacher-Student Relationships and Engagement latent moderated structural equation modelling (LMS) (Klein & Moosbrugger, 2000) was deployed.

5.5.5.3.1 Model 0

Model 0 utilised the measurement model described in section 5.5.4.1, with Gender included as a covariate and the addition of linear regressions exploring the variance of Fear Appeal Frequency, Challenge, Threat, and Teacher-Student Relationship on the three Engagement variables (Persistence, Planning and Task management) at the within-level, and upon Engagement Persistence at the between-level. The model provided good model fit statistics: χ^2 (471) = 1203.185, RMSEA = .039, SRMRW = .076, SRMRB = .074, CFI = .931, and TLI = .918, factor loadings for within ranging from .556 to .995 and between .567 to .943.

Table 5.4 *Bivariate Correlations of Measurement Model to explore Fear Appeal Interactions*

	FA Freq	Chall	Threat	TSR	Eng Per	Eng Plan	Eng Task	Gender	Age
Fear Appeal Frequency	-	.26***	.27***	.03	-.04	.16***	.10*	-.03	.01
Fear Appeal Challenge	.25	-	.12*	.42***	.51***	.53***	.39***	-.09**	-.04
Fear Appeal Threat	.64***	.45**	-	.03	-.06	.03	.11**	.28***	.01
Teacher-Student Relationship	-.10	.50**	-.05	-	.39***	.30***	.28***	-.01	-.01
Engagement Persistence	-.19	.63***	-.17	.27	-	.82***	.62***	-.04	.01
Engagement Planning						-	.83***	-.01	-.00
Engagement Task Management							-	.05	-.05
Gender								-	-
Age								-	-

Note. *p<.05. ** p <.01. ***p<.001. Level 1 correlations are presented above the diagonal; Level 2 correlations are presented below the diagonal.

5.5.5.3.2   Models 1-7

A series of LMS were run to explore the potential moderating roles of Fear Appeal Frequency, Challenge, Threat, and Teacher-Student relationship upon the Engagement factors. Table 5.6 provides the results for comparing the interaction models. None of the interaction models were found to be more advantageous than Model 0, when comparing the AIC or aBIC of the models or when calculating the likelihood ratio test; all *D*s were not statistically significant. As there was no advantage to the more complex interaction models, Model 0 was accepted as the final model to explore the variables within a ML-SEM.

Table 5.5 Cross-Level Interaction Models for Fear Appeal Variables

	D (df)	AIC	aBIC	*Δ*AIC	*Δ* aBIC
Model 0		81284.899	81607.018		
(1) Freq x Chall	3.702 (1)	81283.494	81610.923	-0.595	-3.905
(2) Freq x Threat	1.713 (1)	81287.472	81614.900	-2.573	-7.882
(3) Freq x TSR	2.996 (1)	81284.906	81612.334	-0.017	-5.316
(4) Chall x TSR	1.777 (1)	81287.344	81614.772	-2.445	-7.754
(5) Threat x TSR	2.996 (1)	81284.906	81612.334	-0.017	-5.316
(6) FreqB x TSRB	0.586 (1)	81285.727	81609.615	-0.838	-2.597
(7) ChallB x TSRB	0.006 (1)	81286.886	81610.774	-1.997	-3.756
(8) ThreatB x TSRB	1.506 (1)	81283.885	81607.774	1.004	-0.756

Note. All *D*s *p*>.05. *D* indicates difference between log likelihood

5.5.5.4   Multi-Level Structural Equation Modelling: Fear Appeals, Teacher-Student Relationships and Engagement

A Multi-level structural equation model (ML-SEM) was undertaken to explore the predictive relationships of fear appeal variables and teacher-student relationship upon engagement variables. The ML-SEM found that there were significant predictors at both the within-level and the between-level.

At the within level, Persistence was predicted by Fear Appeal Frequency (ß = -.11, *p*=.027), Challenge (ß = .45, *p* <.001) and Teacher-Student Relationship (ß = .26, *p* <.001). Planning was predicted by

Challenge (ß = .47, *p* <.001) and Teacher-Student Relationship (ß = .16, *p* <.001). Task Management was also predicted by Challenge (ß = .32, *p* =.000) and Teacher-Student Relationship (ß = .19, *p* <.001). At the between level, Persistence was predicted by Challenge (ß = 1.08, *p* <.001) and Threat (ß = -.60, *p*<.001). Gender was included as a covariate and was significantly related to Challenge (ß = -.10, *p* =.007) and Threat (ß = .29, *p* <.001).

Figure 5.1 shows the ML-SEM for significant relationships. Standardised beta coefficients for all variables can be found within Table 5.7. Standardised regression coefficients of ß <.10 are considered small; ß<.10 to .25 are moderate, and ß >.25 large (Keith, 2019).

Table 5.6 *Standardised beta coefficients of ML-SEM for Fear Appeal Interactions*

	Persistence	Planning	Task Management	Persistence B	Gender
Fear Freq	-.11*	.09	.03		-.03
Chall	.45***	.47***	.32***		-.10**
Threat	-.08	-.04	.06		.29***
TSR	.26***	.16***	.19***		-.01
Fear FreqB				-.19	
ChallB				1.08***	
ThreatB				-.60***	
TSRB				-.31	
Gender	.32	.05	.07		

*p<.05. ** p <.01. ***p<.001.
Note. TSR - Teacher-Student Relationship; Chall – Challenge Appraisal

Figure 5.1 *ML-SEM to show significant relations from Fear Appeal Frequency, Challenge, Threat, and Teacher-Student Relationship to Engagement variables at the within-level and between level*
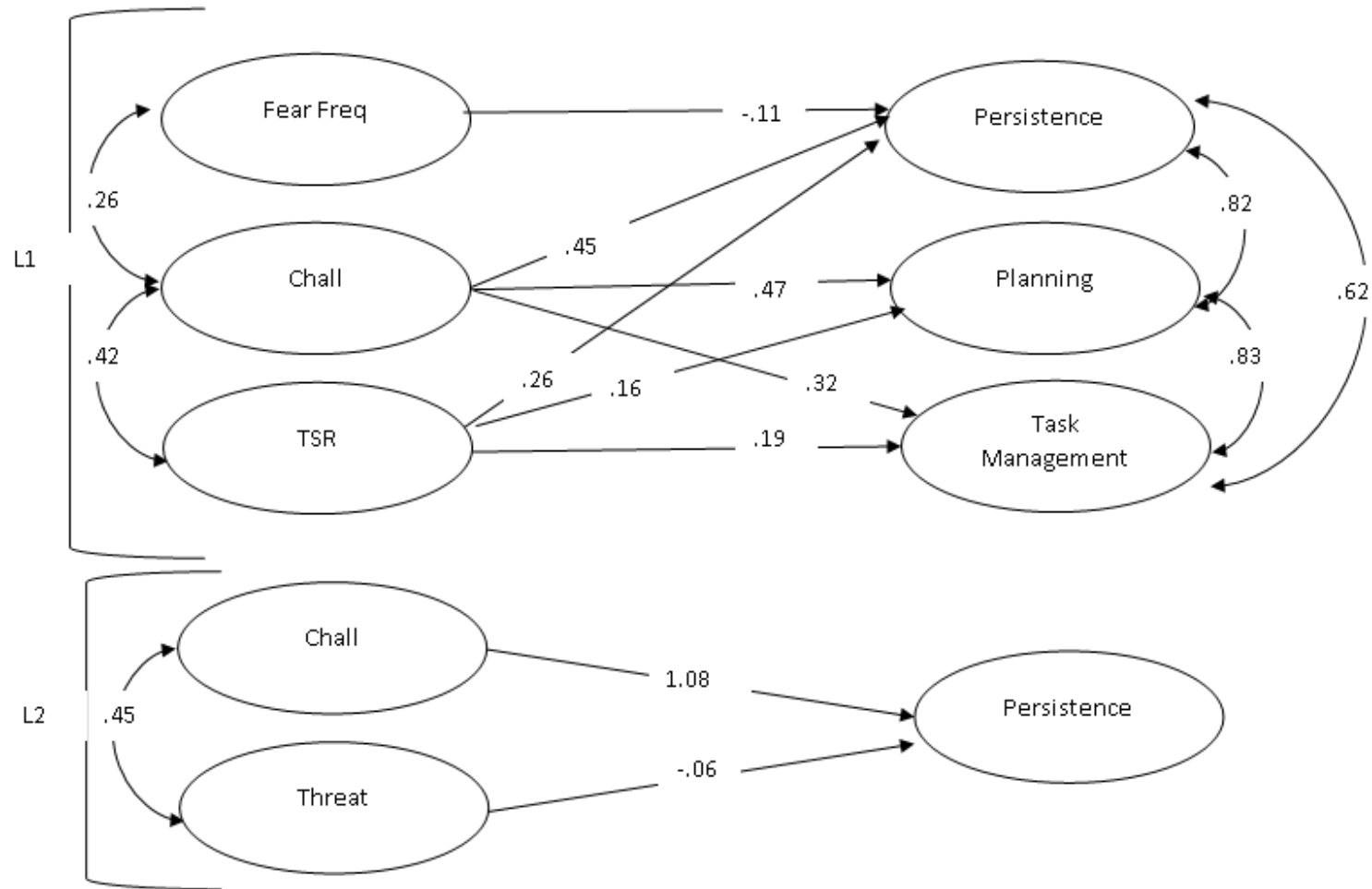
Note. Straight lines show standardised beta coefficients; curved lines show correlations. TSR - Teacher Student Relationship; Chall – Challenge Appraisal

5.5.5.5 Cross-level Interactions

In order to explore whether there is any significant interactional effect across levels, upon engagement factors dependent upon the frequency in which teachers communicate fear appeal statements, cross-level interactions were conducted. In order the explore the potential interaction of L2 fear appeal communications upon engagement factors, nine models were tested. Table 5.8 indicates which models were tested and provides model fit statistics for the models. These findings indicate that the models exploring the interaction between L2 frequency and challenge on engagement persistence (Model 1 in table 5.8), and the interaction between L2 frequency and challenge on engagement task management were significant models (Model 3 in table 5.8). However, when exploring the significance of the interaction, the significant interactions found related to the model exploring the interaction between L2 frequency and challenge on engagement persistence (Model 1), and the interaction between L2 frequency and threat on engagement task management (Model 6 in table 5.8). Therefore, only these latter models were further explored and will be discussed further below.

Table 5.7 *Cross-Level Interaction Models for Fear Appeal Variables*

	D (df)	AIC	aBIC	*Δ*AIC	*Δ* aBIC
Model 0		81284.899	81607.018		
(1) Chall x FreqB on EngPer	7.934** (1)	81273.030	81598.688	11.869	8.33
(2) Chall x FreqB on EngPlan	0.057 (1)	81287.759	81613.417	-2.87	-6.399
(3) Chall x FreqB on EngTask	4.953* (1)	81278.993	81604.651	5.896	2.367
(4) Threat x FreqB on EngPer	0.214(1)	81288.469	81614.128	-3.58	-7.11
(5) Threat x FreqB on EngPlan	1.063 (1)	81286.772	81612.430	-1.873	-5.412
(6) Threat x FreqB on EngTask	2.678(1)	81283.541	81609.200	1.358	-2.182
(7) Freq x FreqB on EngPer	3.172(1)	81282.554	81608.212	2.345	-1.194
(8) Freq x FreqB on EngPlan	0.483 (1)	81288.021	81613.680	-3.122	-6.662
(9) Freq x FreqB on EngTask	0.035 (1)	81288.828	81614.487	-3.929	-7.469

Note. D indicates difference between log likelihood. *p<.05. ** p <.01. ***p<.001. TSR - Teacher Student Relationship; Freq – Fear Appeal Frequency; Chall – Challenge Appraisal

5.5.5.5.1   Cross-Level Interaction Between Challenge Appraisal and Between-level Frequency on Engagement

Persistence

In order to explore the interactions between teachers' use of fear appeal communications (modelled through between-level fear appeal frequency) and students' challenge appraisal upon persistence, a ML-SEM with Cross-level interaction was conducted. Table 5.9 provides the unstandardised beta coefficients of the ML-SEM with the cross-level interaction between L2 fear appeal frequency and challenge upon engagement persistence, with gender included as a covariate. A significant interaction was found for the interaction between L2 fear appeal frequency and challenge upon engagement persistence (B=.18, p=.05).

Table 5.8 *Unstandardised beta coefficients of ML-SEM with Cross-Level Interactions: L1 Challenge x L2 Freq on L1 Engagement Persistence*

	Persistence	Planning	Task Management	Persistence B	Gender
Within Part of Model					
Freq	-.23*	.10	.04		-.05
Challenge	—	.63***	.49***		-.12*
Threat	-.07	-.04	.07		.53***
TSR	.37***	.27***	.36***		-.01
Between Part of Model					
FreqB				.05	
ChallB				.79**	
ThreatB				-.29***	
TSRB				-.18	
ChalxFreqB	.18*				
Gender	.05	.09	.15	—	—

*p<.05. ** p <.01. ***p<.001.*
Note. TSR - Teacher Student Relationship; Freq – Fear Appeal Frequency; Chall – Challenge Appraisal; FreqB – L2 Fear Appeal Frequency

The cross-level interaction found between challenge and between-level fear appeal frequency upon engagement persistence was explored through a simple slope initially created in M*plus* then recreated in Word for ease of viewing (see figure 5.2). Mid Frequency refers the mean frequency of teachers' fear appeal communications. High Frequency shows +1SD of frequency of teachers' fear appeal communications, whilst Low Frequency shows -1SD. The plot demonstrates that there is a positive relationship between challenge appraisal of fear appeals and engagement persistence irrespective of the frequency of which teachers use fear appeal communications to the class. However, the frequency of these communications does amplify this relationship; with higher levels of fear appeal frequency resulting in higher levels of engagement persistence for students with a challenge appraisal.

Figure 5.2 *Simple slope to show the cross-level interaction found between challenge and between-level fear appeal frequency upon persistence*
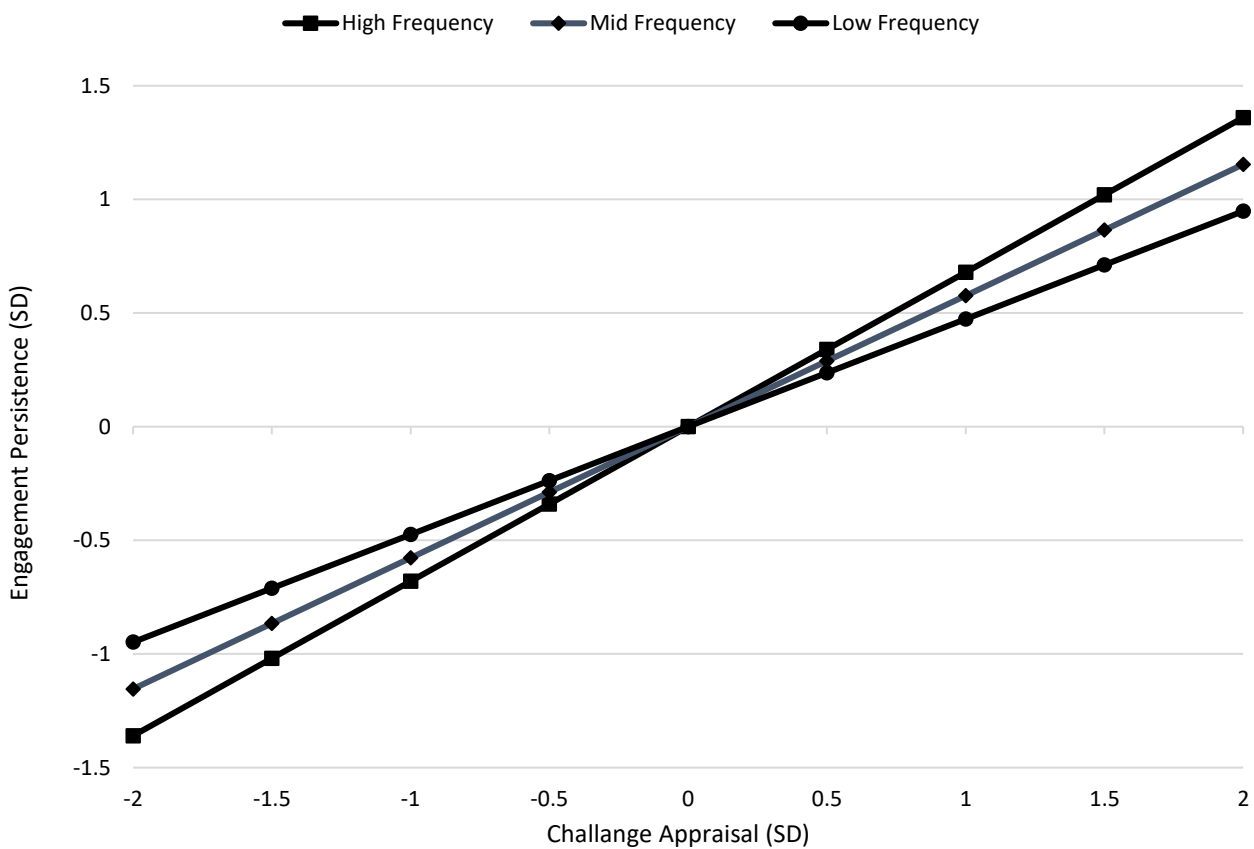
5.5.5.5.2   Cross-Level Interaction Between Threat Appraisal and Between-level Frequency on Engagement

Task Management

In order to explore the interactions between teachers' use of fear appeal communications (modelled through between-level fear appeal frequency) and students' threat appraisal upon task management, a ML-SEM with Cross-level interaction was conducted. Table 5.10 provides the unstandardised beta coefficients of the SEM with the cross-level interaction between L2 fear appeal frequency and threat upon engagement task management. Gender is included as a covariate. A significant interaction was found for the interaction between L2 fear appeal frequency and threat upon engagement task management (B=-.13, p=.01).

Table 5.10 *Unstandardised beta coefficients of SEM with Cross-Level Interactions: L1 Threat x L2 Freq on L1 Engagement Task Management*

	Persistence	Planning	Task Management	Persistence B	Gender
Within Part of Model					
Freq	-.11*	.10*	.04		-.05
Challenge	.54***	.63***	.49***		-.14*
Threat	-.08	-.04	-		.53***
TSR	.38***	.27***	.36***		-.01
Between Part of Model					
FreqB				.05	
ChallB				.79**	
ThreatB				-.30***	
TSRB				-.18	
ThreatxFreqB			-.13**		
Gender	.05	.10	.14	—	—

*p<.05. ** p <.01. ***p<.001.
Note. TSR - Teacher Student Relationship; Freq – Fear Appeal Frequency; Chall – Challenge Appraisal; FreqB – L2 Fear Appeal Frequency

Although a significant cross-level interaction effect was found between threat appraisal and between-level fear appeal frequency upon engagement task management, the model fit was not found to be significantly different, indicating the findings may not be substantial. In order to explore the nature of the relationship, a simple slope plot was created in M*plus* then recreated in Word for ease of viewing (see figure 5.3). Mid Frequency refers the mean frequency of teachers' fear appeal communications. High Frequency shows +1SD of frequency of teachers' fear appeal communications, whilst Low Frequency shows -1SD. The plot indicates that when teachers' use of fear appeal communications is low, there is a positive correlation between threat appraisal and engagement task management, when fear appeals increase to a medium level, this correlation diminishes, and becomes negligible when fear appeals are used with high frequency.

Figure 5.3 *Simple slope to show the cross-level interaction found between threat and between-level fear appeal frequency upon task management*
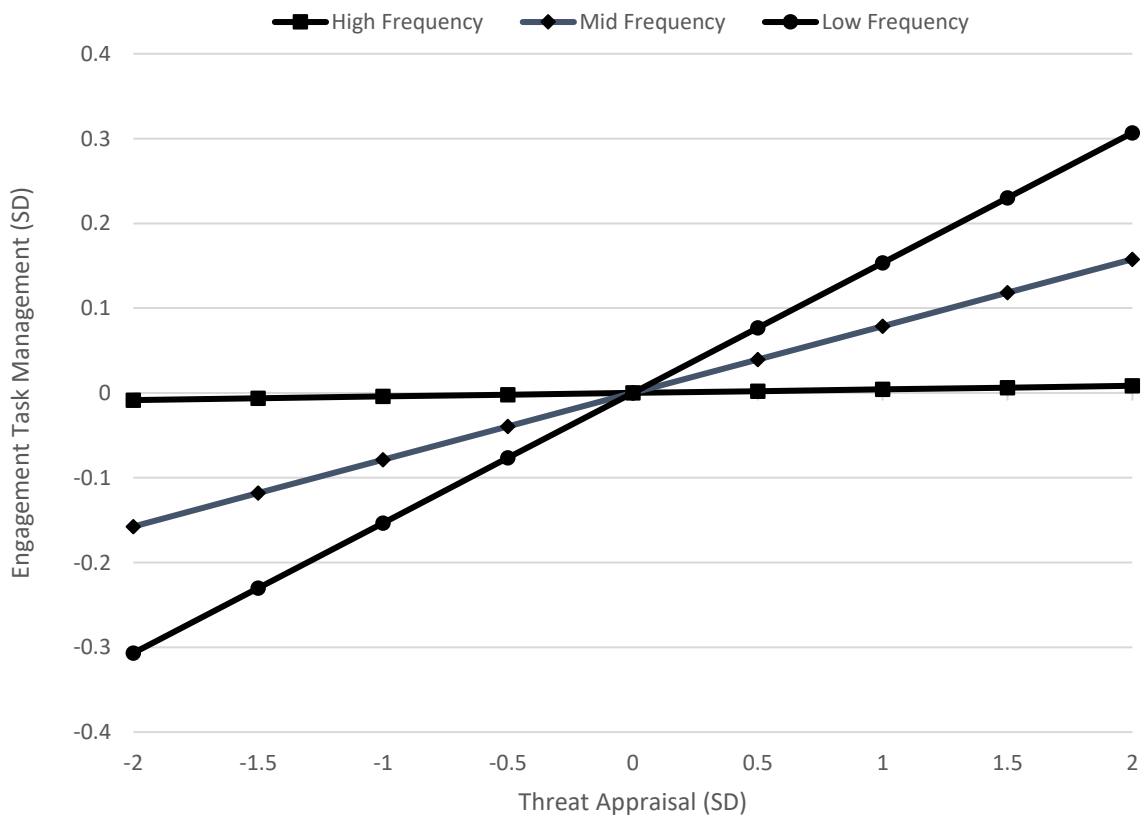
5.5.6   Efficacy Appeal Interactions

5.5.6.1   *Measurement Model to Explore Efficacy Appeal Interactions*

Initially a multilevel confirmatory factor analytic model (ML-CFA) was run to explore the utility of the measurement model utilising these latent factors. At the within-level of the model, engagement was measured by a lower order model with three subscales: Persistence, Planning and Task Management (see section 5.5.3.1.1). Efficacy appeals were measured via three subscales: Efficacy Appeal Frequency, Self-efficacy, and Response Efficacy (with residual variance correlated at the domain level) (see section 5.5.3.4.1). Teacher-student relationship was modelled as a higher order model with two subscales: Personal and Academic (with the covariance between the sub-scales constrained to 0, and factor loadings for the sub-scales constrained to 1) (see section 5.5.3.2.1).

At the between-level of the model, engagement was modelled by the Persistence sub-scale only (See section 5.5.3.1.2 for discussion) and only Efficacy Appeal Frequency was modelled at the between level (See section 5.5.3.4.2 for discussion). Teacher-student relationship was measured on one scale with reduced items (See section 5.5.3.2.2 for discussion).

The measurement model generally demonstrates good model fit indices; χ^2 (676) = 1291.297, RMSEA = .030, SRMRW = .037, SRMRB = .112, CFI = .950, and TLI = .943, factor loadings for within ranging from .490 to .985 and between .313 to .949. Although the SRMRB is higher than would be typically expected from a SRMR figure, there is debate about the utility of this figure when there are small numbers of clusters, and doesn't necessarily suggest an ill-fitting (Padgett & Morgan, 2021) (see discussion in Section 5.5.3.4.2).   Therefore, as the remainder of the model has good model fit indices and factor loadings, this model was accepted for use as a basis for the remainder of the analysis.

5.5.6.2   *Bivariate Correlations of Measurement Model*

The bivariate correlations for the measurement model are provided in Table 5.11. At the within level, significant correlations were found between Teacher-Student Relationship, all Efficacy variables, and all Engagement variables. At the between level, the only significant correlations were identified between Efficacy Frequency and Teacher-Student Relationship.   Gender and Age only had small

correlations with Efficacy Appeal Frequency and Self-efficacy, and therefore were not included as covariates in the measurement model going forward due to their minimal influence.

5.5.6.3 Latent Interaction Structural Equation Modelling

To explore the relationships between Efficacy Appeals, Teacher-Student Relationships and Engagement further, LMS (Klein & Moosbrugger, 2000) was utilised.

5.5.6.3.1 Model 0

Model 0 utilised the measurement model described in section 5.5.5.1, with the addition of linear regressions exploring the variance of Efficacy Appeal Frequency, Self-efficacy, Response Efficacy, and Teacher-Student Relationship on the three Engagement variables (Persistence, Planning and Task management) at the within-level, and Efficacy Appeal Frequency and Teacher-Student Relationship on Engagement Persistence at the between-level. The model provided good model fit statistics; χ^2 (676) = 1291.297, RMSEA = .030, SRMRW = .037, SRMRB = .112, CFI = .950, and TLI = .943, factor loadings for within ranging from .490 to .985 and between .313 to .949.

Table 5.9 *Bivariate Correlations of Measurement Model to explore Efficacy Appeal Interactions*

	EA Freq	RE	SE	TSR	Eng Per	Eng Plan	Eng Task	Gender	Age
Efficacy Appeal Frequency	-	.62***	.73***	.50***	.39***	.45***	.30***	-.08*	.04
Perceived Response Efficacy		-	.77***	.52***	.52***	.46***	.40***	.04	.03
Perceived Self-Efficacy			-	.54***	.51***	.54***	.35***	-.05	.06*
Teacher-Student Relationship	.53***			-	.39***	.31***	.29***	-.01	-.01
Engagement Persistence	.28			.13	-	.83***	.62***	.01	.01
Engagement Planning						-	.35***	.00	.00
Engagement Task Management							-	.05	.05
Gender								-	-
Age									-

Note. *p<.05. ** *p* <.01. ***p<.001. Level 1 correlations are presented above the diagonal; Level 2 correlations are presented below the diagonal. SE - Self-efficacy; RE - Response Efficacy; TSR - Teacher-Student Relationship

A series of LMS were run to explore the potential moderating roles of Efficacy Appeal Frequency, Self-Efficacy, Response Efficacy and Teacher-Student relationship upon the Engagement factors. Table 5.12 indicates which models were tested and provides the results for comparing the interaction models. Although there is no way to assess whether the fit of these models is equal or worse than Model 0, if the log-likelihood ratio test is not significant then it can be concluded that Model 0 does not result in a significant loss of fit compared to the less parsimonious models (Maslowsky et al., 2015). None of the interaction models were found to be more advantageous than Model 0, when comparing the AIC or aBIC of the models or when calculating the likelihood ratio test; all *D*s were not statistically significant. As there was no advantage to the more complex interaction models, Model 0 was accepted as the final model to explore the variables within a ML-SEM.

Table 5.10 *Interaction Models for Efficacy Appeal Latent Interactions*

	D (df)	AIC	aBIC	*ΔAIC*	*Δ* aBIC
Model 0		99393.131	99745.337		
(1) SE x Freq	0.608 (1)	99397.913	99755.429	-4.782	-10.092
(2) RE x Freq	1.229 (1)	99396.672	99754.189	-3.541	-8.8520
(3) SE x RE	1.017 (1)	99397.095	99754.612	-3.964	-9.2750
(4) TSR x Freq	0.063 (1)	99399.004	99756.521	-5.873	-11.184
(5) TSR x SE	0.463 (1)	99398.205	99755.721	-5.074	-10.384
(6) TSR x RE	1.000 (1)	99397.131	99754.647	-4.000	-9.3100
(7) TSRB x FreqB	0.076 (1)	99394.979	99748.955	-1.848	-3.6180

Note. D indicates difference between log likelihood. All *p*s > 05. SE - Self-efficacy; RE - Response Efficacy; TSR - Teacher-Student Relationship

5.5.6.4 *Multi-Level Structural Equation Modelling: Efficacy Appeals, Teacher-Student Relationships and Engagement*

A multi-level structural equation model (ML-SEM) was undertaken to explore the predictive relationships of efficacy appeal variables and teacher-student relationship upon engagement variables. Results suggest that there were significant predictors at the within-level, but no significant predictors at the between-level. At the within level, Persistence was predicted by Self-Efficacy (ß = .24, *p*=.011),

Response efficacy (ß = .29, *p* <.001) and Teacher-Student Relationship (ß = .13, *p*=.007); Planning was predicted by Self-Efficacy (ß = .40, *p* <.001); and Task Management was predicted by Response Efficacy (ß = .28, *p* <.001). Figure 5.4 demonstrates the ML-SEM for significant relationships. Standardised beta coefficients for all variables can be found within Table 5.13. Standardised regression coefficients of ß <.10 are considered small; ß<.10-2.5 are moderate, and ß >.25 large (Keith, 2019).

Table 5.11 *Standardised beta coefficients of ML-SEM for Efficacy Appeal Interactions*

	Persistence	Planning	Task Management	Persistence B
Within Part of Model				
Efficacy Freq	-.03	.10	.04	
Self-Efficacy	.24*	.40***	.06	
Response Efficacy	.29***	.10	.28***	
TSR	.13*	-.01	.09	
Between Part of Model				
FreqB				.29
TSRB				-.02

*p<.05. ** p <.01. ***p<.001.
Note. TSR-Teacher-Student Relationship; FREQB – Frequency at L2; TSRB - Teacher-Student Relationship at L2

Figure 5.4 *ML-SEM showing significant relations from TSR, SE and RE to Engagement variables at the within-level.*
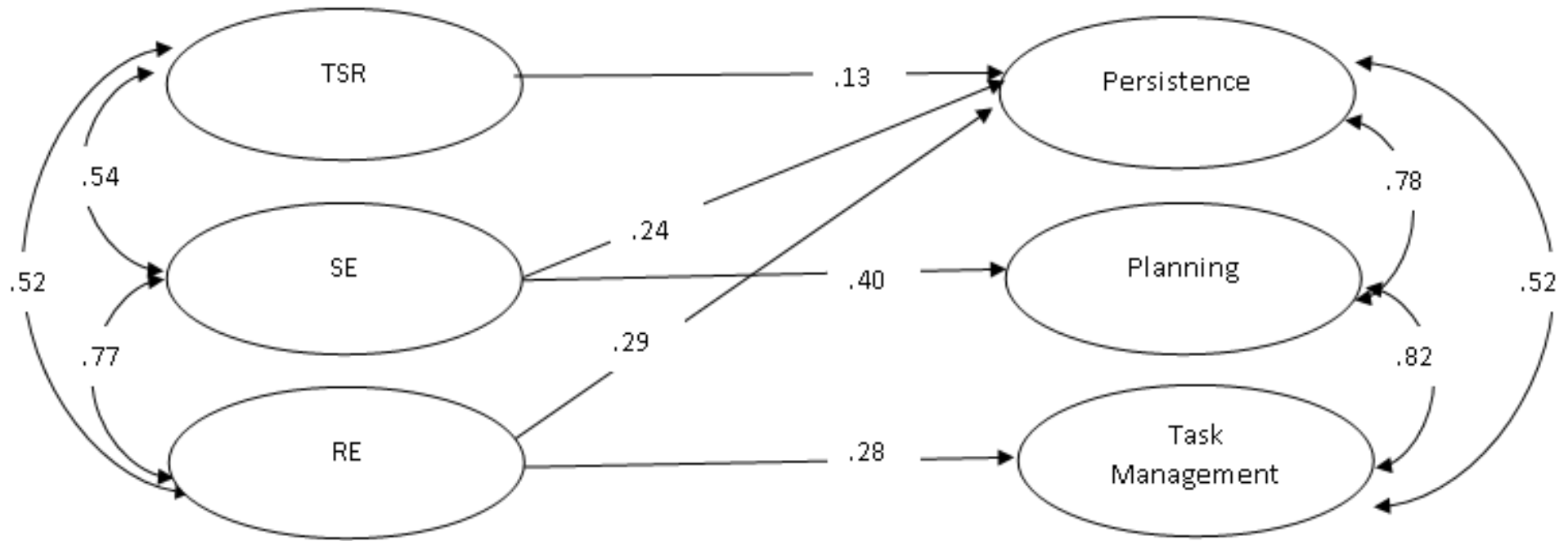
Note. Straight lines show standardised beta coefficients; curved lines show correlations. TSR - Teacher Student Relationship; SE – Self-efficacy; RE – Response Efficacy

5.5.6.5 *Cross-Level Interactions*

In order to explore whether there is any significant interactional effect upon engagement factors dependent upon the frequency in which teachers communicate efficacy appeal statements, cross-level interactions were conducted. Nine Models were tested (showed in table 5.14), but no significant interactions were found and therefore no further analysis for efficacy appeal communications were undertaken. Model fit statistics are displayed in Table 5.14.

Table 5.12 Cross-Level Interaction Models for Efficacy Appeal Variables

	D (df)	AIC	aBIC	*Δ*AIC	*Δ* aBIC
Model 0		99360.665	99712.872		
(1) SE x FREQB on EngPer	1.125 (1)	99362.416	99718.163	-1.751	-5.291
(2) SE x FREQB on EngPlan	0.025 (1)	99364.616	99720.363	-3.951	-7.491
(3) SE x FREQB on EngTask	0.159 (1)	99364.349	99720.095	-3.684	-7.223
(4) RE x FREQB on EngPer	1.858(1)	99360.950	99716.696	-0.285	-3.824
(5) RE x FREQB on EngPlan	0.137 (1)	99364.392	99720.138	-3.727	-7.266
(6) RE x FREQB on EngTask	0.137 (1)	99364.393	99720.139	-3.728	-7.267
(7) FREQ x FREQB on EngPer	1.288 (1)	99362.090	99717.837	-1.425	-4.965
(8) FREQ x FREQB on EngPlan	1.107 (1)	99362.453	99718.200	-1.788	-4.965
(9) FREQ x FREQB on EngTask	0.053 (1)	99364.561	99720.307	-3.896	-7.435

Note. D indicates difference between log likelihood. All *p*s > 05.

5.6 Discussion

A range of analyses (such as: bivariate correlations; latent moderated structural equation modelling; multi-level structural equation modelling; and cross-level interactions) were used to explore how fear and efficacy appeal communications used by teachers in the GCSE classroom were appraised by students, how these appraisals related to students' feelings of engagement and whether students' perceptions of the relationship with their teacher affected these relationships.

The amount students attended to fear appeal communications was found to directly predict engagement persistence, whilst challenge appraisals significantly predicted all engagement variables. However, threat appraisals were not found to significantly predict any of the engagement variables.

The amount students attended to efficacy appeal communications was not found to be a significant predictor of engagement variables. However, response efficacy was found to predict persistence and task management, but not planning; whilst self-efficacy was found to predict persistence and planning, but not task management.

Although teacher-student relationship was found to significantly predict engagement at the individual level, it was not related to engagement at the class level. Nor were class-level relations observed in regard to efficacy appeal communications. Class-level effects were found in relation to fear appeal communications, with higher class average challenge appraisal relating to greater class-average engagement, and higher class-average threat appraisal relating to lower class-average engagement. Teacher-student relationship was not found to moderate the relationship between fear or efficacy appeals, and student engagement.

Cross-level interactions were utilised to explore whether increased class-level frequency of fear and efficacy appeal communications affected the relationship between individual level fear and efficacy appraisals upon engagement. No significant cross-level interactions were found for efficacy appeal communications. Two significant models were identified when exploring class-level fear appeal frequency. Firstly, class level fear appeal frequency was found to interact with challenge appraisal; indicating that greater use of fear appeal communications from teachers resulted in higher levels of engagement persistence for students with a challenge appraisal. Secondly, class level fear-appeal frequency interacted with threat appraisal to impact students' engagement task management. Results suggested that when teachers' use of fear appeal communications was low, a positive correlation was seen between threat appraisal and engagement task management, but this correlation becomes negligible when fear appeals are used with high frequency. Findings will be discussed in turn relating to each research question, with consideration given to how they relate to previous research and potential reasons for current results.

5.6.1 RQ1: What is the relationship between student-level fear appeal appraisal and student engagement?

5.6.1.1 Fear Appeal Frequency

In the present study, fear appeal frequency at the individual level is modelled using a class-mean centred approach and therefore is conceptualised as the amount an individual attends to fear communications from their teacher relative to their classmates (Putwain et al., 2022). Frequency of fear appeal communications were found to be positively correlated with both challenge and threat appraisals. These findings are consistent with previous research (Putwain, Nakhla, et al., 2017; Putwain, Remedios, et al., 2016; Putwain, Symes, et al., 2016; Putwain et al., 2022; Symes et al., 2015) and provides further support for the proposition that fear appeals act as a reflective prompt for students, causing them to reflect upon their perceived value and competence beliefs (Putwain et al., 2021). Fear appeal frequency was also found to be correlated with engagement planning and task management, but not persistence.

When exploring the predictive nature of fear appeal frequency within a ML-SEM, contrary to previous findings, (see Putwain, Nakhla, et al., 2017; Putwain, Remedios, et al., 2016; Putwain et al., 2019a; Putwain, Symes, et al., 2016; Putwain et al., 2022; Symes et al., 2015) fear appeal frequency was found to directly predict engagement persistence. The appraisal model holds that the frequency of communications is not the impactful factor upon educational outcomes; it is how students appraise these communications which is important, however increased frequency can amplify these appraisals. The present findings should be considered with caution, however, due to differences in the methodological approach to previous studies. Most prior research has been able to conduct data collection at multiple time points to model the prospective impact upon outcome variables. As this study was only able to collect data at one time point, it may be that this relationship would not be replicated if modelled across time, particularly given the fact this relationship was small. Indeed, previous research which has also found a link between fear appeal frequency and outcomes variables (Belcher et al., 2022), utilised correlational methods at one-time point and therefore, it could be considered that the methodological approach adopted in these studies is influencing the findings. For

instance, it may be that the directionality of the relationship is reversed, and it is students' prior levels of engagement persistence which affects their levels of attention to fear appeal communications made by the teacher.

5.6.1.2   Challenge Appraisal

Challenge appraisal was found to be significantly positively correlated to all the engagement sub-scales. This finding is consistent with previous research, with significant relationships found with both behavioural and emotional aspects of student engagement (Nicholson & Putwain, 2019; Nicholson et al., 2019; Putwain, Nakhla, et al., 2017; Putwain et al., 2019b), with behavioural engagement indicated by behaviours such as effort, persistence and involvement, and behavioural disaffection specified by passivity, giving up and withdrawal (Skinner et al., 2008).

When modelled in an ML-SEM along with threat appraisal, challenge appraisal was found to predict all elements of engagement. This finding is in-line with the majority of research which has thus far been conducted exploring the impact of challenge appraisal upon student engagement (Putwain, Nakhla, et al., 2017; Putwain, Symes, et al., 2017; Putwain et al., 2022). Putwain, Symes, et al. (2017) postulate that as a challenge appraisal has a mastery focus and associated positive emotions and behaviour intentions, it aligns that this appraisal would result in greater behavioural engagement. Students with a mastery focus strive to understand material, improve their skills and develop competence (Gonida et al., 2009; Mih et al., 2015), which require students to put in effort and persist with their learning, which are considered core aspects of behavioural engagement (Skinner et al., 2008). Therefore, it is unsurprising there is strong empirical support for the link between a mastery focused approach in students and increased behavioural engagement (Gonida et al., 2009; Mih et al., 2015; Putwain et al., 2018; Reschly et al., 2008). Conversely, one paper, utilising a robust cross-lagged panel design (which allowed for exploration of concurrent relationships and reciprocal models to be tested) found that challenge appraisal was found to predict subsequent reduced behavioural disaffection but was not significantly related to behavioural engagement (Nicholson & Putwain, 2019).

5.6.1.3 Threat Appraisal

Threat appraisal was only found to be significantly correlated with the Task Management sub-scale of engagement; this relationship was positive, however had a small effect size (r = .11). Most research has found no significant correlations between threat appraisal and behavioural engagement (Nicholson & Putwain, 2019; Nicholson et al., 2019; Putwain, Nakhla, et al., 2017). Whilst research which has found a significant negative correlation with behavioural engagement were of a small magnitude compared to relations with challenge appraisal (Putwain et al., 2019b).

When placed into a ML-SEM modelled simultaneously with challenge appraisal, threat appraisal was not found to significantly predict any of the engagement variables. There have been mixed findings in previous research exploring the impact of threat appraisal upon engagement. Some studies have found students' threat appraisal to predict reduced behavioural engagement (Putwain, Nakhla, et al., 2017; Putwain, Nicholson, et al., 2016; Putwain, Symes, et al., 2017). When considering the proposition that a threat appraisal would be seen by students as a risk to their self-worth and is accompanied by self-worth protection strategies such as withdrawal of effort (Putwain, Nicholson, et al., 2016), then a reduction in behavioural engagement would be anticipated (Putwain, Symes, et al., 2017). However, authors who have also found a similar non-significant relationship between threat appraisal and behavioural engagement posit that this finding may be due to the nature of a threat response (Nicholson & Putwain, 2019; Putwain et al., 2022). For example, it is considered that threat appraisal would be associated with negative emotions and therefore may be more strongly associated with achievement-related emotions rather than behavioural outcomes. As the current study adopted a behaviour-focused conceptualisation of engagement, it may be that threat appraisal would have been found to be more strongly related to more emotional/cognitive components of student engagement (Putwain et al., 2022). The relationship between threat appraisal and emotional components of engagement has been previously supported (Nicholson & Putwain, 2019; Putwain, Nakhla, et al., 2017; Putwain, Nicholson, et al., 2016; Putwain, Symes, et al., 2017). Emotional engagement is regarded as emotions such as enthusiasm, enjoyment and pride, and emotional disaffection relates to feelings such as frustration, anxiety and self-blame (Skinner et al., 2008). Therefore, it is unsurprising that there is a

stronger link generally found between threat appraisal and emotional aspects of engagement, compared to behavioural aspects which are demonstrated by actions such as effort and persistence (engagement), and passivity and withdrawal (disaffection) (Skinner et al., 2008).

5.6.1.4   Interaction

Latent moderated structural equation modelling (LMS) was utilised to explore potential interactions between attention to fear appeal communications and challenge and threat appraisals upon engagement. However, none of the interaction models tested were found to be more advantageous than the measurement model, this indicated no interactional effect of these variables.

5.6.2   RQ2: Are there class-level relations between fear appeals and student engagement?

5.6.2.1   Fear Appeal Frequency

Fear appeal frequency at the class level is considered to be a climate variable as the referent is teacher behaviour (Marsh et al., 2012), with items asking students to consider the frequency of fear appeal communications made from the teacher to the class. Fear appeal frequency at the class level was not found to be significantly related to engagement, mirroring previous research (Putwain, Nicholson, et al., 2016; Putwain et al., 2022). These studies, however, were able to establish an indirect relationship via class-level challenge and threat appraisals, supporting the appraisal model of fear appeal communications.

5.6.2.2   Challenge and Threat Appraisal

Challenge and threat appraisal, when modelled at the class-level, are considered to be contextual factors, as the referent is the individual student, as the construct is comprised of an aggregation of the different students' characteristics (Marsh et al., 2012). Thereby, these variables represent class-average challenge and threat appraisals. At the between-level, only engagement persistence was modelled as an outcome variable, due to the low intra-class correlation coefficients found for the task management and planning sub-scales; indicating their minimal variation at the class-level (see section 5.5.3.1.2). Class-level engagement persistence was found to be predicted by both challenge and threat appraisal.

These results indicate that higher class average challenge appraisal is related to greater class-average engagement, whilst higher class-average threat appraisal is related to lower class-average engagement.

Results are in line with those of Putwain, Nicholson, et al. (2016) who found higher class-average challenge appraisal to be related to greater class-average behavioural engagement, whilst higher class-average threat appraisal was related to lower class-average behavioural engagement. They proposed that these findings may be because students are placed into sets according to ability, with class-level appraisal being related to students' (actual or perceived) ability. These findings may reflect phenomena such as social comparison, whereby students' reflections about their own competence are influenced by their perceived standing within the class (Marsh, 1984). Alternatively, this finding could also be explained by other considerations of class composition, for example, teachers have been found to adapt their instructional practices depending upon the general class composition (Hutchison, 2003). Indeed, research notes how teachers adapt their messages to students (Flintcroft et al., 2017). These findings has been previously reflected within the fear appeal research, with teachers using fear appeals more frequently in lower achieving classes (Putwain et al., 2022) and those where the teacher perceives class-level behavioural engagement to be low (Putwain, Nakhla, et al., 2017). Furthermore, it has also been found that teachers use gain-framed autonomy supportive communications more frequently with students in receipt of lower grades and less often with students receiving higher grades (Santana-Monagas, Núñez, et al., 2022).

5.6.3 RQ3: How does teacher-student relationship relate to student engagement in consideration of the fear appeal appraisal model?

5.6.3.1 Student-Level

Teacher-student relationship was found to be positively correlated with all engagement sub-scales. When placed into a ML-SEM as a predictor variable, alongside challenge and threat appraisals, TSR was found to be a significant positive predictor of all engagement variables. These findings are in-line with previous research indicating the role of students' perceptions of their relationship with their teachers,

and their levels of engagement (Furrer & Skinner, 2003; Hughes et al., 2008; Lee, 2012; O'Connor & McCartney, 2007; Skinner & Belmont, 1993).

Teacher-student relationship was found to be correlated with challenge appraisal, but not a threat appraisal. The lack of a significant relationship between students' threat appraisal and perceptions of their relationship with their teacher may be reflective of the complexity of how students view teachers' negatively valanced communications in the classroom environment. Indeed, in a study exploring students' feeling of relatedness with their teacher, and teachers' use of loss and gain-framed motivational messages, Santana-Monagas, Núñez, et al. (2022) discuss unexpected findings relating to loss-framed messages. Loss-framed messages (which focus on the negative outcomes of engaging in certain behaviours) focused on students' levels of autonomy was found to be negatively related to students' feelings of relatedness with their teacher, as predicted. However, loss-framed messages focused on students' levels of control were unexpectedly found to be a positive predictor of students' feelings of relatedness with their teacher. The authors posit that this finding may be understood if students view these communications by teachers as a sense of concern for their learning and therefore the teacher is using these messages through a desire to support them in positive learning behaviours, considered in a positive light by students, increasing their feelings of relatedness. Although this study only explored students' perceptions of teachers' use of these communications, and not how they appraised them, limiting the ability to make direct comparisons with the current findings, the results add to the consideration that perhaps, negatively valanced motivational messages from teachers are more complex in nature when considering students' perceptions of their relationship with their teacher, than positively valanced communications. Banks and Smyth (2015) qualitative research posited that positive relationships with teachers act as a protective factor against stress for students, reducing the experience of academic stress in high-stakes environments. Taken together, these results may indicate that positive teacher-student relationships are related to students' viewing fear appeals as a challenge, but do not buffer against threat appraisals.

Latent interaction structural equation modelling was deployed to explore whether teacher-student relationship had a moderating role between fear appeal variables and student engagement, but no

significant interactions were found. These results therefore could not provide support for teacher-student relationship having a moderating role between how students view the frequency of fear appeals and appraise them and their engagement. It was hypothesised that students' perception of their relationship with their teacher would moderate the relationship between students' appraisal of fear appeals communications and their engagement, based upon the consideration that source credibility is considered to have an impact on how fear appeal messages are appraised (Higbee, 1969; Tormala et al., 2006). However, there is debate from research in the health literature as to the extent of this effect, with other research failing to find any relationships between source credibility and attitude change (Umeh, 2012). The artificial nature of these studies (whereby, typically, a message is presented to participants with a description of the source's credentials indicating them to be a credible source or not) may not be a realistic comparison in the naturalistic interaction of relationships in the classroom setting. Furthermore, studies finding significant positive effects of source credibility have found these effects to be on attitude change and levels of fear, rather than actual behaviour change (Higbee, 1969). Therefore, perhaps the level of source credibility is more relevant in students' appraisal process rather than their engagement (considered as the behaviour change). Future research may benefit from measuring TSR and fear appeal appraisal at multiple time points, allowing for more sophisticated analysis of these variables in order to more effectively disentangle the direction and nature of this interaction, whilst controlling for previous levels.

5.6.3.2 Class-Level

When modelled at the class-level, teacher-student relationships are considered as a contextual factor. Despite variables such as teacher friendliness and classroom organisation being considered climate factors (Marsh et al., 2012), teacher-student relationship is based around students' perceptions of their individual relationships with the teacher, thereby, the individual student's perception is the referent. This variable is comprised of the aggregated responses from a class of students' perceptions of their relationship with their teacher. Although teacher-student relationship was found to significantly predict engagement at the individual level; it was not related to engagement at the class level. Research exploring the multi-level effects of other educational factors, such as the big-fish-little-pond effect, have

also acknowledged differences between appraisals modelled at the individual level, and those modelled at the class-level within the same population (Trautwein et al., 2009; Zimprich et al., 2005), perhaps due to differences in composition of students between different classes or influences of peers on one another within classes (Zimprich et al., 2005).

Latent interaction structural equation modelling was utilised to explore the potential moderating role of class-level TSR on class-level fear appeal appraisal and engagement, however, no significant interactions were found. Therefore, these results could not provide support for the consideration that class-average perceptions of teacher-student relationship moderated the relationship between class-aggregated challenge and threat appraisals, and engagement. In a study exploring students' feelings of relatedness with their teacher and teachers' use of motivational messages, Santana-Monagas, Núñez, et al. (2022) found that teachers' use of loss-framed messages which centred around lack of control over ones' own motivation, were found to be negatively related to perceptions of teacher relatedness when the teacher in question generally used loss-framed messages more frequently. However, these communications were found to have a positive relationship with teacher-relatedness when teachers were generally rated as using motivational messages (either gain or loss-framed) rarely. Although an unexpected finding, the authors posited that this could be explained by the consideration that if a teacher who typically does not make controlling messages, makes a loss-framed, controlling message, it could be viewed by the students as a sense of concern from the teacher, making them think the teacher desires the best for them, supporting their feelings of relatedness with them. These findings pose consideration into the directionality of the relationship between teacher-student relationship and students' appraisal of fear appeal messages. For example, it may be that perceived relationships with teachers mediate the relationship between message appraisal and engagement, as opposed to moderating it. Or that teachers' general teaching practices influence students' initial appraisal of fear appeal communications (Santana-Monagas, Núñez, et al., 2022). Future research exploring the interplay between TSR and fear appeal message appraisal would be valuable in order to secure deeper understanding of these relationships and offer recommendations to teachers and educators about the utility and effectiveness of these communications.

5.6.4 RQ4: Does the class-level frequency of teachers' fear appeals moderate student-level relationships between fear appeals and student engagement?

Cross-level interactions were used in order to explore whether increased class-level frequency of fear appeal communications influences the relationship between individual-level challenge and threat appraisals upon engagement. Two statistically significant models were identified: class-level frequency and individual-level challenge appraisal upon engagement persistence; and class-level frequency and individual-level threat appraisal upon engagement task management. Only one study to date has explored the potential moderating role of class-level fear appeal frequency upon individual level fear appeal appraisal and engagement, and no significant interactions were identified (Putwain et al., 2022).

5.6.4.1 Cross-Level Interaction Between Challenge Appraisal and Between-level Frequency on Engagement Persistence

The findings from the cross-level interactions indicated a positive relationship between individual-level challenge appraisal of fear appeals and engagement persistence irrespective of the frequency of which teachers use fear appeal communications to the class. However, the frequency of these communications was found to amplify the relationship. In other words, greater use of fear appeal communications from teachers resulted in higher levels of engagement persistence for students with a challenge appraisal. The finding that increased levels of fear appeal communications amplify the positive relationship between challenge appraisal and engagement is consistent with previous research. Increased frequency of fear appeal communications is consistently related to greater levels of challenge appraisals (Putwain, Nakhla, et al., 2017; Putwain, Remedios, et al., 2016; Putwain, Symes, et al., 2016; Putwain et al., 2022; Symes et al., 2015), whilst challenge appraisal is linked to increased engagement (Putwain, Nakhla, et al., 2017; Putwain, Symes, et al., 2017; Putwain et al., 2022) due to the considered links between challenge appraisals and positive behaviour intentions and mastery focus (Putwain, Symes, et al., 2017). When considering the wider persuasive communications literature, it is generally considered that when messages are viewed by recipients as strong and effective (i.e. the verbaliser provided a good quality argument), increased repetition of these communications has a positive impact (with the opposite true when arguments are considered to be weak) (Cacioppo & Petty, 1989; Moons

et al., 2009; So et al., 2017). However, as is generally typical with fear appeal research, these results come from artificial experiments with manipulated weak and strong arguments presented to participants. The current research is unable to assess students' perception of validity and quality of the teachers' fear appeal communications, however, it could be contended that a challenge appraisal would be more likely if the students' viewed teachers' fear appeal communications to be persuasive.

5.6.4.2 Cross-Level Interaction Between Threat Appraisal and Between-level Frequency on Engagement Task Management

The cross-level interactions results indicated that when teachers' use of fear appeal communications was low, there was a positive correlation between threat appraisal and engagement task management, but when fear appeals increase to a medium level, this correlation diminished and then became negligible when fear appeals are used with high frequency. More specifically, when class-level fear appeal frequency is low, students who view these communications as more threatening will have higher levels of engagement than students who view communications as less threatening. However, when class-level fear appeal frequency is high, engagement is low no matter the students' level of threat. In other words, when a student who interprets fear appeals as threatening receives low or medium use of fear appeal communications from teachers, they will have higher levels of task management; however, if a teacher uses fear appeal communications more frequently, then the potential benefit of increased threat is removed.

These results indicate the potential for there to be an optimum level of fear appeal communications for students who view fear appeal communications as threatening. A small amount of these communications can have the beneficial effect of increased engagement (in relation to task management); whilst too many will diminish this seemingly positive outcome. Although the relationship between increased levels of threat and increased engagement is unexpected, the finding that increased levels of fear appeal communications reduce the potential positive impact upon engagement is consistent with prior thinking. Increased frequency of fear appeal communications has been consistently related to greater levels of threat appraisals (Putwain, Nakhla, et al., 2017; Putwain, Remedios, et al., 2016; Putwain, Symes, et al., 2016; Putwain et al., 2022; Symes et al., 2015), with

authors proposing these communications prompt students to reflect upon their percieved value and competance beliefs; with more regular communications strengthening students' cognitive judgements. Therefore, the increased use of these communications may result in students feeling increased risk to their self-worth and therefore leading them to engage in self-protection strategies, such as withdrawal of effort (Putwain, Nicholson, et al., 2016), which could be denoted here by reduced levels of engagement.

Indeed, these findings are interesting when considering the Control-Value theory of achievement emotions (see Pekrun, 2000) which proposes that differing achievement emotions can impact upon educational outcomes. The theory posits that emotions can be positively or negatively valanced, and have high or low activation (Pekrun & Linnenbrink-Garcia, 2012). Tension, anger, and anxiety are considered negatively valanced, activating emotions. Whilst negatively valanced deactivating emotions could be considered as sadness, tiredness, exhaustion, and hopelessness. Whilst both types of emotions are considered as negative, their effects on engagement can be dramatically different (Pekrun & Linnenbrink-Garcia, 2012). Negative deactivating emotions are generally considered detrimental to educational outcomes, as they are considered to undermine engagement and have been found to be related to reduced effort, motivation and attention to learning tasks (Linnenbrink, 2007; Pekrun et al., 2002). Whereas negative activating emotions have been found to have diverging impacts. For some, these emotions may reduce intrinsic motivation and produce task-irrelevant thinking, whereas, for others, they may have beneficial impact via strengthening students' feelings of extrinsic motivation (Pekrun et al., 2002). As Linnenbrink (2007) asserts, for these students, the contemplation of not making progress towards ones' goals may lead to increased engagement in order to reduce the unpleasant effect of that feeling. However, there are mixed findings, with some research finding both activating and deactivating emotions to have negative effects on motivation (Linnenbrink, 2005). Therefore, it could be considered that a degree of fear appeal communications could engage students with a threat appraisal into negatively activated emotions which may motivate positive behaviours in order to avert the threatening feelings. However, as the number of these communications increase, this increases students' negative deactivating emotions resulting in reduced effort and motivation.

While it is a useful consideration in light of the current findings, further research would be needed in order to explore the validity of this potential dynamic. Future research may consider the inclusion of other areas of engagement which may shed more light on the nuanced relationship between threat appraisal and engagement. For example, the inclusion of other MES (Martin, 2012a) factors, namely mufflers (maladaptive motivation measure measuring anxiety, failure avoidance and uncertain control) and guzzlers (maladaptive engagement measuring disengagement and self-sabotage) may help to unpick this relationship and explore the ways in which fear appeals may increase engagement even in those that find the communications threatening.

An alternative suggestion comes from consideration of the findings from Nicholson et al. (2019) and their use of cluster analysis techniques to explore students' combined fear and efficacy appraisals. Results indicated that students who had both high levels of threat appraisal and high levels of challenge appraisal had adaptive engagement responses. The current variable-level analysis does not allow for the exploration of whether these students also had high levels of challenge appraisal, and therefore this could be the reason for increased engagement. The exploration of the current data with Latent Profiling Techniques would allow for further exploration of this finding. Despite some suggested reasonings for these interesting findings, it is important to note that although a significant cross-level interaction effect was found, the model fit was not significantly different from the model with no cross-level interaction; indicating that findings may not be substantial. Therefore, it would be prudent for future research to further explore the potential moderating effect of class-level fear appeal communications upon student-level relationships between fear appeal appraisal and outcomes such as student engagement, particularly given previous research found no such effect (Putwain et al., 2022).

5.6.5 RQ5: What is the relationship between student-level efficacy appeal appraisal and student engagement?

5.6.5.1 Efficacy Appeal Frequency

As with the fear appeal model, efficacy appeal frequency at the individual level, was modelled using a class mean-centred approach and therefore is conceptualised as the amount that a student attends to

efficacy appeal communications from their teacher, relative to their classmates. Frequency of efficacy appeal communications was significantly and strongly correlated with response efficacy and self-efficacy. This presents a similar pattern of findings to fear appeal frequency and appraisal (Putwain et al., 2021), potentially indicating a similar process whereby efficacy appeal communications act as a reflective prompt for students to consider the perceived utility of the messages (response efficacy) and whether they feel competent to undertake them (self-efficacy). Efficacy appeal frequency was also found to be significantly correlated with all of the engagement measures. It could be posited that the nature of efficacy appeal communications, with their focus on effective test-taking strategies, could focus students' attention to the task in hand and therefore increase their levels of engagement. For example, when teachers engage in practices such as reviewing taught material and providing relevant examples to students, this has been found to increase students' levels of cognitive engagement (Mazer, 2013). However, when exploring the predictive nature of efficacy appeal communications, by placing within a ML-SEM, frequency was not found to be related to any of the engagement measures. These findings are similar to those in the fear appeal research (see Putwain, Nakhla, et al., 2017; Putwain, Remedios, et al., 2016; Putwain et al., 2019a; Putwain, Symes, et al., 2016; Putwain et al., 2022; Symes et al., 2015). This indicates the potential for a similar appraisal-based model for efficacy appeals, whereby the use of efficacy appeal communications is not the central factor pertaining to subsequent outcomes; it is the appraisal of their usefulness (response efficacy) and the recipients' feelings of competence to engage in the recommended behaviour (self-efficacy) which are the important factors in outcomes.

5.6.5.2   Response Efficacy

Response efficacy was significantly and strongly correlated with self-efficacy. This may relate to the nature of the ways in which teachers communicate efficacy communications. For example, if teachers emphasise the importance and utility of these strategies in a supportive and encouraging away, this may help students to feel that the strategies are helpful and feel encouraged that they will be able to undertake them. Caution should be taken with the nature of this correlational relationship, however. In a study exploring the effects of formative assessment and feedback, it was found that students'

perception of the usefulness of the teacher's feedback was not related to their self-efficacy when their initial level of self-efficacy was controlled for (Rakoczy et al., 2019). This indicates that students' perceptions of the usefulness of the feedback and how they judged their competence were not connected. Future research would benefit from the addition of multiple data points in order to control for prior levels to disentangle relationships further. Response efficacy was also found to be significantly correlated with all engagement measures. However, when looking at the predictive role of response efficacy upon engagement measures, it was found to significantly predict persistence and task management, but not planning. These findings therefore present support for the importance of teachers' explaining to students how test-taking skills and techniques could be beneficial as this is likely to increase students' engagement in their studies.

5.6.5.3   Self-Efficacy

Self-efficacy was significantly correlated with all engagement measures, but when placed into a structural equation model, was only found to significantly predict persistence and planning, but not task management. There is limited research exploring the nature of efficacy appeal relationships, making direct comparisons in findings restricted. However, one study which investigated the impact of different combinations of fear and efficacy messages, found that the use of efficacy messages in isolation produced significantly higher levels of state motivation and affective learning than messages containing fear and efficacy, ones with fear only and ones with neither fear nor efficacy (Sprinkle et al., 2006). As discussed in depth in Study Two (see [section 4.2.2.4](#)), the methodology adopted in Sprinkle and colleagues' study did not allow for the exploration of the appraisal of these communications, so it cannot be ascertained whether frequency, response efficacy or self-efficacy was pertinent to these outcomes. Nevertheless, these findings do support the notion that efficacy appeals appear to have a positive impact upon students' motivation and engagement in learning.

5.6.5.4   Interaction

Latent moderated structural equation modelling (LMS) was utilised to explore potential interactions between attention to efficacy appeal communications, response efficacy and self-efficacy upon

engagement. However, none of the interaction models tested were found to be more advantageous than the measurement model, this indicated no interactional effect of these variables.

5.6.6   RQ6: Are there class-level relations between efficacy appeals and student engagement?

5.6.6.1   *Efficacy Appeal Frequency*

Due to theoretical and empirical considerations (see section 5.5.3.4.2 for discussion) only efficacy appeal frequency was modelled to explore class-level relationships. Efficacy appeal frequency at the class-level is considered to be a climate variable, as the referent is teacher behaviour (Marsh et al., 2012) with items asking students to consider the frequency of teachers' efficacy appeal communications made to the class. Only engagement persistence was modelled as an outcome variable at the class-level, due to the low intra-class correlation coefficients found for the task management and planning sub-scales; indicating their minimal variation at the class-level (see section 5.5.3.1.2 for discussion). No significant correlation was found between these variables, nor was class-level frequency of fear appeals a significant predictor of engagement persistence when placed in the ML-SEM. The non-significant relationship between class-level frequency of efficacy appeals upon engagement mirrors that in the fear appeal research (Putwain, Nicholson, et al., 2016; Putwain et al., 2022). This adds support to the consideration that appraisal of efficacy messages is the important determining factor upon subsequent educational outcomes, rather than how frequently teachers communicate them.

5.6.7   RQ7: How does teacher-student relationship relate to student engagement in consideration of the efficacy appeal appraisal model?

5.6.7.1   *Student-Level*

Teacher-student relationship was found to be significantly correlated with all engagement variables and all efficacy variables. It was hypothesised that there would be a significant relationship between teacher-student relationship and response efficacy, given the nature of response efficacy, with its focus on beliefs of whether teachers' advice will be effective; the students' perception of their teacher would be expected to impact this appraisal. It was interesting therefore that there was a similar magnitude

in correlation between teacher-student relationship and self-efficacy as there was between teacher-student relationship and response efficacy. Self-efficacy by nature is considered to be self-reflective (Bandura, 1986) and therefore would be expected to be less impacted by external relationships. However, it could be that having positive relationships with teachers improves students' self-efficacy perceptions. Indeed, positive interaction with teachers has been found to be related to lower stress in students, mediated through students' academic self-efficacy; with authors positing this is due to teachers' reassurance about academic progress (Banks & Smyth, 2015). These findings may be reflective of the positive relationship found between students' perceptions of their teacher-student relationship and self-efficacy (Öqvist & Malmström, 2018). Indeed, teachers' emotional support (utilising the same measure as the present study) has been found to be strongly correlated ($r =.56$) with students' self-efficacy (Wentzel et al., 2017).

When exploring the predictive nature of teacher-student relationship upon engagement, a significant relationship was found with persistence, but not task management or planning. Positive relationships between teacher supportive behaviours and levels of student engagement are a consistent finding in the literature (Furrer & Skinner, 2003; Hughes et al., 2008; Lee, 2012; O'Connor & McCartney, 2007; Skinner & Belmont, 1993). For example, when considering how teacher communication behaviours related to student engagement, Mazer (2013) found that teachers' immediacy behaviours (such as smiling, using eye contact, using warm vocals, providing personalised examples) and clarity behaviours (such as reviewing taught material, providing relevant examples, linking context and examples) increased students' levels of cognitive and emotional engagement. Findings also indicate a reciprocal nature to this relationship, with teachers' behaviours and students' engagement actively interacting (Hamre & Pianta, 2006; Skinner & Belmont, 1993). Although, the current research methodology does not allow for exploration of potential reciprocal effects, when combining findings from the present research and those from Sprinkle et al. (2006) this does point to a potential reciprocal relationship between teacher-student relationship and efficacy appraisal. Sprinkle et al. (2006) found that students in receipt of efficacy messages alone would be more likely to visit the instructor for support with subsequent assignments and take another course with them (compared to instructors using messages

containing fear and efficacy, ones with fear only, and neither fear nor efficacy). Future longitudinal research would therefore be recommended to further explore the dynamics of these relationships.

It is interesting to note that teacher-student relationship was only significantly related to engagement persistence in the efficacy appeal ML-SEM, whilst significantly related to all engagement measures when placed in the fear appeal ML-SEM. Perhaps positive communications from teachers such as putting in effort which may run alongside efficacy communications boost students' motivation to work and persist in their studies, but does not necessarily have a direct impact on undertaking the actual activity itself. If a student values their relationship with their teacher, they may find these communications boost their passion and drive to learn (Ruiz-Alfonso & León, 2017), increasing their feelings of energy and enthusiasm to tasks (Santana-Monagas, Núñez, et al., 2022).

Latent interaction structural equation modelling was deployed to explore whether teacher-student relationship had a moderating role between efficacy appeal appraisal and student engagement, but no significant interactions were found. These results therefore could not provide support for teacher-student relationship having a moderating role between how students appraise efficacy appeals and their engagement. Perhaps instead, it is that students' perceptions of the relationship with their teacher may in fact precede the efficacy appraisal rather than moderate its effects. Indeed, research into fear appeals within the health literature highlight that the credibility of the source of the message is an important factor in how a message is appraised (Higbee, 1969; Kim & Shin, 2018); with messages viewed as more persuasive from credible sources. Therefore, it may be that if a student perceives a positive relationship with their teacher, they would view communications about exam preparation to be more reliable and therefore have a stronger efficacy appraisal, which then would lead to greater engagement levels. These findings may be tentatively supported by the strong positive correlations found between TSR and response efficacy ($r = .52$) and self-efficacy ($r = .54$). Future research, measuring TSR and efficacy appraisal at multiple time points would allow for more sophisticated analysis of these variables to disentangle the direction and nature of this interaction, whilst controlling for previous levels.

5.6.7.2 Class-Level

Teacher-student relationship when modelled at the class-level would be considered to be a contextual factor as the variable is based upon class-aggregated scores of students' perceptions of their individual relationships with the teacher. Despite teacher-student relationship being found to be a significant predictor of engagement at the individual level, it was not related to engagement at the class level. Differences between individual-level and class-level models has also been documented by Santana-Monagas, Núñez, et al. (2022). Their research explored teachers' use of motivational communications (both loss and gain framed), feelings of relatedness with the teacher, and students' feeling of vitality (conceptualised as energy and enthusiasm of a task, so could be considered in a similar vein to engagement). They found that when modelled at the individual level, feelings of relatedness with the teacher were found to be a consistent predictor of students' feeling of vitality no matter how teachers generally used motivational communication strategies (i.e., gain or loss-framed, used frequently or rarely). However, at the class-level, teacher-relatedness was only predictive of students' vitality when teachers generally used very few motivational communications (either gain or loss-framed). However, contrary to the present findings, Santana-Monagas, Núñez, et al. (2022) found when comparing results at both levels of analysis, that relationships between engaging messages and relatedness was higher at the teacher-level than at the student level, suggesting that teachers' engaging messages had stronger predictive value on feelings of teacher relatedness when used toward the whole class instead of toward individual students. They propose this may indicate that messages made to the class more generally may create a stronger sense of belonging. However, these results should be considered with caution when applied to the present finding due to the potential impact the difference in measurement between teacher-relatedness and teacher-student relationship may have on the ability to compare results. Relatedness indeed may be more impactful when considered at the class-level, given its definition as a sense of belonging (Klassen et al., 2012) which may reflect a classroom-wide effect. Whereas teacher-student relationship in the present study utilised elements of both emotional support and instructional support and given that the emotional aspects of teacher support are more strongly associated with students' school outcomes than teachers' instructional behaviours

(Cornelious-White, 2007), there may be differences when combining these elements into one higher-order concept of teacher-student relationship.

Latent interaction structural equation modelling was utilised to explore the potential moderating role of class-level TSR on class-level efficacy appeal appraisal and engagement, however, no significant interactions were found. Therefore, these results could not provide support for the consideration that class-average perceptions of teacher-student relationship moderates the relationship between class-aggregated efficacy appraisals, and engagement. This non-significant finding may be reflective of the complexity of modelling perceptions of teacher-student relationships at the classroom-level. For example, Wentzel et al. (2017) found class-level perceptions of teacher value to be positively related to student-level effort to learn, but class-level perceptions of teacher expectations were not found to have a significant effect. These findings furthers the proposition that the way the components of teacher-student relationships were measured and modelled may influence the present findings. Future research may benefit from separating the emotional and instructional components of students' view of their teacher-student relationship and modelling these individually.

5.6.8 RQ8: Does the class-level frequency of teachers' efficacy appeals moderate student-level relationships between efficacy appeals and student engagement?

Cross-level interactions were undertaken to explore whether increased class-level frequency of efficacy appeal communications affected the relationship between individual level efficacy appraisals upon engagement. No significant cross-level interactions were found, indicating class-level frequency of efficacy appeals did not moderate the relationships between individual-level appraisal on engagement. These findings are reflective of previous research looking at the potential moderating role of class-level fear appeal frequency upon engagement whereby no significant interactions were identified (Putwain et al., 2022).

It is interesting that the present study found several moderating interactions of fear appeal communications but not efficacy appeal communications. Perhaps it is that teachers' negatively valanced communications have a more pervasive classroom-wide impact than positively valanced

communications. For example, Strati, Schmidt, & Maier (2017) found that when teachers made unhelpful comments (such as teasing or using sarcasm) towards any particular student in the class, class-level engagement decreased.

5.7   Conclusion

The positive relationship found between students' challenge appraisal and engagement, and lack of significant relationship between students' threat appraisal and behavioural aspects of engagement largely support findings from previous research (Nicholson & Putwain, 2019; Putwain, Nakhla, et al., 2017; Putwain, Symes, et al., 2017; Putwain et al., 2022). Whilst the finding that higher class-average challenge appraisal was related to greater class-average behavioural engagement, and higher class-average threat appraisal was related to lower class-average behavioural engagement may reflect the nature of ability setting (Putwain, Nicholson, et al., 2016) or teachers differing their instructional practices depending on the general composition of the class (Hutchison, 2003; Putwain et al., 2022).

In line with previous literature, when students with a challenge appraisal received more frequent use of fear appeal communications from their teacher, this resulted in higher levels of engagement (Putwain, Nakhla, et al., 2017; Putwain, Symes, et al., 2017; Putwain et al., 2022). This suggest the positive effects these communications can have for some groups of students. For students with a threat appraisal, there appeared to be an optimum level of fear communications from teachers. A low to moderate use of these communications was found to increase students' task management engagement, however when teachers used these communications more frequently, this seemingly positive benefit diminished. These findings may reflect the concept that some level of anxiety can be helpful in learning situations (Pekrun & Linnenbrink-Garcia, 2012), but too much may result in students feeling increased risk to their self-worth, leading to engagement in self-protection strategies such as withdrawal of effort (Putwain, Nicholson, et al., 2016).

Efficacy appeal frequency was not found to relate to student engagement at the individual or class-level; supporting the consideration of a similar appraisal-based model seen in fear appeals (Putwain, Nakhla, et al., 2017; Putwain, Remedios, et al., 2016; Putwain et al., 2019a; Putwain, Symes, et al., 2016;

Putwain et al., 2022; Symes et al., 2015). Thereby indicating that student' beliefs about the usefulness of teachers' recommendations of test taking practices and their feelings of competency in engaging in these practices are the principal factors in determining how students will respond to these communications. As students' level of response efficacy and self-efficacy were found to be related to their engagement, this supports the consideration that teachers should provide effective explanations to their students about why the test-taking practices they recommend will be effective in supporting them with preparing for their exams, as well as focusing on enhancing students' beliefs in their ability to put these methods into practice.

Although teacher-student relationships were found to predict student engagement, it was not found to moderate the relationship between fear or efficacy appeals and student engagement. Future research may benefit from exploring whether students' perceptions of their relationship with their teacher has a stronger impact in relation to their appraisal of fear and efficacy communications, as opposed to between students' appraisal and the intended behaviour change of increased engagement.

5.8   Chapter Summary

Chapter 5 detailed Study Three, which aimed to explore teachers' use of fear and efficacy communications in the classroom, how students appraised these communications, and how these appraisals related to students' levels of engagement in their studies. Students' perceptions of their relationship with their teacher upon these relationships were also explored, as were the classroom-level effects upon engagement. Results indicated a similar appraisal-based model for efficacy appeals as is seen within fear appeal communications. Classroom effects were noted in relation to fear appeal communications but not for efficacy appeals. Greater use of fear appeal communications from teachers was found to result in higher levels of engagement persistence for students with a challenge appraisal. For students with a threat appraisal, there appeared an optimum frequency of fear appeals for positive impact upon engagement; with low to moderate use of fear appeal communications resulting in higher levels of task management; but increased use of communications resulted in lower levels of this type of engagement. Although teacher-student relationship was not found to moderate the relationship between fear or efficacy appeals and student engagement, a direct relationship was found upon

engagement. The theoretical and practical implications of these findings are discussed in Chapter 6, alongside limitations of the research and future directions.

6 Chapter Six: General Discussion

6.1 Chapter Overview

Chapter Six provides a general discussion of the body of work presented in the thesis. Initially, a summary of key findings from each of the three studies is presented, followed by commentary on the theoretical and practical implications of these findings. Next, limitations of the research will be discussed, along with consideration to potential future directions for the field.

6.2 Summary of Key Findings

The current body of research utilised three studies to explore how teachers communicate to students about their GCSE exams, how students interpret these communications and how this relates to their engagement in their studies.

Study One adopted an explorative approach aimed to investigate the ways in which teachers communicate to students about their GCSE exams. Results from observational analysis indicated that teachers communicated to students about exams in a variety of diverse ways. Four higher order themes emerged: Instructional Practices, Direction of Message, Grade Point and Efficacy Appeals. The majority of observed messages centred on how teachers supported students with exam preparation strategies. Teachers promoted skills and techniques which would be important for students to implement when preparing for and undertaking their exams, such as: likely content to come up on the exam; techniques, hints and tips to try and help students achieve the highest grade possible in their exam; how best to answer questions; how to spend their time effectively in the exam; how marks are allocated and can be maximised effectively. Although these types of teacher practices may be typically considered as 'gaming the system' (Abrams et al., 2003; Hutchings, 2015; Meadows & Black, 2018; Stenlund et al., 2017), the present study conceptualised these communications as 'Efficacy Appeals'. The term efficacy appeals is derived from the health literature and are considered to be persuasive communications promoting alternative strategies to encourage behaviour change (Witte & Allen, 2000). Shortcomings in the limited amount of research undertaken in how efficacy appeals can be applied in the educational context, led to the focus for Study Two.

Study Two aimed to develop a conceptualisation of efficacy appeal communications within the educational context and a way to measure teachers' use of these communications and how students appraised them. Efficacy appeals were broadly defined as 'statements which provide students with an action to follow which will help them to achieve their target grade'. In order to explore the use of these communications within the educational setting, the Teachers' use of Efficacy Appeals in the Classroom prior to High-Stakes Exams (TEACHE) was developed. Empirical findings from Study One and wider test preparation strategy literature (Abrams et al., 2003; Barksdale-Ladd & Thomas, 2000; Gulek, 2003) was utilised to develop broad areas of efficacy appeal communications teachers make, such as: exam strategy and content, time spent in exam, mark allocation and maximisation. Due to individual differences in how communications can be interpreted, it is important to measure not just teachers' frequency of efficacy appeals but also how they are appraised by individuals (Folkman, 2013; Putwain & Symes, 2014, 2016; Soenens et al., 2015; Vansteenkiste & Mouratidis, 2016). In addition to its empirical basis, the TEACHE was grounded within the theoretical framework of the Extended Parallel Process Model (EPPM) (Witte, 1992), which asserts the importance of establishing the recipients' belief as to the effectiveness of a recommended action (response efficacy), and whether they feel competent at undertaking the action (self-efficacy). Therefore, for each area of test preparation skill (such as exam strategy), three items were developed: 1) the frequency teachers used this type of communication; 2) whether a student felt the technique would be effective (response efficacy); 3) whether the student felt they were able to effectively undertake this technique (self-efficacy). In order to ensure the TEACHE provided reliable and valid data, data were collected to explore its psychometric properties. Cognitive pre-testing and confirmatory factor analysis processes refined the TEACHE; resulting in an 18-item measure containing three factors: frequency; perceived response efficacy; perceived self-efficacy. The 18-item version displayed good psychometric properties in relation to internal reliability and convergent validity, meaning that the questionnaire could be used on a wider scale to explore relationships with other educational variables.

Study Three aimed to explore how fear and efficacy appeal communications used by teachers in the GCSE classroom were appraised by students, how these appraisals related to students' feelings of

engagement and whether students' perceptions of their relationship with their teacher affected these relationships. The amount to which students attended to fear appeals communications was found to predict their levels of persistence in their studies. In line with previous research, when students viewed teachers' fear appeal communications as a challenge, this predicted their levels of engagement, however, students' threat appraisals were found to be unrelated to their levels of engagement (Nicholson & Putwain, 2019; Putwain, Symes, et al., 2017; Putwain et al., 2022). The amount students attended to efficacy appeal communications was not found to be a significant predictor of engagement variables. However, when looking at the effects of the appraisal of these communications, it was found that students who considered recommendations by their teacher to be effective (high response efficacy) had higher levels of persistence and task management; whilst students who thought they could effectively undertake the recommended actions (high self-efficacy) had higher levels of persistence and planning.

There were no class-level effects found in relation to efficacy appeal communications. However, there were significant findings in relation to fear appeal communications; with higher class average challenge appraisal relating to greater class-average engagement, and higher class-average threat appraisal relating to lower class-average engagement. Previous research also noting this effect (Putwain, Nicholson, et al., 2016) posits this may be reflective of setting students by ability. Cross-level interactions were utilised to explore whether class-level frequency of fear and efficacy appeal communications affected the relationship between individual level fear and efficacy appraisals upon engagement. No significant cross-level interactions were found for efficacy appeal communications, but two significant findings were found in relation to fear appeals. Firstly, greater use of fear appeal communications from teachers was found to result in higher levels of engagement persistence for students with a challenge appraisal; reflecting findings from previous literature (Putwain, Nakhla, et al., 2017; Putwain, Symes, et al., 2017; Putwain et al., 2022). Secondly, it was found that when a student who interprets fear appeals as threatening receives low or medium use of fear appeal communications from teachers, they will have higher levels of task management. However, if a teacher uses fear appeal communications more frequently, then the potential benefit of increased threat is removed. Thereby

potentially indicating there to be an optimum frequency of fear appeal communications for students who view these communications as threatening; with a small amount having the beneficial effect of increased engagement, but too many diminishing the seemingly positive outcome. Teacher-student relationship was not found to moderate the relationship between fear or efficacy appeals, and student engagement, however was found to directly affect engagement, supporting findings from the wider literature (Furrer & Skinner, 2003; Hughes et al., 2008; Lee, 2012; O'Connor & McCartney, 2007; Skinner & Belmont, 1993).

6.3 Theoretical Implications

Discussions centre around two key theoretical contributions which the body of research presented within the thesis offers. Firstly, the conceptualisation of teachers' communications on test-taking skills and techniques as efficacy appeals. Secondly, the ability to explore the use of both fear and efficacy appeals in the educational setting.

6.3.1 Conceptualisation of Efficacy Appeals

Although teachers' provision of test-taking skills and techniques is not a new phenomenon, with test preparation regarded as part of daily teacher instruction (Abrams et al., 2003; Barksdale-Ladd & Thomas, 2000), the conceptualisation of these communications as an efficacy appeal has allowed for a deeper understanding of the effectiveness of these communications.

Findings from Study Three (see section 5.6.5) indicate that efficacy appeals appear to have a similar appraisal-based model as those found for fear appeals (Putwain, Nakhla, et al., 2017; Putwain, Remedios, et al., 2016; Putwain et al., 2019a; Putwain, Symes, et al., 2016; Putwain et al., 2022; Symes et al., 2015). Teachers' use of these communications was not found to significantly impact students' levels of engagement in their studies, but appraisals of these communications did. Namely, it was students' perceptions of whether the recommended practices which the teacher was advocating would be effective (response efficacy) and whether they felt confident in their abilities to effectively undertake the recommended practices (self-efficacy) which had an effect on their levels of engagement in study behaviours.

Previous research indicates that effective study skills and knowledge about exams (such as commonly tested content, understanding of the mark scheme and how exams were marked) can result in students' improved attitude and motivation, academic performance and more positive learning related emotions (Andrade & Valtcheva, 2009; Credé & Kuncel, 2008; Daly et al., 2012; Dodeen et al., 2014; Putwain et al., 2013). However, findings from the current study offer the position that simply providing students with this information is not enough; teachers also need to ensure they are presenting to students why utilising these practices will help them to achieve their grades, as well as supporting their confidence and competence in using these skills and techniques. Future research on students' development of effective study skills and test-taking practices may wish to acknowledge the importance that students need to feel efficacious and see the relevance of these practices for them to have positive benefits.

6.3.2   Fear and Efficacy Appeals in the Educational Environment

Although there have been a number of studies to date exploring the impact of efficacy communications within the educational field (Putwain & Roberts, 2012; Sprinkle et al., 2006; von der Embse et al., 2015), methodological limitations restricted their ability to provide reliable conclusions as to the impact of these messages. A thorough discussion of these limitations are set out in <u>Section 4.2.2.4</u>, but a brief summary is provided below.

Firstly, the studies utilised inconsistent definitions of what an efficacy appeal was, meaning that they were not measuring the same thing, thereby making comparison of findings ineffectual. Given this was identified as an issue with research from the health literature, with Witte commenting that "terms such as fear, threat and efficacy must be carefully defined and used in a consistent manner across studies if the literature is to be reconciled" (Witte, 1992, p. 329) it was deemed important to construct a definition which was theoretically driven (based upon the Extended Parallel Process Model; Witte, 1992), applicable within the educational field and broad enough to be relevant across educational sectors. Therefore, the present study defined fear appeals as 'statements which provide students with an action to follow which will help them to achieve their target grade'.

Furthermore, the studies adopted varying methods in which to study and measure efficacy appeals. Sprinkle et al. (2006) and von der Embse et al. (2015) utilised artificial experimental-based methodologies with manipulated conditions, typically found within the health research. The present study however, aimed to move away from this type of approach and toward that deployed within the fear appeal in education research (see Putwain & Symes, 2014; Putwain et al., 2021) by exploring students' perceptions of actual communications received in the classroom. The creation of the TEACHE means that the use of and perception of efficacy appeal communications can be studied in a naturalistic approach, which offers the ability to gain more reliable and valid data about how these messages may affect students in their day-to-day environment. The TEACHE allows for the understanding of how teachers use efficacy appeals in the GCSE classroom, how students appraise these communications, as well as exploring the impact of these appraisals upon other educational variables. Furthermore, it also means that future research will now be able to measure and analyse how both fear and efficacy appeals affect students.

Given that efficacy appeals are considered to be the key component which affects positive intention and behaviour change (Basil & Witte, 2012; Gore & Bracken, 2005; Maddux & Rogers, 1983; Peters et al., 2013; Ruiter et al., 2014) it is surprising that to date there has been a lack of research considering efficacy appeals in the educational setting, despite calls from researchers to do so (Belcher et al., 2022; Putwain & Roberts, 2012; Putwain & Symes, 2011a, 2011b). In their review of the literature in the health field, Witte and Allen (2000) conclude that the most persuasive messages are those which impart high threat and high efficacy, followed by those with high threat and low efficacy. Whilst low threat and high efficacy are suggested to be less persuasive, and messages which have low levels of both threat and efficacy are suggested to be the least persuasive. Despite this research being typically artificial in nature and therefore not necessarily directly comparable to the present context, it provides a strong rationale for considering how fear and efficacy appraisals may work conjointly to impact educational outcomes. Future research can utilise the TEACHE and the TUFAQ in order to measure both types of communications. For example, it would be useful for future research to consider

whether students' levels of response efficacy and self-efficacy moderate the relationship between frequency of fear appeal communications and challenge or threat appraisals.

Moreover, a similar method to that deployed by Santana-Monagas, Núñez, et al. (2022) utilising latent profile analysis (LPA) techniques could be adopted. This analysis could explore profiles of how teachers use combinations of messages, and how these relate to students' perceptions of their relationships with their teacher and/or their levels of engagement in their studies. This would therefore provide additional insight into how these communications coexist and impact students. Furthermore, the exploration of profiles of students' challenge, threat, response and self-efficacy appraisals and how these combinations relate to their engagement would offer unique insight (section 6.6.1.3 offers further discussion on how LPA may be effectively adopted in future research).

6.4   Practical Implications

The Covid-19 pandemic gave rise to two years without formal high-stakes testing procedures (Freedman, 2021), leading renewed debate on the value of these high-stakes exams and calls for their abolition from researchers, practitioners and politicians (Wyness, 2021). However, the traditional format exams have since returned, indicating they are here to stay. Therefore, although ideologically recommendations may centre upon changing the high-stakes exams process; pragmatic recommendations will focus upon supporting teachers in how best to communicate to students about these exams as well as the advocacy of policy consideration.

6.4.1   Recommendations for Teachers

6.4.1.1   General Exam Communications

Findings from observations of how teachers communicated to students prior to their GCSEs indicated a variety of ways in which teachers positioned communications about upcoming exams. Some teachers aimed to motivate their students to engage in exam preparation through controlling approaches and pressuring students to engage in study behaviours (see section 3.5.1.1), whereas others adopted a more encouraging and reassuring approach (see section 3.5.1.2) to empower students. Although both styles may be considered to be motivational in their own right, these types of approaches are likely to

have different levels of effectiveness depending upon the recipient (Flintcroft et al., 2017). Furthermore, how teachers frame their communications in relation to onerous of responsibility (see section 3.5.1.3) also demonstrates how small differences in teachers' use of language can have an impact upon how a message about exam preparation comes across to students and may affect students' feeling of support whilst preparing for their exams. Therefore, it would be recommended for teachers to engage in conscious reflection about how they are communicating to students in order to consider how their practices may affect students. This could be facilitated through lesson video recording and reflection activities (Hollingsworth & Clarke, 2017; Tripp & Rich, 2012) or by peer observation and discussion (Daniels et al., 2013).

6.4.1.2   *Efficacy Appeals*

Prior research recognises that much school time is devoted to preparing students for their exams (Abrams et al., 2003; Daly et al., 2012), including coaching students on test-taking strategies and time management (Barksdale-Ladd & Thomas, 2000; Cuff et al., 2019; Gulek, 2003; Stenlund et al., 2017). However, conceptualising these communications within the psychological domain of efficacy appeals offers a deeper insight into the effectiveness of the use of these communications in the classroom with students prior to high-stakes exams. Indeed, the current research identifies that it is not teachers' use of these communications which has the desired effect of encouraging students to engage in their studies; outcomes depend upon how students appraise these communications. Namely, results indicate that when students believe that teachers' recommended practices will help them to succeed in their exam (high response efficacy) and they feel capable of carrying out these practices (high self-efficacy), they will have higher levels of engagement when it comes to planning, persisting, and managing their studies. Therefore, exploring these communications within this theoretical framework allows for the understanding that teachers should not only be communicating to students test-taking techniques and strategies which will be useful for preparing for their exams, but explaining *why* they are useful and *how* they will help the student when it comes to preparing for their exam. Furthermore, there should be a focus on supporting students in feeling competent in undertaking these skills. This could be enhanced in day-to-day teaching as well as the inclusion of specific revision and exam planning

sessions in order for students to develop competency and assurance in their ability to utilise these skills and practices. Given that many schools often offer additional timetabling of subject specific revision classes, these approaches could be incorporated into these sessions (Flintcroft et al., 2017; Perryman et al., 2011). Furthermore as much school time is devoted to undertaking practice tests prior to high-stakes exams (Black et al., 2002; Daly et al., 2012; Harlen et al., 2002; Hutchings, 2015; Stenlund et al., 2017), these practices could be enhanced by positioning these exercises as a way of supporting students to develop mastery of exam techniques.

6.4.1.3   Fear Appeals

In line with previous literature from the educational fear appeal research, recommendations about how teachers should use fear appeals is not straight-forward due to students' differing on whether fear communications are motivating or anxiety inducing (Banks & Smyth, 2015; Flintcroft et al., 2017; Putwain, Nakhla, et al., 2017; Putwain, Symes, et al., 2017). For some students, fear appeals are viewed as an opportunity for personal growth and are associated with positive emotions and behaviour intentions (Putwain & Symes, 2014), increased engagement (Putwain, Nakhla, et al., 2017; Putwain, Nicholson, et al., 2016; Putwain, Symes, et al., 2017) and subsequent academic performance (Putwain, Symes, et al., 2017; Putwain et al., 2022). Indeed, results from the current study suggest that when students view communications in this challenging manner, the more frequently teachers make these comments, the more engaged they will be. However, students who interpret fear appeals as a threat are likely to view these communications as a risk to their self-worth which can result in self-worth protection strategies, such as withdrawal of effort and negative emotions (Putwain, Nicholson, et al., 2016), reduced motivation (Putwain & Remedios, 2014b) and engagement (Nicholson & Putwain, 2019; Nicholson et al., 2019) and worse exam performance (Putwain & Remedios, 2014b; Putwain, Symes, et al., 2017; Putwain et al., 2022). Findings from the present study add an additional layer of complexity when considering students with a threat appraisal; as results indicated that even for students with a threat appraisal, there can be some benefit of fear appeals communications when used sparingly. When students with a threat appraisal received low to moderate frequency of fear appeals, they had increased levels of engagement in task management practices, whereas this seemingly positive benefit diminished

when teachers used these communications more frequently. These results may be reflective of the consideration that some levels of anxiety can be beneficial in learning situations (Pekrun & Linnenbrink-Garcia, 2012), whereas too much can result in increased risk to students' self-worth, which may lead to self-protection strategies such as withdrawal of effort (Putwain, Nicholson, et al., 2016).

Given the varying effects these communications can have for different students, it would be ill-advised to offer advice on how teachers should make fear appeal communications to the class as a whole; despite results from observations indicating that messages are predominantly presented in this way (see section 3.5.2). Instead, advice centres around the importance of understanding the individual needs of students and appreciating the best tactic to use for them. Indeed, teachers do appear to already acknowledge the importance of using targeted language depending on which student they are speaking to (Flintcroft et al., 2017). However, this relies on the consideration that teachers are able to accurately judge students' internal experiences, which has not been found to reliably be the case when assessing concepts such as student engagement (Skinner & Belmont, 1993) or motivation (Lee & Reeve, 2012). Therefore, providing training for teachers on how to judge students perceptions may be beneficial in order for them to make informed communications directed to students' individual needs (Putwain et al., 2021). Building strong relationships with students may also support teachers in understanding students' individual needs (Pianta et al., 2012). Furthermore, having positive relationships with students may also help to buffer the potential negative effects of class-wide negatively-valanced communications such as fear appeals as students are more likely to view these communications as a sense of concern and a desire for their best interests when they have a positive relationship with their teacher (Santana-Monagas, Núñez, et al., 2022).

6.4.1.4   *Fostering Positive Teacher-Student Relationships*

Despite teacher-student relationship not being found to moderate the relationship between students' fear and efficacy appraisals and their engagement in their students, it was found to directly relate to students' engagement, mirroring findings from previous literature (Furrer & Skinner, 2003; Hughes et al., 2008; Lee, 2012; O'Connor & McCartney, 2007; Skinner & Belmont, 1993). Thereby furthering the suggestion that providing a supportive classroom environment and fostering strong links with students

is beneficial. Teachers can foster emotional support by demonstrating warmth and care for students, showing students respect and demonstrating a desire to understand their feelings and points of view (Martin & Collie, 2019; Pianta & Hamre, 2009; Ruzek et al., 2016). Instructional support can be developed by setting clear expectations and instructions, explaining the usefulness of content, providing positive feedback and strategic help, and encouraging student responsibility (Hamre & Pianta, 2005; Ruiz-Alfonso & León, 2017; Skinner & Belmont, 1993; Vansteenkiste et al., 2012). Indeed, students' reflections of teacher behaviours which support them through their GCSEs included the provision of clear instructions and direction of improvement, making work interesting and challenging, and providing help, encouragement and positive comments on work (Brown & Woods, 2022). This further highlights the importance of providing both emotional and instructional support in order to foster positive relationships with students preparing for their GCSE exams.

6.4.2   Policy Recommendations

Findings from the Sawtooth effect, whereby cohort performance in high-stakes tests suddenly drop following assessement reform and rise slowly after time (Cuff et al., 2019) indicates the degree to which teachers' understanding and knowledge about exam processes can guide students in achieving better outcomes. Teachers who engage in additional marking work or are involved with assessment or exam board processes, may have more of an insight into how to effectively 'game the system' which could pose a lack of equitability for students. This is particularly pertinent given the finding that students need to feel that these practices will be effective (i.e., have high response efficacy). Having a teacher in a seemingly authority position on offering this advice could be viewed as strengthening the level of insight a teacher may have into how to effectively apply skills and techniques to the exam. Furthermore, given that teachers' own levels of self-efficacy can impact students' self-efficacy and achievement (Bolshakova et al., 2011), if teachers are less confident in how to support students in engaging in 'gaming the system' practices, then this could further exacerbate students' engagement in their studies, which could affect their performance (Putwain, Symes, et al., 2017).

Therefore, it could be concluded that a more formalised approach to test taking skills and practices would be more equitable for students. For example, an introduction in the national curriculum for

schools to implement evidence-based approaches to support students in how to prepare for their exams, build students' competencies in these skills and teaching students to become more 'assessment literate' (Gulek, 2003). As many schools often engage in practises such as additional timetabling of subject specific revision classes (Flintcroft et al., 2017; Perryman et al., 2011) a standardised approach may help to reduce work-load for both staff and students. Indeed, although teachers acknowledge that exam preparation is an important aspect of their responsibilities (Abrams et al., 2003; Daly et al., 2012) they feel that they spend too long on this and it negatively impacts their teaching (Barksdale-Ladd & Thomas, 2000). Therefore a uniformed approach may be helpful for teachers as well as students.

Effective study skills can result in improved motivation and attitude towards tests, better learning related emotions and improved academic performance (Andrade & Valtcheva, 2009; Credé & Kuncel, 2008; Dodeen et al., 2014; Putwain et al., 2013). Therefore, offering a standardised approach to this for students would appear to be a more egalitarian method and ensure that all students are in receipt of high-quality advice. An approach devised around the self-regulated learning (SRL) model (Zimmerman, 1986; Zimmerman & Campillo, 2003) may provide an effective approach, given that meta-analytical research suggests SRL training programmes have small to medium effects on students' motivation (g=0.35) and academic performance (g=.037) (Theobald, 2021).

6.4.3 Conclusion

Conceptualising teachers' communications on test-taking skills and techniques as efficacy appeals has allowed for the identification that it is the students' appraisal of how effective these techniques will be and how competent they feel in undertaking them which have the predominant effect on their engagement with their studies. Thereby it is recommended that teachers couple the advocacy of skills and techniques with explanation as to why and how recommended techniques are useful to students, as well as building students' competencies in these techniques. In line with previous findings, fear appeals communications are not recommended to be made class-wide given the degree to which students can differ in how they appraise these communications and subsequent effects upon emotions, engagement and performance (Putwain, Nakhla, et al., 2017; Putwain, Nicholson, et al., 2016; Putwain, Symes, et al., 2017). Developing good relationships with students can be beneficial on a variety of

levels. Firstly, it can help teachers to understand students' individual needs and therefore provide targeted communications as well as potentially acting as a buffer against negative effects if teachers do make class wide fear appeals. Furthermore, stronger teacher-student relationships generally increase students' levels of engagement. Consideration is also given to the potential inequity students may face in receiving test preparation advice and how a more uniform approach to this may provide a more impartial approach for students.

6.5 Limitations

Findings presented should be considered in line with limitations of the research methodology. The primary limitations of the present research centre around the disruption to the data collection process due to the covid-19 pandemic. Study 3 was originally planned to utilise longitudinal data to explore potential causal relationships between efficacy appeals, fear appeals, teacher-student relationships, student engagement and grade outcomes within a cross-lagged panel model. However, school closures and exam cancellations meant that only one time point of data was collected.

6.5.1 Data Collected at One Time-Point

Study 3 was originally planned to adopt a similar methodological approach to that of Nicholson and Putwain (2019); a longitudinal cross-lagged panel design which would allow control of concurrent relationships between variables at each time point and the stability of the same variable across time so that cross-lagged paths could be tested (e.g. efficacy appeal appraisal on engagement, and engagement predicting efficacy appeal appraisal); as controlling for auto-lagged paths is considered the gold standard in longitudinal designs (Adachi & Willoughby, 2015). However, only one time point of data was collected, meaning that causation cannot be determined. Indeed, as Putwain, Nakhla, et al. (2017) posit, whilst student engagement is treated as an outcome in the present study, it is possible that students who are more or less engaged to begin with may appraise fear and efficacy communications differently. This limitation proves problematic for making reliable practical and theoretical conclusions as to the exact nature of the efficacy appraisal process, given that this is the first study exploring this concept. Furthermore, in addition to one time point restricting the ability to control for students' previous levels, the time point of data collection was in October of students' final

year of GCSE study. Although students will have been exposed to fear and efficacy communications throughout their GCSE syllabus, the frequency of these communications could perhaps be more significant closer to students' exams (Putwain et al., 2022) and their impact upon engagement may be more pronounced at this point too, particularly given that the measures of behavioural engagement focused upon planning, persistence and managing study tasks. This proposition can be supported by considering findings from a study conducted by Nicholson et al. (2019), which used cluster analysis methods to explore the effects of students fear appeal appraisals. During data collection in October of students' final year of their GCSEs, cluster analysis identified two clusters of students' appraisals of fear appeal communications. However, four months later in February, analysis indicated students' data was better considered within four distinct clusters, suggestive of changes in appraisals during this time. It was also found that movement to different groups within this time period had a significant effect upon students' levels of engagement, indicting a tangible outcome effect from changes in appraisals during that time. The authors indicate changes may be due to teachers' fear appeal communications feeling more saliant to students in February as exams were closer. Indeed, wider educational research posits that approaches to learning have been found to change as the academic year progresses and high-stakes exams become closer (Smith et al., 2002).

Additionally, given the longitudinal effects of positive teacher-student relationships over the course of the academic year (Furrer & Skinner, 2003; Ruzek et al., 2016), the impact of students' perceptions of their relationship with their teacher may have had a stronger moderating effect if measured at a later time point in the academic year. Therefore, the present findings may not offer a complete picture of teachers' use of and students' appraisal of fear and efficacy communications in students' final year of GCSE study; data gathered closer to students' exams may offer a more substantive understanding.

6.5.2   Engagement as an Outcome Variable

A further consideration resulting from loss of data is that students' engagement was modelled as the outcome variable. Data on students' math GCSE grade was originally intended to be collected in order to model this as a learning outcome. Due to the results-driven approach in schools (Ball et al., 2012; Perryman et al., 2018), offering evidence on how students' appraisal of teachers' exam communications

may affect their academic performance would be advantageous. Therefore, the present findings offer limited practical implications relevant to educators. However, as fear appeal appraisals are not found to directly relate to academic achievement, but indirectly via engagement (Putwain, Symes, et al., 2017; Putwain et al., 2022), and that evidence from the wider literature asserts that engagement is generally considered to be a significant predictor of academic achievement (Klem & Connell, 2004; Leon et al., 2017; Reyes et al., 2012), the present research may provide tentative consideration as to the potenital impact on academic achievement. Furthemore, utilising student engagement as an outcome has proved theoertically advantageous given the explorative nature of the present research. The EPPM (Witte, 1992) asserts that the effectiveness of fear and efficacy communications be ascertained by related behaviour change (Witte & Allen, 2000). Given that the focus of fear and efficacy messages within the educational context focuses upon students undertaking preparation for their GCSE exams, exploring students' levels of engagement in appropriate exam-related preparation activities was an appropriate outcome variable to determine how use of and appraisal of these communications relates to associated behaviour change. Therefore, the current study still offers valuable findings to the field, but future research would benefit from collecting data on students' grades to explore the impact on academic achievement.

6.6   Future Directions

6.6.1   Future Analytical Approaches with Present Data

6.6.1.1   *Teacher-Student Relationship a Moderator of Fear and Efficacy Appeal Appraisal*

As previously discussed (see sections 5.6.3.1 and 5.6.7.1) the present study failed to find a significant moderating effect of students' perception of their relationship with their teacher on the relationship between fear or efficacy variables and student engagement. Research from the health literature indicates that credibility of the source of a communication is an important factor in how a message is appraised (Higbee, 1969; Kim & Shin, 2018). Therefore it is posited that perhaps the moderating effect of students' perception of their relationship with their teacher may have a more saliant moderating effect between teachers' frequency of fear and efficacy appeals and students' appraisals of these communications. Despite longitudinal data offering a more robust approach to analysing this

mechanism, utilising the present dataset to model this potential interaction may provide a preliminary insight into this relationship.

6.6.1.2   *Efficacy Appraisal as Moderator of Fear Appeal Appraisal*

The present study identified that efficacy appeals act in a similar appraisal-based model to those of fear appeals within the educational setting (see section 5.6.5.1). The EPPM (Witte, 1992) posits that recipients' response and self-efficacy perceptions determine the behavioural outcome of a threat response (see section 4.2.1.4 for overview). Briefly, if a recipient has high response and self-efficacy then they will adopt a 'danger control' response, resulting in behaviour change in line with recommendations (Witte et al., 1996). However, if response or self-efficacy is low, they will feel unable to control the danger, leading to a fear control response and engagement in defensive reactions such as denial and defensive avoidance (Witte et al., 1996). Therefore, it would be advantageous to utilise results from the current data to explore whether a similar model is relevant within fear and efficacy appeals in the educational field. Namely, whether students' perceptions of response and self-efficacy moderate the relationship between students' threat appraisal and their engagement (which in the present context would be considered as a danger control response as students would be implementing recommendations from the teacher to engage in positive study behaviours).

Furthermore, although not based upon the EPPM which does not consider the prospect of a challenge appraisal per se, it could be explored whether students' perceptions of response and self-efficacy moderate the relationship between fear appeal frequency and students' challenge appraisal. When the concept of a challenge appraisal was initially presented, it was thought to take place when a student felt confident in their ability to perform behaviours which would reduce failure (Putwain & Symes, 2014). Therefore, exploring whether response efficacy and self-efficacy moderates this relationship may offer support for this. Undertaking these analyses would help to understand whether efficacy is as salient in understanding reactions to fear appeal communication as is demonstrated within the health literature (Basil & Witte, 2012; Gore & Bracken, 2005; Maddux & Rogers, 1983; Peters et al., 2013; Ruiter et al., 2014). Furthermore, it may develop understanding about the circumstances in which

students' respond to fear appeal communications as a threat or challenge and how appraisals relate to other educational variables.

6.6.1.3   Latent Profile Analysis

The present research adopts a variable-orientated statistical analysis approach. This type of analysis is traditionally deployed within educational psychology research and allows for associations between variables and outcomes to be examined in isolation, but limits the opportunity to explore how multiple appraisals may co-occur within individuals and how profiles relate to outcome variables (Corpus & Wormington, 2014).

An alternative approach is person-centred analysis, in which the individual rather than the variable is the focus of analysis (Hart et al., 2003). These types of analysis allow for multifaceted understanding. For example how predictors can combine within individuals to create distinct profiles and how profiles compare on outcome measures (Laursen & Hoff, 2006), as well as helping to establish subpopulations of students who share a common experience (Collie et al., 2020). These approaches can therefore be useful when considering the dynamic interplay between person and context, and understanding what motivates students in school; potentially making it more reflective of real-world motivational processes (Linnenbrink-Garcia & Wormington, 2017). Increasing in popularity, person-centred approaches have been utilised in a variety of educational-psychology areas, such as: student motivation (Pastor et al., 2007); student engagement (Gupta, 2023); self-regulated learning (Xu & Corno, 2022); and teacher-student relationships (Hughes et al., 2014).

As previously documented (see [section 5.2.2.6)](#) these methods have also been utilised in a more synonymous field, with Nicholson et al. (2019) utilising cluster analysis to explore how students evaluate fear appeals as both threatening and challenging, indicting them to be distinct concepts which can coexist, rather than opposite ends of a continuum. Furthermore, Santana-Monagas, Núñez, et al. (2022) adopted latent profile analysis to study teachers' use of engaging messages, leading them to identify profiles of how teachers use combinations of messages, and how these relate to feelings of relatedness with their teacher. Utilising this type of analysis revealed that the predictive power of

certain types of teachers' communications is dependent upon how teachers generally utilise messages. The led the authors to conclude, "when approaching the study of teacher-messages, it is important to examine the usage of all messages together, as the frequency to which certain messages are reported may affect the predictive value of other messages" (Santana-Monagas, Núñez, et al., 2022 p. 16). An example when considering the present study in this vein, could be that response efficacy communications by a teacher who generally uses more fear appeal communications may have a different impact than a teacher who generally utilises response efficacy communications more frequently and less fear-appeal communications.

The adoption of these statistical techniques in the aforementioned research has provided distinctive advancement to the understanding of the field. Therefore, utilising this type of analysis with the current data may aid knowledge and understanding. For example, the use of latent profile analysis with the current dataset would allow for the exploration of how threat and challenge appraisals of fear appeals, and self-efficacy and response efficacy appraisals combine to create different student profiles, and how these profiles then may predict engagement behaviours. Additionally, the frequency of teachers' use of threat and challenge, and self-efficacy and response efficacy could be explored in a similar vain to that of Santana-Monagas, Núñez, et al. (2022), giving rise to considerations of how teachers may utilise differing patterns of communications in order to motivate students. The analysis of data in this approach may also be of value for providing practical implications, for example teachers could be informed about the type of messages they may be best using for different student profiles, allowing for more targeted intervention (Santana-Monagas & Núñez, 2022).

6.6.2   Alternative Methodological Approaches

The typical nature of motivational and engagement research generally explores how individual motivational constructs predict outcomes. However, this approach has been criticised for being over-simplistic in nature, posing the danger that this does not accurately reflect motivational functioning within the classroom setting, hampering practical application (Linnenbrink-Garcia & Wormington, 2017). Indeed, there is a lack of thorough understanding of how motivational beliefs may change across

time and context, and may be influenced by different instructional support, as well as the differing patterns of motivational changes (Linnenbrink-Garcia & Wormington, 2017).

These issues are also relevant when considering the majority of research to-date within the field of fear and efficacy appeals in education. Findings are somewhat limited due to methodological approaches utilised. Whilst the need for subject-specificity and focus on appraisal of individual teacher messages is necessary due to theoretical underpinnings, it creates an issue relating to gathering data at a snapshot in time as it neglects to consider how motivation and appraisal may be fluid and fluctuate over time. Utilising a more nuanced approach to study the dynamics and contextual factors relating to appraisal of teacher communications and the relationship with motivation and engagement may be a useful consideration for future research. For example, utilising intensive longitudinal measures to collect students' real-time motivation and engagement through mobile technology several times a day, over several weeks to explore motivational and engagement shifts, as deployed in Martin et al. (2015)'s study. This approach could be utilised to explore the real-time antecedents and outcomes of fear and efficacy appraisal, such as, how different types of messages (e.g. just fear, just efficacy, fear, and efficacy together, messages to individuals, those to the whole class, the context of how the message is used) relate to students' motivation and engagement. Indeed, as Martin et al. (2015) conclude, the events surrounding the students was the defining impact upon students' motivation and engagement, rather than any patterns in timings. Furthermore, they observed that although students shared the same academic environment, students experience their own distinct reality, which can account for significant intra and inter-individual variance in motivation and engagement. A more intricate understanding of the dynamics of these communications may help to unpick their nature further to allow more targeted advice for educators about the use of these communications.

6.6.3   Alternative Sources of Exam Communications

The present study has focused specifically upon the ways in which maths teachers communicate to students within their class about their forthcoming exams. In order to try and build up a nuanced understanding of the mechanisms which are involved within the appraisal process and how other factors, such as how teacher-student relationship impacts this process, it was important to follow the

specificity matching principle, in which specific predictors are used to predict specific behaviours (Swann Jr et al., 2007). However, in reality, there will be many other sources of fear and efficacy communications for students within the educational setting. For example, other school-related sources of fear and efficacy communications, such as from more senior school staff. This commentary may be presented in an entirely different manner to that of classroom staff in a day-to-day practice, such as in assemblies (Putwain, Nakhla, et al., 2017). The present study established interactions between students' judgements about their relationship with their teacher and elements of fear and efficacy appraisal (i.e., positive relation with challenge appraisal from fear appeals; and positive relationship with efficacy appeal frequency, perceived response efficacy and perceived self-efficacy). Therefore, it would be interesting to explore whether communications from those in more senior positions are made in a different manner (for example, are they made in a more authoritarian tone, or communicated as more of a focal message rather than general day-to-day communications?), and whether the more removed nature of these communications (i.e., said to a whole year group) would have a different effect on the appraisal of these communications by students. Given the consideration that message source may impact upon the persuasiveness of the communication (Higbee, 1969; Kim & Shin, 2018) it would be useful to explore how the other types of communications students' receive impact upon their appraisal of these communications and related educational outcomes.

6.7 Conclusion

Observational analysis identified that the majority of teachers' communications to students about their GCSEs related to test-taking skills and techniques. These communications were conceptualised as efficacy appeals, and in order to address methodological and theoretical limitations of previous research, the present study set out to develop a way to measure these communications and how students appraised them. Subsequently, teachers' use of fear and efficacy communications and students' appraisal of these communications were explored, alongside how these appraisals related to students' engagement and whether this was affected by students' perceptions of their relationship with their teacher. Results indicated that student who appraised fear appeals as challenging had higher levels of behavioural engagement, and this increased as teachers made more frequent fear appeal

communications. Students' threat appraisal remained unrelated to behavioural engagement at the individual level, however, when explored at the class-level, an interesting finding was noted. When teachers used low to moderate fear appeals to a class, students with a threat appraisal had higher levels of engagement task management. However, when teachers used more frequent communications, this seemingly positive effect diminished; potentially indicating an optimum level of fear appeal communications for students who appraise these communications as threatening. Furthermore, results indicated that, like fear appeals, efficacy appeals are not the pertinent component to educational outcomes; it is how students appraise them. Students' perceptions of whether the recommendation will be effective (response efficacy) and whether they feel competent in engaging in the recommended practice (self-efficacy) are the determining components which relate to their levels of engagement. Whilst students' perceptions of their relationship with their teacher was not found to moderate the relationship between fear or efficacy appeals and student engagement, it was found to directly relate to students' engagement.

Theoretical implications from the body of research presented in this thesis explored the advantage of understanding teachers' communications relating to test-taking skills and practices as efficacy appeals. Furthermore, how a reliable and valid measurement of efficacy appeals will subsequently allow for the exploration of how both fear and efficacy appeals may coexist and impact upon students conjointly. Practical implications centred around the need for teachers to carefully consider the type of communications they use with students regarding forthcoming exams, ensuring that language used is targeted to individual students' needs. An appreciation of students' needs can be strengthened by fostering positive relationships with students, which also enhances their engagement. Furthermore, when teachers provide students with test-taking skills and techniques they should also highlight how recommended techniques will be helpful for students in preparing for their exams and focus on building students' competence and confidence in using these techniques.

Additional analysis of the present dataset is recommended to explore whether students' perceptions of their relationship with their teacher moderates the relationship between the frequency of teachers' fear and efficacy communications and students' appraisals of these communications. Furthermore,

whether students' response efficacy and self-efficacy appraisals moderate the relationship between fear appeal frequency and challenge and threat appraisals. Utilising latent profile analysis techniques would also offer valuable insight into whether there are unique student profile combinations relating to students' threat and challenge appraisals of fear appeals, and self-efficacy and response efficacy appraisals and how these varying profiles may predict engagement behaviours. Future research would also benefit from undertaking a longitudinal cross - lagged panel design with the present constructs in order to control autoregressive and concurrent relationships and make more sound causal connections. The adoption of innovative methodological techniques such as intensive longitudinal real-time data collection through mobile technology (Martin et al., 2015) may also support understanding of the complex and dynamic appraisal process of teachers' exam communications and their educational outcomes.

6.8 Chapter Summary

Chapter 6 aimed to provide a general discussion of the body of research presented within the thesis. An overview of the key findings of the study was presented, followed by consideration of the theoretical advances which the study has offered. Next, practical applications of the findings were presented. Furthermore, consideration was given to limitations of the current research and potential future directions in the field were offered.

7 Chapter Seven: Conclusion

7.1 Chapter Overview

Chapter 7 provides an overview of the thesis. Key findings from Study One, Two and Three will be presented, followed by an overview of the theoretical and practical implications of the findings from the thesis, highlighting its originality and importance. Furthermore, considerations to potential future directions in the research field are offered.

7.2 Study One

Study One acted as an exploratory phase of the PhD research, undertaken to develop research questions for the main study. This explorative phase was conducted via 30 observations in GCSE classrooms, in order to explore the ways in which teachers communicated to students prior to their GCSE exams. An unstructured approach to observations was adopted and thematic analysis conducted to analyse the findings. Four distinct higher-order themes emerged from the data: Instructional Practices, Direction of Message, Grade Point and Efficacy Appeals.

Instructional Practices considered the ways in which teachers utilised different teaching practices in relation to communications about exams. Teachers' attempts to motivate students through discussion of exams was sometimes presented in a controlling style, with the use of pressure to motivate students to behave in a certain way (Reeve, 2009). Other times was seen in a more supportive approach by adopting a reassuring tone, providing rationale for learning activities, and attempting to empower students. This theme also discussed how teachers' personal pronoun use can impact upon how messages about exam preparation are conveyed to students, and how this may affect their feelings of support in their learning.

Direction of Message considered the ways in which teachers transmitted communications regarding exams to students. Although the majority of communications observed were made to the whole class, there were instances of teachers speaking directly to individual students. Furthermore, teachers were also found to communicate to students in a narrative manner, providing commentary whilst students were engaged in other tasks.

The theme Grade Point considered the variety of purposes in which teachers made reference to grade point, such as: encouraging students to engage in their work; focusing students upon attainment outcomes; and distinguishing between students within the class.

 The majority of observations reflected teachers' communications relating to exam preparation strategies and the promotion of skills and techniques useful for the exam (such as: strategies to use in the exam; likely content to be tested in the exam; how to effectively spend time in the exam; how marks are allocated, and how these can be maximised). Whilst perhaps traditionally considered as 'teaching to the test' or 'gaming the system' practices (Barksdale-Ladd & Thomas, 2000; Cuff et al., 2019; Meadows & Black, 2018), the present study conceptualised these communications as 'Efficacy Appeals'. Originating from the health literature, efficacy appeals are considered to be persuasive communications promoting alternative strategies to encourage behaviour change (Witte & Allen, 2000). Efficacy appeals are typically researched alongside fear appeals which are a type of persuasive communication focused on eliciting a fear response in recipients (Witte, 1992). Whilst there is has been a variety of research exploring fear appeal communications within the educational setting (see Putwain et al., 2021 for review), there is limited research looking at efficacy appeals. As efficacy appeals are considered to be an important component in understanding how persuasive communications impact on behaviour change (Witte, 1992; Witte & Allen, 2000), this highlighted an important deficit in the current literature. Thereby propelling the focus of the thesis to develop a conceptualisation of efficacy appeal communications within the educational environment and a way to measure these communications, as well as exploring how students' appraisal of these communications relate to other educational variables.

7.3   Study Two

The aim of Study Two was to develop the conceptualisation of efficacy appeals within the educational field and devise a way to measure these communications. Efficacy Appeals were defined as statements which provide students with an action to follow which will help them to achieve their target grade.

Grounded within both the theoretical model of the Extended Parallel Process Model (Witte, 1992) and empirical data from Study One and wider literature from the test-taking practices field (Abrams et al., 2003; Barksdale-Ladd & Thomas, 2000; Gulek, 2003), a measure of teachers' use of efficacy communications and how students appraised them was developed, entitled Teachers' use of Efficacy Appeals in the Classroom prior to High-Stakes Exams (TEACHE). After several stages of refinement, including cognitive pre-testing with six students and confirmatory factor analysis of the items from data collected from 236 participants, an 18-item scale was established. The TEACHE contained questions on a variety of test-taking areas such as: exam content; mark allocation and maximisation; revision tips; and how to spend time in the exam. For each of these domains, students responded to how often their teacher recommended the practice (frequency), whether they thought the skill or technique would be effective in helping them to prepare for their exam (response efficacy) and how confident they felt in performing the recommended practice (self-efficacy). The TEACHE displayed good psychometric properties in relation to internal reliability and convergent validity; meaning it could be utilised on a wider scale in subsequent research to explore how teachers' use of efficacy appeals and students' appraisals of these communications may relate to other educational variables.

7.4 Study Three

Study Three set out to explore how teachers' use of fear and efficacy communications in the classroom and students' appraisal of these communications impacted their levels of engagement, and whether students' perceptions of their relationship with their teachers affected this relationship. Data were collected from 1062 Year 11 students from seven schools.

7.4.1 Fear Appeals

Results from analysis on fear appeal data mostly aligned with findings in previous studies, such as the positive relationship between students' challenge appraisal and engagement (Putwain, Nakhla, et al., 2017; Putwain, Symes, et al., 2017; Putwain et al., 2022) and lack of significant relationship between students' threat appraisal and behavioural aspects of engagement (Nicholson & Putwain, 2019; Putwain et al., 2022). Furthermore, the finding that higher class-average challenge appraisal was related to greater class-average behavioural engagement, and higher class-average threat appraisal was related to

lower class-average behavioural engagement has also been previously found (Putwain, Nicholson, et al., 2016).

Two significant cross-level interactions between class-level frequency of teachers' fear appeal communications and fear appeal appraisal and engagement were identified. Firstly, greater use of fear appeal communications from teachers was found to result in higher levels of engagement persistence for students with a challenge appraisal, reflecting previous findings (Putwain, Nakhla, et al., 2017; Putwain, Symes, et al., 2017; Putwain et al., 2022). Furthermore, an interesting finding in relation to students with a threat appraisal was noted. For these students, when teachers used fear appeal communications at a low or moderate level, students indicated greater levels of task management engagement. However, as teachers' frequency of communications increased, the perceived positive benefit of greater engagement subsided. Although the relationship between increased levels of threat and increased engagement is unexpected, findings may reflect the Control-Value theory of achievement emotions (Pekrun, 2000), whereby small amounts of fear appeal communications may invoke positive activation emotions, resulting in increased engagement. Whereas, increased fear communications from teachers results in students feeling increased risk to their self-worth, leading to negatitive deactivating emotions and engagement in self-protection strategies, such as withdrawal of effort (Putwain, Nicholson, et al., 2016). Alternatively, findings may reflect the diverging effects that negatively activating achievement emotions may have upon students' approach to learning situations (Linnenbrink, 2007; Pekrun et al., 2002). These results potentially indicate an optimum level of fear appeal communications frequency for students with a threat appraisal.

7.4.2 Efficacy Appeals

Previous research exploring the use of, and impact of teachers' efficacy communications is scarce and subject to limitations (see for discussion). Therefore, the present study utilised a theoretically and empirically devised questionnaire in order to explore how students interpret these communications, and how this related to their engagement.

The lack of relationship between efficacy appeal frequency and student engagement is potentially supportive of a similar appraisal-based model of efficacy appeals as is seen with fear appeals (Putwain, Nakhla, et al., 2017; Putwain, Remedios, et al., 2016; Putwain et al., 2019a; Putwain, Symes, et al., 2016; Putwain et al., 2022; Symes et al., 2015), whereby the use of an efficacy communication is not indicative of subsequent educational outcomes, but the appraisal of their usefulness (response efficacy) and recipients' feelings of competency in engaging in the recommended behaviour (self-efficacy) are the significant factors in impacting educational outcomes. As students' level of response efficacy was found to be related to their engagement, this underscores the advantage of teachers making clear commentary on the utility of the behaviours they are recommending to their students and how this can help support them in preparing for their exams. Students' perceptions of their ability to engage in teachers' recommended actions (self-efficacy) was also found to relate to aspects of their engagement, namely their persistence and planning; thereby supporting the consideration that teachers' communications focused on enhancing students' beliefs in their ability can have a positive impact upon their motivation and engagement in their studies (Sprinkle et al., 2006).

7.4.3 Teacher-Student Relationships

Given the importance that students' perceptions of their relationship with their teacher can have upon their educational outcomes (Roorda et al., 2011) and the potential impact that credible sources can have upon the persuasiveness of communications (Higbee, 1969; Kim & Shin, 2018), it was posited that students' perceptions of their relationship with their teacher would moderate the relationship between students' fear and efficacy appraisal and their levels of engagement in their studies.

However, whilst teacher-student relationships were found to predict student engagement, reflecting previous literature (Furrer & Skinner, 2003; Hughes et al., 2008; Lee, 2012; O'Connor & McCartney, 2007; Skinner & Belmont, 1993), teacher-student relationship was not found to moderate the relationship between fear or efficacy appeals and student engagement. It was posited that the perception of students' relationship with their teacher may have a more significant role when explored in relation to students' appraisal of fear and efficacy communications as opposed to upon the degree to which their behaviour changes (considered here through their levels of engagement), particularly

given that previous research indicates the impact credible sources can have upon attitude change, but not necessarily behaviour change (Higbee, 1969). Therefore, future research would benefit from collecting data over multiple time points to allow for more sophisticated analysis of these variables to disentangle the nature of this interaction.

7.5   Theoretical Implications

Two key theoretical implications from the body of research are identified. Firstly, the conceptualisation of teachers' communications relating to test-taking skills and practices as efficacy appeals has allowed for deeper understanding as to how and when these communications can be effective in supporting students in preparing for their studies. Previous literature identifies the benefits of students developing these skills (Andrade & Valtcheva, 2009; Credé & Kuncel, 2008; Daly et al., 2012; Dodeen et al., 2014; Putwain et al., 2013) but the current findings highlight the importance that students also need to feel that these practices will be effective and they need to feel confident in undertaking them.

Furthermore, the development of a reliable and valid way of measuring efficacy appeals in the naturalistic, educational environment allows for subsequent research to explore how the use of and appraisal of both fear and efficacy communications relate to students' educational outcomes. There has been a surprising dearth of research exploring the impact of efficacy appeals in the education setting, despite their important role in positive intention and behaviour change (Basil & Witte, 2012; Gore & Bracken, 2005; Maddux & Rogers, 1983; Peters et al., 2013; Ruiter et al., 2014). Therefore, the development of the TEACHE will allow for future research to explore how fear and efficacy communications may coexist in the classroom, and whether they work conjointly to impact educational outcomes.

7.6   Practical Implications

The conceptualisation of teachers' communications on test-taking skills and techniques as efficacy appeals allowed for deeper consideration into the effectiveness of these communications for students prior to high-stakes exams. Results suggested that rather than simply receiving this information, it is students' beliefs of the effectiveness of recommended practices (response efficacy) and their

confidence in being able to effectively use these skills (self-efficacy) which are the principal factors relating to how they engage in their studies. Thereby leading to the recommendation that when teachers provide students with test preparation advice, they should also explain how and why techniques are useful for preparing students for their exams, as well as building students' competencies in these techniques. It is also advocated that teachers take care not to make fear appeal communications to the class as a whole, and instead use a targeted approach to students who will view these communications in a motivating way. Developing positive relationships with students will help teachers to identify which students would benefit from which type of approach, as well as supporting student engagement more generally. Wider implications considered the potential inequity in students' receipt of test preparation advice, suggestive that a more uniform method to the provision of these skills and techniques may offer a more egalitarian approach.

7.7   Future Directions

 Several suggestions for additional analyses based on the current data were offered. Firstly, given the suggestion that perhaps the significant effect of students' perceptions of relationships with their teacher precedes the appraisal process, it would be worthwhile to model whether students' perceptions of their relationship with their teacher moderates the relationship between the frequency of teachers' fear and efficacy communications and students' appraisals of these communications. Secondly, given that the EPPM (Witte, 1992) proposes levels of response and self-efficacy to be key factors in behaviour change outcomes of threat response, it would be beneficial to explore whether students' response efficacy and self-efficacy appraisals moderate the relationship between fear appeal frequency and challenge and threat appraisals. Additionally, undertaking latent profile analysis techniques would offer unique insight into whether there are distinctive student profile combinations relating to students' threat and challenge appraisals of fear appeals, and self-efficacy and response efficacy appraisals and how these varying profiles may predict engagement behaviours.

Undertaking a longitudinal cross-lagged panel design with the present constructs in future research would offer significant advantage in being able to control autoregressive and concurrent relationships, in order to make more sound causal connections.   The complex and dynamic appraisal process of

teachers' exam communications may also be further explored by the adoption of innovative methodological techniques such as intensive longitudinal real-time data collection through mobile technology (Martin et al., 2015) allowing for more nuanced understanding of the use of and appraisal of these communications, and their educational outcomes.

7.8 Conclusion

This thesis set out to explore the ways in which teachers communicate to students about their GCSE exams. Findings identified that the majority of communications made by teachers related to test-taking skills and techniques. These types of communications were interpreted as a form of efficacy appeal, a type of persuasive communication promoting alternative strategies to encourage behaviour change (Witte & Allen, 2000). As previous research had several methodological and theoretical limitations, a questionnaire (TEACHE) was created to measure the use of and appraisal of these communications. Data obtained from the TEACHE demonstrated good psychometric properties.

Subsequently, data was collected to explore the use of teachers' fear and efficacy communications and how students appraised these communications, and whether these appraisals related to students' levels of engagement, and whether their perception of their relationship with their teacher affected this relationship. Results regarding fear appeal appraisal was mostly in line with previous literature. A novel finding suggested that there may be an optimal level of fear appeals communications for students with a threat appraisal. Low to moderate levels of these communications resulted in these students having higher engagement in relation to task management; but increased use of these communication diminished this seemingly positive benefit. Results from efficacy appeals indicated that, like fear appeals, teachers' use of the communication is not the pertinent component to subsequent educational outcomes; it is how students appraise them. Students' perceptions of the effectiveness of the recommended practice (response efficacy) and whether they feel competent in engaging in the recommended practice (self-efficacy) are the determining components which impact their levels of engagement. It was anticipated that students' perceptions of their relationship with their teacher would affect the relationship between fear and efficacy appeals and students' engagement, but teacher-student relationship was not found to moderate these relationships. Leading to the assertion that the impact

of this relationship may play a more significant role in the initial appraisal of fear and efficacy appeals, rather than at the behaviour change stage.

Theoretical implications from the findings consider the advancement to conceptualising teachers' communications relating to test-taking skills and practices as efficacy appeals and how the provision of a reliable and valid measurement of efficacy appeals allows for the exploration of both fear and efficacy appeals in the educational environment, and how appraisals of these communications may conjointly impact students. Findings from the research indicate that teachers should not only be providing students with test-taking skills and techniques but ensuring that they communicate to students how and why these techniques are useful for preparing students for their exams, as well as building students' confidence in deploying these techniques. Fostering positive relationships with students can not only help teachers to identify which students would benefit from particular types of communications but can also support students' engagement more generally. Undertaking additional analysis on the present dataset would further aid understanding regarding the dynamics of relationships, and the use of latent profile techniques would offer valuable insight into whether there are unique student profiles in relation to appraisals of fear and efficacy communications and how this may relate to student engagement.

7.9   Chapter Summary

Chapter 7 provided a conclusion to this thesis. The aims and findings of the three empirical studies undertaken within the body of work were summarised. An overview of the theoretical and practical implications of the findings was provided, as well as consideration to future directions of the research field.

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