Evaluating the Impact of a Whole-Class Intervention Designed to Promote
Emotion Regulation for Learning with 9-10-year old Children

A thesis submitted by

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Statement 4

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Abstract

Emotions have been found to be intertwined with many aspects of the learning process (Hinton & Fischer, 2010; Linnenbrink, 2007; Meyer & Turner, 2006; Pekrun, Frenzel, Goetz & Perry, 2007). For some children emotions appear to have a debilitating effect on their effort, persistence and problem-solving and can lead to task avoidance and self-defeating behaviours (Linnenbrink, 2007; Tyson, Linnenbrink-Garcia & Hill, 2009). The purpose of this mixed methods study was to examine the impact of a four-week whole-class intervention designed by the researcher to promote pupils' emotion regulation in the classroom. The study uses a social cognitive framework (Bandura, 1986) and draws on theory and research in the inter-related fields of appraisal theories of emotion (Frijda,1986), the control-value theory of achievement emotions (Pekrun, 2006; Pekrun, Frenzel, Goetz & Perry, 2007), implicit theories of ability and achievement goal orientation (Dweck, 2000; Dweck & Leggett, 1988; Pintrich, 2000), the dual-process model of self-regulated learning (Boekaerts, 2011) and the process model of emotion regulation (Gross, 1998; 2002). The research took place in two London primary schools with 166 Year 5 pupils (mean age 10.4 years) and four class teachers. For the quantitative part of the study, a non-equivalent groups pre and post experimental design with a waiting list control group was used. The qualitative part of the study involved questionnaires completed by 113 intervention pupils and the four class teachers. Inferential statistical analysis revealed a statistically significant effect of time on intervention pupils' incremental theory of ability, mastery goal orientation and use of the cognitive reappraisal strategy. The perceptions of pupils and teachers of the impact of the intervention were explored using thematic analysis. The findings from both phases were merged to answer the overarching research question. Implications for educational psychologists and educators are discussed and suggestions for future research are made.

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Chapter One

Introduction

1.0 Introduction to Chapter One

This introductory chapter provides a summary of the thesis, including the topic of the study, the chosen methodology and the research setting. The introduction outlines the study's aims and provides the rationale for the study as well as explaining the researcher's own interest in the topic of emotion regulation. The introduction also provides an overview for the remainder of the thesis.

1.1 Summary of the Thesis

This mixed methods study evaluates the impact of a whole-class intervention with 9-10-year old primary school pupils. The aim of the intervention is to promote emotion regulation for learning. The intervention, designed by the researcher, combines the promotion of an incremental theory of ability (Dweck, 2000) and a mastery goal orientation (Dweck & Leggett, 1988; Pintrich, 2000) as well as teaching pupils two emotion regulation strategies related to learning activities and learning outcomes experienced in the classroom.

The current study is situated within the wider field of self-regulated learning (Boekaerts, 2011; Duckworth, Akerman, MacGregor, Salter & Vorhaus, 2009; Zimmerman, 2000a). The current study aims to fulfil a number of purposes:

1. To contribute to knowledge about ways of enhancing primary school pupils' emotion regulation for learning through a whole-class intervention.

2. To provide data and knowledge about the effectiveness of the intervention to participating schools to support their development of a Personal, Social and Health Education (PSHE) curriculum.

3. To contribute to information on the role of the educational psychologist (E.P) in supporting schools in delivering universal programmes to enhance the learning and wellbeing of all children.

The research took place in two London primary schools with 166 Year 5 pupils (mean age 10.4. years) and four class teachers. For the quantitative part of the study a non-equivalent groups pre and post experimental design with a waiting list control group was used. The qualitative part of the study involved questionnaires completed

by 113 intervention pupils and the four class teachers. The quantitative data was analysed using inferential statistical analysis and the qualitative data was analysed using thematic analysis. The study addresses a gap in the research literature on ways of promoting emotion regulation for learning in a real world context with primary school pupils.

1.2 Setting the Scene

The researcher is an educational psychologist (E.P) in an outer London borough. In carrying out consultation with schools the researcher has noticed concerns raised by school staff and parents about children who are described as having "emotional blocks" to learning or for whom their negative emotional responses appear to impede their progress. For some pupils, for example, making a mistake or receiving critical feedback can lead to them appearing to give up. For other pupils, their perception of a task as overly challenging can lead to angry outbursts from which it takes them time to recover. Other pupils may appear anxious when experiencing challenges in learning and despondent when they face a setback. More resilient learners appear to be able to take on challenges and to 'bounce back' from failures. It is acknowledged that for some individuals, who may have experienced, for example, attachment insecurity, trauma or loss, their prior experiences are likely to have an impact on their ability to self-regulate their emotions and that effective interventions for these children will most likely be based on developing secure relationships with key adults (Bomber and Hughes, 2013; Geddes, 2006). However, the focus in the current research is on developing emotion regulation related to learning activities and outcomes for *all* children. Therefore, the researcher wanted to find out more about the cognitive, motivational and emotional processes involved in self-regulated learning and how strategies for regulating emotions more effectively in the learning context can be promoted for all learners.

1.3 The 'Learning Track' Project

Universal interventions target whole populations, as opposed to small groups or individuals who have been identified as having a high-risk status. The 'Learning Track' project is a 4-session whole-class intervention designed by the researcher. The content of the intervention is based on theory and research in the fields of achievement emotions (Pekrun, 2006; Pekrun, Frenzel, Goetz & Perry, 2007), self-regulated learning (Boekaerts, 2011), achievement goal orientation (Dweck, 2000; Dweck & Leggett, 1988; Pintrich, 2000) and emotion regulation (Gross, 1998; 2002; Gross & John, 2003; Gross & Thompson, 2007; Koole, 2009). The intervention combines the promotion of an incremental theory of ability and a mastery goal orientation to learning with two emotion regulation strategies: controlled breathing and cognitive reappraisal.

An incremental theory of ability, or the belief that one's ability is malleable (Dweck, 2000), is promoted in the intervention through teaching pupils about how the brain learns, that is through making new connections and creating neural pathways. A mastery goal orientation to learning (Dweck & Leggett, 1988; Pintrich, 2000) is fostered in the intervention through demonstrating to pupils the effects of practice on their speed in performing a skill and through reflecting with pupils on skills that they have already developed over time through effort, practice and persistence (Blackwell, Trzesniewski & Dweck, 2007). The intervention also includes raising pupils' awareness of emotions experienced in learning situations which can either help or hinder their learning. Two emotion regulation strategies are directly taught in relation to situations encountered in classroom learning: controlled breathing (for example, Koole, 2009) and cognitive reappraisal (Gross, 2002).

1.4 Rationale for the Study

There is a growing awareness that emotions have the ability to influence the learning process both positively and negatively (Fredrickson, 2001; Linnenbrink, 2007; Linnenbrink & Pintrich, 2000; Pekrun et al., 2007). In educational settings emotional experiences influence interactions, affect learning and performance and influence personal growth in both students and teachers (Fried, 2011; Meyer & Turner, 2006; Pekrun et al., 2007). Emotions can convey valuable information, they can direct attention to information (Frijda, 1986) and can enhance or negatively influence motivational processes (Linnenbrink, 2007). As a result, they are

increasingly being viewed as integral to the learning process (Hinton & Fischer, 2010; Meyer & Turner, 2006; Schutz & Lanehart, 2002).

It could be argued that for most learners, at some point during the learning process, emotions could appear to 'get in the way' of their learning and progress. This can occur at the onset of a learning task (for example, perceiving a homework task as boring or overly challenging), during the task if the learner encounters a challenge or obstacle (such as not being able to understand a complicated piece of text), or at the outcome of the task, when the learner receives feedback about how they have performed (such as a test score or comments about how to improve) (Zimmerman, 2000a).

Emotional responses to learning can have an impact on motivation, behaviour and academic progress (Linnenbrink, 2007; Pekrun et al., 2007; Tyson, Linnenbrink-Garcia & Hill, 2009). Negative emotional responses to learning tasks and outcomes, such as anxiety, hopelessness or anger, are not always resilient responses in that they can lead learners to give up in the face of challenges and to have difficulty in recovering following setbacks in learning (Dweck, 2000; Linnenbrink, 2007). The rationale for the current study continues with a consideration of the following three areas:

    (a) the benefits of emotion regulation;

    (b) the links between emotion, cognition and motivation;

    (c) the developing field of self-regulated learning, which has more recently incorporated emotion regulation.

1.4.1 Benefits of emotion regulation. In the current study, which draws on appraisal theories of emotion (Frijda, 1986; Scherer, 2000), emotion regulation for learning encompasses both the cognitive and motivational processes that can give rise to emotions in the first place (Frijda, 1986; Pekrun et al., 2007) as well as emotion regulation strategies that can be employed to manage negative emotions (Gross, 2002; 2003; Gross & John, 2003; Gross & Thompson, 2007).

The growing interest in the field of emotion regulation stems in part from findings that effective emotion management brings a wide range of interpersonal, academic and mental health benefits for children (Boekaerts, 2002; Davis & Levine , 2012; Graziano, Reavis, Keane & Calkins, 2007; Gumora & Arsenio, 2002).

Emotion regulation enables learners to have some control over their behaviour and to remain engaged with learning. For example, Boekaerts (2002) has noted that students who regulate their emotions are more successful at learning tasks. Similarly, Gumora and Arsenio (2002) found that early adolescents' emotion regulation made a significant contribution to academic achievement over and beyond the influence of other cognitive contributors. Moreover, the use of emotion regulation strategies has also been found to maintain individual wellbeing and improve interpersonal functioning (Graziano et al., 2007; Gross & John, 2003). The above areas of research, therefore, indicate that promoting the use of emotion regulation strategies in the classroom could be of benefit to all learners.

1.4.2 Links between emotions, cognition and motivation. In the field of educational neuroscience, Hinton and Fischer (2010) stress that the emotional, cognitive and motivational dimensions of learning are inextricably interlinked. It has been suggested that one contribution of neuroscience to education is the confirmation that the brain develops through a dynamic and continuous interaction between biology and experience (Hinton, Miyamoto & Della-Chiesa, 2008). Hinton et al. stress the interdependence of learning and emotion. They write that there are three major brain networks involved in learning: the recognition network, the strategic network and the affective network.   The recognition network receives sensory information from the environment and transforms it into knowledge; the strategic network is recruited for planning and co-ordinating goal-oriented actions; the affective network is involved in emotional dimensions of learning such as interest, motivation and stress. Hinton et al. write that all these networks work together to guide the learning process.

The affective network is made up of a set of structures in the centre of the brain which is known as the limbic system and contains the brain regions associated with emotional processing (the amygdala and hippocampus). This area is highly connected with cortical areas involved in cognitive processing. Hinton et al. (2008) suggest that learning is likely to be more effective if, in addition to providing a positive and emotionally supportive learning environment, educators also add to pupils' existing emotion regulation strategies, and the latter is an aim of the current study.

Similarly, in their research involving observations of classroom contexts, Meyer and Turner (2006) write that in classroom observations and student self-reports they have found it difficult, if not impossible, to separate emotions, cognitions and motivation. However, research on emotion in education has been in a state of relative fragmentation and it has been argued that there has been a lack of conceptual integration of research on emotion, cognition and motivation (Mega, Ronconi & De Beni, 2014; Pekrun, Elliot & Maier, 2009). In order to address this noted lack, the approach used in the current study integrates cognitive processes (learners' self-beliefs), motivational processes (learning goal orientation) and emotion regulation processes in order to enhance pupils' self-regulated learning.

1.4.3 Self-regulated learning. Interest in self-regulated learning and its impact on learning and attainment has been increasing in recent years (Boekaerts, 2011; Duckworth et al., 2009; Zimmerman, 2000a; Zimmerman & Schunk, 2011). Self-regulation includes the ability to concentrate, to become involved in group activities, to restrain disruptive and impulsive behaviour and to work autonomously (Duckworth et al., 2009).   Duckworth et al.'s review emphasises the importance of curriculum strategies for improving self-regulation that encompass the following three areas: cognitive skills (memory, attention, problem-solving); meta-cognitive skills (understanding one's own learning and thinking processes) and, of significance to the current study, affective skills (monitoring and regulating one's moods and emotions). Key findings from the review above are that there is a positive overall relationship between self-regulation and academic achievement and that the effect of self-regulation on achievement exists independently of prior attainment (Duckworth et al., 2009; Zimmerman & Schunk, 2011).

Moreover, in a recent summary of educational research into the average impact of a range of different educational strategies on pupil attainment in the United Kingdom, it was noted that meta-cognition and self-regulation approaches have consistently high levels of impact with pupils making an average of eight months' additional progress as a result of these interventions. It was also noted that teaching meta-cognition and self-regulation strategies can be particularly effective for low achieving pupils (Higgins, Katsipataki, Coleman, Henderson, Major & Coe, 2014).

However, it is only in more recent years that the field of self-regulated learning has included emotional and motivational processes. In the dual-process

model of self-regulated learning, for example, appraisals, motivation and emotions are given a central role (Boekaerts, 2010). In Boekaerts' model achievement goals and emotional wellbeing are presented as the two priorities facing learners in classrooms. According to this model, self-regulated learners are capable of remaining on (or returning to) the 'learning track' through the use of 'volitional strategies'. These strategies include the use of personal resources when confronting obstacles in order to protect the intention to learn (Corno, 2004) and include strategies for regulating emotions (Boekaerts, 2010). Linked to these ideas regarding volitional strategies, an aim of the current study is to add to pupils' personal resources in terms of their emotion regulation strategies when confronting challenges and setbacks in learning.

The section above has attempted to provide a rationale for the current study. In the current study a review of relevant literature intends to explore how emotions are generated in learning contexts, how they influence learning and how they may be regulated. This review of relevant theory and research forms the basis of the design of the four-session 'Learning Track' project which is the intervention being evaluated in the current study.

1.5 Distinctive Contribution of the Study

As mentioned above, within the field of self-regulated learning, emotional and motivational processes involved in learning have only received attention relatively recently (Boekaerts, 2010; Mega et al., 2014) and there appears to have been a lack of research into ways of developing learners' emotion regulation which is specific to the learning context (Boekaerts, 2011; Fried, 2011). Previous research into emotion regulation in the classroom or related to learning has involved correlational research investigating learners' current use of strategies (Fried, 2011; Gumora & Arsenio, 2002) or has involved contrived laboratory-based research rather than research carried out in naturalistic settings (for example, Davis & Levine, 2012).

Through extensive searches on intervention studies which aim to promote emotion regulation in the school or classroom context (Appendix A) there appears to be a lack of such research. It seems that the current study's distinctive contribution is in integrating research from distinctive fields in order to design and evaluate a whole-class intervention which aims to develop 9-10-year old pupils' emotion regulation for learning through promoting an incremental theory of ability, a mastery

goal orientation to learning and the use of emotion regulation strategies in classroom and learning contexts.

1.6 Design of the Current Study

The current study adopts a pragmatic approach and, as such, uses mixed methods to evaluate and to explore the impact of the intervention on pupils' implicit theories of ability, mastery orientation to learning and use of emotion regulation strategies. The quantitative part of the study involves a non-equivalent groups pre-post design with a waiting list control group. Five pupil self-report measures are used. The qualitative part of the study involves pupil and teacher questionnaires which aim to explore, in more depth, participants' perceptions of the impact of the intervention.

1.7 Summary and Introduction to Remainder of the Thesis

Chapter One has introduced the topic and rationale for the thesis, including the researcher's personal interest in emotional processes involved in learning.

Chapter Two introduces the social-cognitive perspective as a framework within which to explore different areas of related research. The chapter reviews appraisal theories of emotion. Furthermore, implicit theories of ability and learning goal orientation are discussed in relation to their impact on appraisals and, hence, on emotional responses. The control-value theory of achievement emotions, which views learners' control and value appraisals as important determinants of achievement emotions, is discussed. The process model of emotion regulation is described and is, in this study, located within the wider field of self-regulated learning. The chapter concludes with the conceptual framework for the study and with the study's research questions.

Chapter Three presents the methodology for this study. Current debates around ontology and epistemology within educational research are reviewed as a foundation for explaining the researcher's pragmatic stance and the research design. The complexity of researching social phenomena in schools is highlighted, along with the practical and ethical issues in experimental research in educational psychology. In Chapter Three the content of the 'Learning Track' project' is also presented.

Chapter Four presents the data analysis from the quantitative part of the study involving five pupil self-report measures. The limitations of non-equivalent group designs are discussed, along with the rationale for carrying out the data analysis. Descriptive and inferential statistics are presented to address the three hypotheses for this phase of the study.

Chapter Five presents the qualitative analysis of pupil and teacher questionnaires in relation to the qualitative research question. The technique of thematic analysis is described and is used to analyse the data. The four main findings from the thematic analysis are presented.

Chapter Six contains an integration and discussion of both the quantitative and qualitative findings in relation to the overarching research question and in relation to to the relevant literature. The way in which the study may have addressed the noted gap in research on emotion regulation for learning is discussed. The researcher considers the extent to which any observed changes can be attributed to the intervention. Suggestions for future research are made in the light of the study's limitations and implications for E.P practice and for educators are discussed.

In Chapter Seven conclusions are drawn about the evidence for the impact of the intervention on processes involved in emotion regulation for learning, including an incremental theory of ability, mastery goal orientation and use of emotion regulation strategies. Conclusions about how these findings contribute new knowledge in this field of research are also made.

Chapter Two

Literature Review

2.1 Overview of Chapter Two

This literature review will look at areas of theory and research that can address the question as to whether children can learn to regulate their emotions in the classroom more effectively. This will involve finding out what emotions are, what gives rise to them, the functions of emotions, how emotions in learning contexts link with self-beliefs, learning goals and achievement and the processes involved in emotion regulation. These areas of theory and research suggest ways in which all learners can be encouraged to regulate their emotions in order to remain on the 'learning track'.

A search of relevant literature, including theory and research on emotion regulation, particularly related to learning activities and outcomes, was carried out by the researcher (Appendix A). Studies on emotion regulation have been carried out within a number of fields, including mental health, developmental psychology and experimental psychology (Gross, 1998). In the present study emotion regulation for learning is viewed as a component of self-regulated learning that can be fostered for all learners. The social-cognitive perspective (Bandura, 1986), which highlights the importance of self-beliefs, is discussed as a framework within which to explore the main concepts and processes involved in the study. The scope of this review, therefore, covers theory and research in the following areas:

  i.   The social-cognitive framework and the concept of self-efficacy;
  ii.   Appraisal theories of emotion and the control-value theory of achievement emotions;
  iii. Theoretical accounts of the functions of emotions and of the impact of emotions on the learning process;
  iv.   Implicit theories of ability and learning goal orientation which influence learners' appraisals;
  v.   Theories of self-regulated learning and how these encompass motivational and emotional processes;
  vi.   Theories of emotion regulation.

The scope of the current study, which focuses on learners' self-beliefs and use of emotion regulation strategies, does not include extensive consideration of environmental factors or of intra-individual factors, such as temperament or attachment security, or consideration of developmental factors relating to emotion regulation in children. However, it is acknowledged that these factors will also have important influences on emotional experiences and emotional responses related to learning activities and outcomes (Bomber & Hughes, 2013; Meyer and Turner, 2006; Tyson et al., 2009).

In the current study it will be argued, drawing on the control-value theory of achievement emotions (Pekrun et al., 2007) and on the dual-process model of self-regulated learning (Boekaerts, 2010), that an intervention which fosters an incremental theory of ability and a mastery goal orientation (Dweck, 2000) and which also teaches adaptive emotion regulation strategies (Gross, 2002; Koole, 2009) will enhance learners' ability to regulate their emotions in learning contexts.

2.2 The Social-Cognitive Approach

Bandura (1986) put forward a view of human functioning that gives a central role to cognition, self-regulation and self-reflection. From this standpoint, people are viewed as self-organising, pro-active, self-regulating and self-reflective, rather than as reactive organisms shaped by environmental forces or driven by concealed inner impulses. According to this theoretical perspective, human functioning is viewed as the product of a dynamic interplay between personal, behavioural and environmental influences. A key concept within the theory, therefore, is that of reciprocal determinism, the idea that personal factors (such as cognition, affect and biological events), behaviour and environmental influences interact. Moreover, in social-cognitive theory, individuals are seen as agents pro-actively engaged in their own development. The key to this sense of agency is the fact that individuals possess self-beliefs that enable them to exercise a measure of control over their thoughts, feelings and actions (Bandura, 1986).

The self-beliefs that individuals use to exercise some control over their environments include self-efficacy beliefs. Self-efficacy is a critical notion in Bandura's work; it comprises beliefs people have about their capability to bring about a particular outcome (Bandura, 1977). Self-efficacy judgments are contextual (task and situation-specific). Perceptions of self-efficacy are held to influence

behaviour in three ways. They firstly influence choice of behaviour; people engage in tasks in which they feel competent and avoid those in which they do not. Secondly, self-efficacy beliefs help determine how much effort people will expend on an activity and how long they will persevere. Finally, self-efficacy beliefs influence people's thought patterns and emotional reactions to challenges (Pajares, 1995). Self-efficacy beliefs are held to be important influences on motivation and behaviour because they mediate the relationship between knowledge and action (Zimmerman, 2000). That is, unless individuals believe that their actions can produce the outcomes that they desire, there is very little incentive to act or to persevere in the face of challenge.

Self-efficacy has an established evidence base for its role in influencing educational outcomes (for example, Pajares, 1995; 1996; Pajares & Miller, 1994). Self-efficacy beliefs are held to constitute a powerful motivating factor in self-regulated learning (Bandura, 1993). Beliefs about self-efficacy are viewed as fundamental for human motivation, wellbeing and personal accomplishment. Of relevance to the current study on emotion regulation is the idea that self-efficacy beliefs affect individuals' thought patterns and emotional reactions. Individuals with high self-efficacy approach tasks as challenges to be mastered rather than threats to be avoided. They also quickly recover their sense of efficacy after setbacks and attribute failures to factors within their control (Bandura, 1977).

According to social-cognitive theory and research, different individuals may understand the same situation quite differently, as they have different knowledge, experiences, expectations, goals and emotions. A social-cognitive approach has informed theory and research on goal-directed behaviour in classrooms, including pupils' goal orientation, their expectancies and values and their self-efficacy, all of which can predict the strength and direction of pupils' pursuit of achievement goals (Boekaerts, de Koning & Vedder, 2006). A social-cognitive perspective, therefore, helps us to conceptualise emotions involved in the learning process as a set of inter-related processes with an individual's self-beliefs (including self-efficacy beliefs) as a crucial element.

This review proceeds with an exploration of the definition and functions of emotions.

2.3 Components of Emotions

In order to consider how to develop learners' emotion regulation it is necessary to explore what emotions are, how they arise and the functions they may serve. Most current theorists subscribe to a multi-component definition of emotion (Scherer, 2000). These components have generally included the "reaction triad" of emotion: physiological arousal, motor expression and subjective feeling. These components have been extended to include motivational factors (action tendencies) and cognitive processes involved in evaluating the eliciting events and the regulation of ongoing emotional processes (Frijda, 1986).

Thus, emotions involve: affective processes that are physiologically bound to subsystems of the limbic system (for example, the amygdala) and subjectively experienced as emotional feelings; emotion-specific thoughts that accompany the feelings (for example, worries in anxiety); physiological activation (or de-activation) that prepares one for action; emotion-specific motivational impulses (for example, fight or flight, giving up); and expressive motor movements communicating the emotion to others (for example, facial expression) (Frijda, 1986). So, for example, a pupil's anxiety about an upcoming test could be composed of nervous feelings (affective component), concern about not performing well (cognitive component), decreased parasympathetic and increased sympathetic tone (physiological component), a desire to escape and avoid the test (motivational component) and troubled facial expressions (expressive component).

When considering the time-span of emotions, they have also been defined as: "multi-component response tendencies that unfold over relatively short time spans" (Fredrickson, 2001). The definition of emotion used in the current study is that of Keltner and Gross (1999) which includes the multi-componential aspect of emotion as well as the idea of emotions occurring over a relatively short time span. They define emotions as:

> episodic, relatively short-term, biologically based patterns of perceptions, experience, physiology, action and communication that occur in response to specific physical and social challenges and opportunities (p.468).

Therefore, emotions are viewed as contextualised and as short, intense episodes. This definition distinguishes emotions from affective traits or more generalised moods. Moods are held to be of lower intensity and to lack a specific referent.

Moreover, emotions and moods are included in the more general construct of positive or negative affect (Scherer, 2000).

2.4 Appraisal Theories of Emotion

Since the mid -1980s psychologists have proposed appraisal theories of emotion (Frijda, 1986; Oatley & Johnson-Laird, 1987) which hold that individuals evaluate events and situations, with the result of the appraisal process determining the nature of the ensuing emotion. Appraisals, therefore, in this view, are given an explanatory role in the generation of emotion.

Lazarus (1999) describes the process of appraisal as "the way diverse persons construe the significance for their wellbeing of what is happening and what might be done about it" (p.9). According to appraisal theories of emotion, emotions are based on an individual's cognitive interpretations and appraisals of specific situations (Frijda, 1986). Frijda writes that emotions arise in response to events that are important to the individual and whose importance he or she appraises in some way. Events that satisfy the individual's goals, or promise to do so, yield positive emotions, events that harm or threaten the individual's concerns lead to negative emotions. In Frijda's view it is the subject's appraisal that counts, that is, the relationship between events and the individual's concerns, and not the events themselves. One of the core assumptions of appraisal theory, therefore, is that it is the appraisal of a situation, not the situation per se, that determines the quality and intensity of an emotional response.

Appraisal theories of emotion assume that emotions elicited by an event are determined by how the event is interpreted along a number of appraisal dimensions, including the importance of the event, the expectedness, the responsible agent and the degree to which it is possible to control the event (Siemer, Mauss & Gross, 2007). Two of these appraisal dimensions (interpretations of importance, or value, and interpretations of control) have emerged as of particular importance when considering achievement emotions (Pekrun, 2006; Pekrun et al., 2007) and are discussed in more detail later.

One of the major criticisms of appraisal theory is its assumed cognitive bias. However, appraisal theorists have argued that the emotion evaluation process can also occur in an automatic fashion and in a largely unconscious way (Scherer, 2000; Pekrun et al., 2007; Pekrun & Stephens, 2009).

The above section has outlined definitions of emotions and appraisal theories of how emotions arise. The next section will discuss research on the functions of emotions and how this may relate to the emotions experienced in learning contexts.

2.5 Functions of Emotions

Emotions, as we have considered, are held to arise in response to an individual's appraisals. In the school context, these appraisals will be different for different learners. Keltner and Gross (1999, p.469) state that, generally, the claim among emotion theorists is that most emotions have a functional basis most of the time, with a 'function' being defined as a consequence of goal directed action. They add that functional accounts of emotions assume that emotions are adaptations to the problems of social and physical survival.

Frijda (1986) has described two major functions of emotions: warning signals and preparing the body for action. In this view, each emotional episode consists of a sequence of steps that is initiated with a warning signal, which increases the level of arousal. High priority warning signals interrupt all ongoing and upcoming activities to make sure that the event does not go unnoticed. Hormonal secretion into the bloodstream prepares the body for action and the cognitive appraisal of the warning signal determines the nature of the phenomenological experience.

A further argument of Frijda's (1986) is that emotions have informational properties. Positive emotions signal that all is well and that one does not need to be alert for obstacles. Hence, one can adopt an open mindset, explore the environment and be creative. Linked to this idea, Fredrickson (2001) has developed the 'broaden-and-build' theory of emotion and has found that positive emotions can broaden thought-action repertoires, suggesting that learners who experience positive emotions may generate more ideas and strategies. Negative emotions, on the other hand, prompt individuals to be on guard and to investigate the task and its context in order to identify the source of the negative feelings (Fredrickson, 2001). In relation to this idea, Bower and Forgas (2001) have, for example, documented the mood congruence effect, according to which, negative moods prime negative information and positive moods prime positive beliefs and expectancies.

Emotions have also been linked to individuals' assessment of progress and their willingness to invest effort. In their theory, Carver and Scheier (2000) have

argued that emotions signal that one is exceeding or falling short of one's standards. Carver and Scheier have argued that emotions may vary depending on whether one is approaching or avoiding a certain goal and on the perception of one's rate of progress towards that goal. An alternative, but complementary, view is that of the control-value theory of achievement emotions which is discussed below.

2.6 The Control-Value Theory of Achievement Emotions

Using a social-cognitive framework, Pekrun (2006) has developed the control-value theory which provides an integrative approach to understanding emotions in education. Pekrun (2006) has defined achievement emotions as "emotions tied directly to achievement activities or achievement outcomes" (p.317). The control-value theory groups achievement emotions by their valence (pleasant versus unpleasant); degree of activation (activating versus deactivating) and object focus (activity versus outcome). Using these three dimensions – valence, activation and object-focus - the control-value theory proposes a three-dimensional taxonomy of achievement emotions.

In their taxonomy of achievement emotions Pekrun et al. (2007) have differentiated between positive activating emotions (enjoyment of learning, hope for success, pride), positive de-activating emotions (relief, relaxation), negative activating emotions (irritation, shame, anxiety) and negative de-activating emotions (hopelessness, boredom). Such emotions are tied either to achievement activities or achievement outcomes.

Achievement activities may include, for example, listening to a teacher's explanation, working independently on a task or participating in small group work. Activity-related achievement emotions, therefore, would include those emotions experienced during these learning activities; for example, the enjoyment experienced when solving a stretching maths problem (a pleasant, activating, activity-related emotion); the boredom experienced when listening to a dull lesson (an unpleasant, deactivating, activity-related emotion); the irritation that might be experienced when activities are perceived as overly challenging (an unpleasant, activating, activity-related emotion). On the other hand, outcome-related achievement emotions include emotions experienced in response to successes or failures. For example, pride in receiving a good test result (a pleasant, activating, outcome-related emotion) or

hopelessness or shame after receiving yet another poor test score (an unpleasant, deactivating, outcome-related emotion).

2.7 Assumptions of the Control-Value Theory

At the heart of Pekrun's theory are assumptions regarding the arousal of achievement emotions. In line with appraisal theories of emotion considered earlier, it is assumed that appraisals of ongoing learning tasks and appraisals of their past and future outcomes are of primary importance. According to the control-value theory, cognitive appraisals of control and value are proximal determinants of achievement emotions. Control appraisals relate to the perceived controllability of achievement activities and outcomes. These include appraisals of the possibility personally to influence activities and outcomes. Control appraisals may include expectations and perceptions of competence, such as self-efficacy (for example, "I'll be able to solve this maths problem), self-concepts of ability (for example, "I usually do well at maths") and causal attributions (for example, "I would have done better if I had practised more"). Value appraisals relate to the subjective value, usefulness or importance of learning activities and outcomes. These can be intrinsic (for example, an interest in learning a language) or extrinsic (valuing an activity or subject as it is likely to bring some external reward).

The control-value theory does not assume that these cognitive appraisals are always made consciously; it acknowledges more automatic processes involved in emotions (Pekrun & Stephens, 2009). According to the control-value theory, in everyday classrooms, recurring sequences of situational perceptions, appraisals and emotions can habitualise over time. Habitualised emotions can mean that perceptions alone are sufficient to arouse an emotion, without the need for intervening appraisals. That is, repeated exposure to a given activity or outcome can lead to emotions that no longer require conscious cognitive appraisal. For example, when a teacher starts to distribute sheets of paper for a spelling test some learners may automatically begin to feel anxious. This may involve little conscious cognitive effort. New experiences, however, can lead to renewed appraisal processes (for example, some experiences of success) so that emotions can be adapted to new situational circumstances (Pekrun et al., 2007).

A criticism of the control-value theory could be that a narrow focus on appraisals linked to learning tasks and outcomes ignores the other influences on

emotions experienced in the complex environment of the classroom, such as social belongingness, self-determination and wellbeing goals (Boekaerts et al., 2006). However, there is some consideration of environmental factors within the theory and these are discussed below.

2.8 Individual and Environmental Influences on Achievement Emotions

Cognitive appraisals of control and value, therefore, are assumed in the control-value theory to determine various achievement emotions. More distal antecedents are assumed to affect emotions by influencing learners' appraisals of control and value in the first place. Examples of distal antecedents include an individual's achievement goals and their achievement-related control and value beliefs (such as implicit theories of ability, which are discussed later).   The control-value theory also acknowledges that emotions can be influenced by non-cognitive factors, such as genetic dispositions and temperament, as well as environmental factors. In the classroom setting, examples of distal environmental factors could include the characteristics of the task being completed, the cognitive demands of the task, the amount of support provided by the teacher, the overall learning climate and the broader socio-cultural context (Pekrun et al., 2007; see also Artino, Holmboe & Durning, 2012).

However, the control-value theory does not give extensive consideration of contextual and environmental factors. According to the control-value theory, it is appraisals relating to learning activities and outcomes that are assumed to be the most important for achievement emotions (Pekrun et al., 2007). Of these appraisals, subjective control over activities and outcomes and subjective value of these activities and outcomes are held to be the most relevant.

2.9 Empirical Research for the Control-Value Theory

Pekrun, Elliot and Maier (2009) report evidence for the theory from a number of qualitative and quantitative empirical studies involving university students. For example, qualitative data gathered from interviews showed that students' reports about emotions experienced in learning and when taking exams were connected to their thinking about control and values in these situations (Pekrun et al., 2009). In addition, Pekrun et al. tested emotions as predictors of exam performance using quantitative data from the Achievement Emotions Questionnaire

(Pekrun, Goetz & Perry, 2005). 218 undergraduates' exam-based emotions were assessed one day before an important mid-term exam. The researchers controlled for gender, social desirability (to address the self-report response sets), positive and negative trait affectivity and ability. They hypothesised and found that hope and pride positively predicted performance and that anger, boredom, anxiety, hopelessness and shame negatively predicted performance.

The limitations of the study include the self-report nature of the measures and the fact that the findings may apply only to the specific type of exam-related context that was examined. In addition, the questionnaires used do not allow for more fine-grained assessment of the continuous flow of motivational and emotional processes that may be involved, for example, in preparing for an exam. Furthermore, students' global or 'in general' self-ratings of emotions (or 'trait' self-ratings) are deemed to be problematic as there is evidence that trait assessments (unlike 'state' assessments, which are situation specific) can be prone to retrospective biases. Therefore, it has been recommended that the results of such trait assessments of emotions be interpreted with caution as it remains unclear the extent to which they reflect actual emotions or rather beliefs about emotions (Bieg, Goetz & Hubbard, 2013).

In order to address this limitation, Bieg et al. (2013) carried out research with 120 grade 8 students (mean age 14.3 years) and grade 11 students (mean age 17.5 years) from 44 different classes of the top track of the state school system in Germany. The researchers collected both trait data (appraisals of control and value for four subject domains and trait emotions of pride, anxiety and boredom) as well as state data, that is, emotions experienced during a task. For the latter, the students were asked to activate a personal digital assistant (PDA) at the beginning of mathematics, physics, German and English classes for a period of two weeks. The PDA randomly signalled within the next 40 minutes and asked students to answer an electronic questionnaire about their current emotions and control-value appraisals in that specific class. For simplicity, a single-item measure was used for each of the three emotions and for the control and value appraisals.

The researchers found, in line with assumptions of the control-value theory, that control appraisals positively predicted pride and negatively predicted anxiety and boredom. Value appraisals were positively correlated with both pride and anxiety. The study also found significant interactions between control and value in

the prediction of pride. For negative emotions the combined effect of low control and high value resulted in more intense feelings of anxiety. The study found that the relations between appraisals and emotions were the same for both the trait and state emotion data (Bieg et al., 2013).

Limitations of the above study are that the participants were all from the higher ability level. Further research with different ability groups would be needed. In addition, the correlational nature of the study precludes causal conclusions (that is, that the influence is from control and value appraisals to emotions). However, the study provides support for the relationship between appraisals of control and value and emotions experienced in classroom settings.

Having discussed the possible influences on emotions experienced in learning situations, the processes through which achievement emotions are assumed to influence performance and achievement (and which may, therefore, support the importance of developing learners' emotion regulation) are discussed in the following section.

2.10 Impact of Emotions on Learning

In order to build a case for why a focus on emotion regulation is important it is necessary to consider what is currently known about the relationship between emotions and learning. One means by which emotions influence learning and performance is through their impact on cognitive resources. From an information processing perspective, both positive and negative emotions have been shown to take up working memory resources by focusing attention on the object of the emotion (Frijda,1986; Pekrun & Stephens, 2009). Emotions that are not directly related to a learning task distract attention from the task, thereby reducing cognitive resources available and impairing task performance. For example, intruding thoughts about the consequences of failing a test (such as having to change maths set or letting one's parents down) will reduce concentration. On the other hand, positive emotions related to the learning task are assumed to focus attention on the task and to aid performance (Fredrickson, 2001; Frijda, 1986; Linnenbrink & Pintrich, 2000). As has been mentioned previously, positive emotions can broaden thought-action repertoires, suggesting that students experiencing more positive emotions may generate more ideas and strategies (Fredrickson, 2001).

In education, the impact of emotions on learning and performance has been studied largely in relation to anxiety, particularly with regard to mathematics and test anxiety (Ashcraft & Kirk, 2001; Beilock & Ramirez, 2011; Hembree, 1988). For example, in the field of mathematics learning, students' fear and anxiety about doing mathematics, over and beyond their actual mathematics ability, can be a barrier to their achievement. For some students, simply the prospect of doing maths elicits a negative emotional response, including increased heartbeat and cortisol, worrying thoughts and an avoidance of situations involving mathematics (Beilock & Ramirez, 2011). Furthermore, mathematics anxiety appears to influence cognitive processing through its effect on working memory, as attention is diverted towards internal worries and intrusive thoughts (Ashcraft & Kirk, 2001).

In addition to the effects on cognitive processes discussed above, emotions may also have an impact on a learner's motivational processes. Positive emotions, for example, have been found to enhance levels of intrinsic motivation (Linnenbrink & Pintrich, 2000). A positive emotion, such as task-related enjoyment can lead to greater interest and motivation for the task. On the other hand, negative emotions, such as task-related boredom or anxiety, can decrease one's interest and intrinsic motivation in the task (Linnenbrink & Pintrich, 2000).

However, the effects of achievement emotions on learning and performance are complex. It has been argued that emotions which impair performance can vary both on the valence (pleasant versus unpleasant) and arousal (activating versus deactivating) dimensions of achievement emotions (Tyson et al., 2009). It is important to consider that some negative emotions could act to increase one's motivation to invest effort (for example, anxiety that one may fail an exam may cause one to study harder). Likewise, even pleasant, activating emotions, such as pride, could be detrimental to performance if they were extreme (Tyson et al., 2009). The primary mechanism for this negative effect is again assumed to be task-irrelevant thinking that produces cognitive interference (Pekrun & Stephens, 2009; Tyson et al., 2009).   Deactivating negative emotions, such as boredom and hopelessness, on the other hand, are expected uniformly to impair performance by producing task-irrelevant thinking and undermining task-related motivation and strategy use (Pekrun & Stephens, 2009; Tyson et al., 2009).   It is likely that the overall effect of any given emotion on performance depends on the cognitive and motivational mechanisms facilitated by the emotion (discussed above), the interplay

of these mechanisms and their interactions with task demands and the learning environment (Pekrun & Stephens, 2009).

Moreover, antecedents, emotions and their effects are thought in the control-value theory to be linked by reciprocal causation over time, in line with a dynamic systems account of emotions in learning (Pekrun, 2006; Pekrun et al., 2007). Positive feedback loops can take place (for example, enjoyment of learning and exam success reinforcing each other) and negative feedback loops can also exist (for example, test failure leading to anxiety and anxiety motivating the student to put in more effort). Furthermore, it is argued that the processes involved in learning and achievement outcomes are expected to feed back into students' emotions and into the wider learning and social environment (Pekrun et al., 2007).

The above section has discussed how emotions may influence learning, motivation and performance. One antecedent that may be important in influencing learners' appraisals (and therefore, it is argued, their emotions) is achievement goal orientation. This will be discussed in more detail below.

2.11 Achievement Goal Orientation

Achievement goal theory has been influential in the literature on motivation for several decades (Ames, 1992; Pintrich, 2000; Tyson et al., 2009). Pintrich (2000) defines achievement goals as "the purposes or reasons an individual is pursuing an achievement task" (p.93). Early work focused primarily on the distinction between performance goals and mastery goals (Ames, 1992). When pursuing performance goals, individuals strive to demonstrate their ability, often relative to others. When pursuing mastery goals, individuals strive to master a skill, usually for the internal satisfaction that mastery provides. A trichotomous model, which differentiates among performance approach, performance avoidance and mastery goal orientations has subsequently been proposed (Elliot, 1999). For example, it has been suggested that not all performance goals are maladaptive (that is, goals based on gaining a particular grade or on out-performing others) and that only performance avoidance goals (that is, goals based on hiding weaknesses, for example) appear to be related to poor outcomes (Pintrich, 2000). In a similar vein, Dweck (2000) writes that students with performance goals are most vulnerable when they are focused on the possibility of failure and their need to avoid it.

Achievement goal researchers agree that goals establish a perceptual-cognitive framework for how individuals construe and interpret achievement settings (Dweck & Leggett, 1988; Pintrich, 2000). Achievement goals are posited to have a direct impact on achievement-related psychological processes, thereby influencing achievement (Elliot & Pekrun, 2007; Pintrich, 2000). Achievement goal orientation represents a general orientation to a task that includes a number of related beliefs about purposes, self-efficacy, competence, success, ability, effort, errors and standards (Pintrich, 2000). It has been argued that it is the integrated and organised nature of these different beliefs about competence and purpose that provides the theoretical utility and power of the achievement goal construct (Pintrich, 2000).

However, a criticism of research on goal-directed behaviour in educational psychology is that researchers have focused too much on a single desired end-state, that is, achievement. Boekaerts et al. (2006) have argued that achievement goals make up only a fraction of the goals that students bring to the classroom and that such goals are not isolated motivating forces in the classroom. They note that it is important that researchers identify the desirable and undesirable end states that students have in mind when they make a mental representation of learning tasks, and these will include personal goals. Such personal goals may include, for example "I want to understand" and "I want to feel confident" as well as "I want to be liked" and "I want to avoid uncaring behaviour" (Boekaerts et al., 2006). These ideas will be considered again when the dual process model of self-regulated learning is discussed (Boekaerts, 2007).

A student's achievement goal orientation can also be linked to perceptions of control and value which, as considered earlier, have been linked with achievement emotions. According to the control-value theory, a mastery goal orientation is posited to promote positive perceptions (that is, perceived controllability and positive value) of achievement activities which leads to positive achievement emotions (for example, enjoyment of learning). On the other hand, a performance approach orientation is posited to promote positive perceptions of success outcomes, which foster hope and pride. A performance avoidance orientation, on the other hand, is assumed to promote negative perceptions (uncontrollability) of achievement outcomes which lead to negative emotions, such as anxiety, hopelessness and shame (Pekrun & Stephens, 2009).

In reviewing achievement goal theory research, Pintrich (2000) states that the different models all predict that a generally adaptive pattern of outcomes is associated with mastery goals and a generally less adaptive pattern is associated with performance goals. However, there is inconsistent evidence about the relationship between achievement goal orientation and achievement outcomes. The pattern for performance-avoidance goal orientation appears to be the most consistent. This particular goal orientation is associated with lower levels of achievement. It is also associated with disengagement from academic tasks, shallow processing and poor retention of information (Tyson et al., 2009). For students who endorse a mastery goal orientation there is evidence that they are more likely to persist in the face of challenge (Elliot & Dweck, 1988) and use higher-level cognitive strategies, for example, elaboration of ideas, critical thinking and self-regulated learning (Pintrich, 2000). However, the positive association between mastery goal orientation and achievement is not as robust as the negative association found for performance-avoidance goal orientation. In their review, Tyson et al. (2009) note that there is evidence to support the idea that a mastery goal orientation is beneficial for achievement, but that the effect appears to be small and is not apparent in all studies.

The link between performance-approach goals and academic outcomes has also been a source of contention in recent years (Tyson et al., 2009). There is evidence that, unlike the evidence for a mastery goal orientation, endorsing a performance-approach goal orientation is negatively related to persistence and cognitive processes, such as engagement. However, the evidence for the relationship between a performance approach orientation and academic achievement is similar, overall, to that found for a mastery goal orientation. It has been argued that the difference between the impact of the mastery and performance-approach orientations appears to lie in learners' engagement, persistence and effort (Tyson et al., 2009).

Furthermore, it has been suggested that the 'missing link' in explaining the inconsistency in relating performance approach goal orientation to achievement may be found in learners' emotional experiences and emotion regulation skills (Tyson et al., 2009). In order to explore these ideas further, empirical research into the link between achievement goals and emotional experiences is considered below.

2.12 Empirical Research on Links Between Achievement Goal Orientation and Emotion

Pekrun, Elliot and Maier (2006) have reported on their research carried out with 102 German college students and 167 American college students which investigated the relationships between achievement goals and discrete emotions. In these studies a trichotomous model of achievement goals was used (that is, including mastery, performance approach and performance avoidance dimensions). The researchers assessed course-related achievement goals early in the semester and later assessed achievement emotions using the Achievement Emotions Questionnaire (Pekrun et al., 2005). Across both studies the researchers reported that they found a similar link between achievement goals and achievement emotions. Mastery goals were positively related to enjoyment of classroom instruction, hope and pride, and were negatively related to boredom and anger. Performance avoidance goals were positively related to anxiety and hopelessness. Performance approach goals were positively related to pride.   These findings held when social desirability, temperament, gender and grade point average were included as controls (Pekrun et al., 2006).

Limitations of the above research are that while the relations between achievement goals and emotions were significant, the effect size of some of the relations found was not substantial. In addition, as noted earlier, broad (or 'in general') measures of goals and emotions were used as opposed to more precise and fine-grained measures related to a specific situation. Importantly, it was acknowledged that emotions are influenced by a number of factors in addition to goals, including situational factors, which were not addressed in the studies.

In another study, Linnenbrink and colleagues carried out correlational research with upper elementary, middle school and college students (Linnenbrink, 2007). They assessed the goal orientations that students endorsed for specific tasks (for example, a series of mathematics problems and reading a passage on Newtonian physics) and examined the affective states that emerged during the tasks (including emotions and moods). It is reported that mastery-approach goal orientations were positively related to pleasant affect and negatively related to unpleasant affect. Using three bipolar indicators of affective states during task completion they also found that middle school students who endorsed mastery-approach goals while solving tasks reported feeling more happy than sad, more calm than tense and more

excited than tired. However, for performance-approach goal orientation, the findings
were not as clear. Performance approach goals were generally either unrelated or
positively related to pleasant affect. In addition, pleasant affect was positively
correlated with behavioural engagement (effort and persistence), whereas unpleasant
affect was negatively correlated with behavioural engagement (Linnenbrink, 2007).

Limitations of the above study are that the affect measure was designed to
assess students' affect while working on the maths activity. However, the students'
affect may have changed as they completed the tasks as a result of how well they
perceived they were doing on the problems (for example, see Op' T Eynde, De Corte
& Lieven Verschaffel, 2007 who found that individual students' emotions can vary
considerably during completion of a mathematics task). A further limitation is the
reliance on self-reported affect and effort- regulation measures. In addition, the use
of bipolar measures of affect (for example, 'happy/sad', 'calm/tense') may not have
fully captured the students' affective experiences.

Overall, the evidence from the above studies suggests that enjoyment and
positive affect, thought to be facilitative for academic performance, are linked to a
mastery goal orientation and that anxiety, thought to be mainly debilitative for
performance, is linked to a performance avoidance goal orientation. In contrast, a
performance-approach orientation is posited to be related both to emotions that can
facilitate performance (such as hope for success) and to emotions that can at times
undermine performance, such as anxiety (Pekrun & Stephens, 2009). From the
perspective of the control-value theory, control and value appraisals interact to
produce a combined effect on achievement emotions. If the outcome of a task is
evaluated as particularly important then stronger positive and negative emotions
should be experienced compared to when value is low. For example, compared to
students who have low control and low value appraisals related to a prospective
outcome, students with high value and low control appraisals, such as before Year 6
Standard Assessment Tasks (SATs) or an important final exam, would be likely to
experience more anxiety (Bieg et al., 2013).

Tyson et al. (2009) argue that, given these ambiguous emotional effects for
performance-approach goals, the regulation of emotions, which is of special
relevance to the current study, may be of particular importance for predicting
whether performance-approach goals exert positive or negative overall effects on

performance and that promoting emotion regulation skills may be particularly important for learners with performance-approach goals.

The above section has summarised areas of research on the differing impact of achievement goal orientation on achievement emotions. Achievement goal orientation has, in turn, been linked to students' underlying implicit theories of ability and these are discussed in the next section.

2.13 Implicit Theories of Ability

Self-theory research has developed our understanding of how learners' self-beliefs influence the goals they pursue and their responses to challenges and setbacks. Yeager and Dweck (2012) define implicit theories as "core assumptions about the malleability of personal qualities" (p.303). Implicit theories create a framework for making predictions and judging the meaning of events in one's world. Research on implicit theories of ability helps us to understand why some learners appear to invest more effort following setbacks and to apply problem-solving strategies and seek help when they are struggling, whereas other learners become frustrated, appear to give up quickly, tend not to accept offers of help easily and may experience negative emotions, such as anger, anxiety or despondency (Dweck, 2000).

An assumption of self-theory research is that individuals develop meaning systems about themselves and the world around them. Dweck (2006) refers to these meaning systems as implicit theories or "mindsets". Dweck maintains that, to varying degrees, most people's beliefs lean towards one of two theories. Individuals may have an incremental or "growth" mindset – viewing themselves and others as capable of changing and improving – or an entity or "fixed" mindset – which holds the view that there are inherent, fixed qualities within oneself, other people and the world around us. Dweck holds that entity beliefs can lead us to make more rigid judgements and can limit the paths we choose to take. These beliefs are held to be an important part of people's motivational systems. They are held to influence the goals that people pursue, the level of interest that they maintain and the effort that they invest as well as predict their behaviour after setbacks (Dweck, 2000; 2006).

Therefore, the achievement goals sought by learners with an entity or incremental mindset are held to differ. It has been argued that those with entity beliefs seek performance goals (for example, to achieve a certain grade or to out-

perform others) and that those with incremental beliefs adopt mastery goals and will seek out challenges. These different mindsets are said to lead to different responses to challenging tasks or to failure. For example, Dweck (2000) notes that pupils with an entity mindset are more likely to exhibit a "helpless" response to challenge and attribute failure to a lack of ability or to factors outside of their control, such as bad luck or poor teaching, which, she notes, may lead to a reduction in effort and task avoidance. Those with an incremental mindset, on the other hand, are said to be more likely to welcome challenge; they may view errors as opportunities for learning and tend to attribute failure to lack of effort, rather than lack of ability (Dweck, 2000).

2.14 Empirical Research : Can Incremental Theories be Shaped?

Blackwell, Trzesniewski and Dweck (2007) carried out two studies in the U.S to examine the impact of implicit theories on academic achievement.   The first of these studies was a longitudinal study involving 373 pupils in four successive seventh grade classes across the transition to secondary school. The participants varied in ethnicity, achievement and socio-economic status. Each of these four cohorts was monitored for their next two years in school. The researchers assessed the pupils' implicit theories, learning goals, effort beliefs and response to failure (the latter through hypothetical failure scenarios) at the beginning of the year. Prior test scores in mathematics were obtained as were subsequent spring and autumn term mathematics term grades over the following two years. Pupils in the incremental and entity groups had entered secondary school with equal prior mathematics achievement. It was found that an incremental theory at the beginning of the school transition predicted more positive motivational patterns and higher attainment in mathematics over the next two years (Blackwell et al., 2007).

In the second of these studies, the first study was replicated with 91 seventh-grade lower-attaining pupils. 48 of these pupils were taught an incremental theory, whilst the remaining 43 pupils were placed in a control group. Both groups received eight sessions. The experimental group received four distinct sessions in which an incremental theory was taught. The key message taught to the experimental group was that learning changes the brain by forming new connections and that the students are in control of this process. The implicit theory questionnaire was re-administered to the students three weeks after the end of the intervention. In addition, the

students' mathematics teachers (who were blind to which students were in the experimental or control groups) were asked to cite individual students who had shown changes in their motivational behaviour.

It was found that pupils in the experimental group endorsed an incremental theory more strongly three weeks after the intervention. Participants in the control group did not change. In addition, 27% of intervention group pupils were spontaneously cited by their mathematics teachers as having shown positive change in their motivational behaviour, compared with 9% of those in the control group. In terms of impact on mathematics grade it was found that students who endorsed more of an entity theory at the beginning of seventh grade reaped the most benefit from the incremental theory intervention. Their declining grade trajectory was reported to have reversed following the intervention. However, the mathematics grades of the students in the control group who endorsed more of an entity theory continued to decline over the next two academic years. The researchers concluded that their study confirmed that even a brief targeted intervention, focusing on a key belief, can have a significant effect on motivation and achievement (Blackwell et al., 2007).

Limitations of the above research are that both studies took place in a single school. Therefore, there may be factors specific to the school that may have had an impact. The studies also focused on only one domain, mathematics learning. In study two, the students were only followed for a short time, so the long-term effects of the incremental theory intervention are not known. In addition, the studies only involved interventions with students and did not include interventions with parents and teachers. Finally, the effect sizes found were small.

Considering implicit theory research in general, little is known about how implicit theories might differ across learning contexts or about those learners who do not appear to endorse strongly either an incremental or an entity theory. In addition, the relevance of implicit theory research for learners with a range of learning difficulties is not clear. There also appears to have been few empirical studies relating to implicit theories in the UK (Green, 2013). Moreover, in Dweck's theory, beliefs are given the central explanatory role. However, the link between beliefs, motivational processes and emotions is not readily apparent in implicit theory research (Pintrich, 2000). It has also been pointed out that the focus on academic goals and learning in implicit theories of ability ignores the social context and the

social wellbeing goals that students also pursue in the context of the classroom (Boekaerts, 2002a; Boekaerts et al., 2006).

The above section has looked at implicit theories of ability and their impact on achievement goal orientation and on learners' responses to challenges and setbacks in learning. Empirical research has indicated that learners' implicit theories may be malleable and that it is possible that an incremental theory can be promoted via interventions which explicitly teach students about an incremental theory and include information on the brain's malleability.

Implicit theories are viewed as important to the current study due to their assumed influence on learning goal orientation which, as discussed earlier, may be linked to positive and negative emotions experienced during learning activities and following learning outcomes. Implicit theories of ability and achievement goal orientation are also increasingly being integrated into theories of self-regulated learning. For example, Mega et al. (2014) write that students who believe that intelligence can be increased may use different strategies to control and regulate their learning. However, students who believe that intelligence is fixed may reduce their level of strategy use. Mega et al. argue that a belief in the fixed nature of abilities may undermine a student's long-term academic success by fostering avoidance of difficult yet necessary tasks.

Theory and research related to self-regulated learning, and the role of emotion regulation as part of a learner's self-regulatory strategies, are explored further in the next section.

2.15 Self-Regulated Learning

Self-regulation is increasingly being studied as a dynamic process within learning contexts and it is seen as amenable to support and intervention. Zimmerman and Schunk (2011) define self-regulation as: " the processes whereby learners personally activate and sustain cognitions, affects and behaviors that are systematically oriented toward the attainment of personal goals" (p.1).

It has been found that there is a positive overall relationship between self-regulation and academic achievement (Duckworth et al., 2009). Research has shown that self-regulation processes are an important source of achievement differences among students and that promoting self-regulated learning is an effective means to

improve the achievement of students of varying levels of proficiency (Duckworth et al., 2009: Higgins et al., 2014; Zimmerman & Schunk, 2011).

It is increasingly being acknowledged that the concept of self-regulation includes a number of aspects, including affective elements (moods, emotions), cognitive elements (beliefs, knowledge, perceptions) and metacognitive skills (reflecting on and understanding one's own thinking and cognitive skills) (Duckworth et al., 2009). A three-part, cyclical model of self-regulation, based on social-cognitive theory, has been proposed by Zimmerman (2000a). In this model there are three phases which are summarised below:

1. Forethought – including outcome expectations, strategy selection, assessing one's self-efficacy, assessing interest and value, and adopting a mastery or performance goal orientation.

2. Performance control – including focusing attention, self-instruction and self-monitoring of progress during the task.

3. Self-reflection – including self-evaluation against a standard or goal after task completion and attributions of success or failure to effort or ability. Self-reflections and attributions pave the way for a new self-regulated learning cycle.

This model shows links with implicit theories of ability and achievement goal orientation in that there is a focus on mastery and performance goal orientations and effort or ability attributions following task completion (Dweck, 2000; Pintrich, 2000). There are also connections in the model with control and value appraisals (Pekrun, 2006). However, emotion and emotion regulation are not given prominence in the above model. It is possible to see links, nevertheless, in the three phases of self-regulated learning of Zimmerman's model with Pekrun's (2006) control-value theory of achievement emotions and to envisage how the two models could be combined. For example, Pekrun's theory identifies prospective outcome emotions (experienced at the onset of a task), activity emotions (experienced during the task) and retrospective outcome emotions (experienced at the end of a task).

However, a model of self-regulation in which emotions have been given a more central role has been developed and this is the dual-process self-regulation model of Boekaerts (2007) which is discussed below.

2.16 Dual-Process Self-Regulation Model

It has been noted that self-regulation and emotion regulation are often so intertwined that it is difficult to say where one ends and the other begins (Koole, 2009). Boekaerts (2007) has developed a theory of self-regulation in which appraisals, emotions and emotion regulation play a prominent role. Boekaerts has developed the dual process self-regulation model which posits that there are two parallel self-regulation pathways when a student encounters a learning task: a mastery pathway and a wellbeing pathway. The assumption is that students have two priorities in the classroom: to increase their competence and to protect their wellbeing. Therefore, in Boekaerts' dual-process model of self-regulation, learners face the following two priorities in classroom learning:

1. to achieve growth (or mastery) goals (for example, to deepen knowledge or increase cognitive skills);

2. to maintain emotional wellbeing (for example, to appear clever, to hide weaknesses, to protect self-esteem and avoid harm).

When a learning activity is appraised favourably it is assumed that positive cognitions and emotions are evoked and that the student begins the task in the mastery pathway. The assumption in this situation is that the student perceives the task as congruent with their personal goals, values and needs. During the learning process, environmental or internal cues may signal that there is a mismatch between the learning activity and the student's personal goals, needs and interests. This is assumed to lead to negative cognitions and emotions and can lead the learner to switch to the wellbeing pathway (protecting oneself from failure, avoidance behaviour, seeking distraction, seeking social belonging, and so on). When this is the case, it has been argued that more successful learners have been found to be able to switch back to the mastery pathway again (Boekaerts, 2007).

In addition to distinguishing between mastery or wellbeing classroom priorities for learners, Boekaerts and Corno (2005) describe two parallel processes for pursuing goals: top-down and bottom-up self-regulation. These processes involve both personal and environmental factors. Mastery goals are argued to be top-down in that they are energised by personal interest, values, positive expected outcomes (or controllability) and rewards. On the other hand, when self-regulation is triggered by cues in the learning environment, for example, being monitored by an adult, it is described as bottom-up. Learners may not begin a task with a firm goal,

however, feedback from the tasks and classroom reward structures (for example, praise and reinforcement for staying on task) may enable the learner to establish good work habits. According to Boekaerts, learners become concerned with wellbeing when cues from the learning environment signal that all is not well. For example, feeling bored, insecure or coerced may lead learners to pursue entertainment, safety or self-determination goals. Learners who, for a variety of reasons, meet greater obstacles in the way of their learning are held to be likely to experience more negative emotions which can over-ride any learning goals and can cause the learner's priorities to shift towards the wellbeing track (Boekaerts, 2007).

Boekaerts (2007) writes that there is accumulating evidence that students' efforts during the learning process to stay focused on the learning task are located within the self-regulatory system at the level of what she refers to as 'volitional' strategies which are discussed in more detail in the next section.

2.17 Volitional Strategies

Volitional strategies are held to play a key role in learner performance when it is necessary to overcome obstacles. They protect the learner's intention to learn against obstacles to goal completion. Corno (2004) describes volition as "the tendency to maintain focus and effort towards goals despite potential distractions" (p.229). For example, students have reported using strategies such as thinking about wanting a good grade, reminding themselves of their goal and thinking about the consequences of carelessness or mistakes (for example, failure or letting their parents down) in order to maintain motivation and persistence (Corno, 2004).

Of relevance to the current study is the idea that volitional strategies are also used to regulate emotional reactions to tasks and situations. Students have reported using strategies such as telling themselves to calm down, reminding themselves of things which make them feel good and thinking of sources of support or help which can help to neutralise negative emotions (Boekaerts & Corno, 2005). Thus, volitional strategies can help learners to regulate their emotions in order to return to mastery goals once they have become concerned with wellbeing. Boekaerts and Corno (2005) suggest that when learners have developed an understanding of volitional strategies they can overcome obstacles. Moreover, they suggest that instruction in adaptive volitional strategies may be particularly useful for children who need to deal regularly with obstacles and setbacks in their learning experiences

in school. Volitional strategies, therefore, can include self-regulatory strategies that enhance both learners' motivation and emotion regulation.

2.18 Self-Regulated Learning and Achievement Goal Orientation

Links can be made between Boekarts' (2007) dual process model of self-regulated learning (discussed above) and the research on achievement goal orientation considered earlier. It could be argued that one of the key processes through which students can remain on, or return to, the mastery pathway is the use of adaptive emotion regulation strategies. Moreover, it could also be argued, based on theory and research on the links between achievement goal orientation and emotional experiences (for example, Pekrun, 2007) that skills in emotion regulation may be more critical for those students who have a performance approach and a performance avoidance goal orientation (that is, the goal orientations that have been linked with more debilitating emotions, such as anxiety) (Tyson et al., 2009). Indeed, Tyson et al have suggested that emotion regulation may explain why mastery-oriented students demonstrate resilience during challenge or failure. As noted earlier, they also suggest that, as performance approach goal orientations are linked to both pleasant and unpleasant emotions, individual variation in the extent to which students with performance approach goals regulate negative emotions may help to explain the mixed pattern of findings relating performance approach goals to achievement (Tyson et al., 2009).

One aim in the current study, drawing on the work of Boekaerts (2007), is to incorporate emotion regulation into the self-regulated learning framework so that self-regulated learning extends beyond self-regulatory cognitions and behaviours (Ben-Eliyahu & Linnenbrink-Garcia, 2013). The next section, therefore, looks at the field of emotion regulation in more detail, beginning with the wider field of affect regulation.

2.19 Affect Regulation

It has been argued that almost all behaviour could be viewed as involving affect regulation in some way. Gross and Thompson (2007) make the point that in some ways all goal-directed behaviour can be seen as an attempt to maximise pleasure (approach) and minimise pain (avoidance). Affect regulation has been broken down in to four groups of processes: coping, emotion regulation, mood

regulation and defences (Fox, 2008; Gross, 1998). Coping focuses on reducing negative affect and coping processes are usually involved with fairly long periods of time (for example, coping with bereavement or with stress about an upcoming exam). Emotion regulation, which will be discussed in more detail later, refers to processes that are implemented to regulate specific emotions. Mood regulation refers to processes for regulating enduring mood states (for example, engaging in an enjoyable activity to enhance one's mood) rather than brief emotions. Mood regulation processes are therefore held to be concerned with altering or repairing emotional experience rather than action tendencies. Defences are processes for regulating impulses and the negative affect often associated with these impulses (Fox, 2008). These distinctions are accepted for the purpose of the current study. However, it should be noted that not all writers in the field accept such distinctions between affect, moods, emotions and defences. They have, for example, been criticised as being "fuzzy" by Koole (2009).

The focus of the current study is emotion regulation and this area of theory and research is discussed below.

2.20 Emotion Regulation

Emotion regulation can be seen as a diverse set of control processes manipulating which emotions are experienced, when and how they are experienced and how they are communicated (Boekaerts, 2011, p.415). Such control processes may be conscious or automatic (Boekarts, 2011; Gross, 1998).

Precursors to the current study of emotion regulation include the psychoanalytic tradition (Freud, 1959) and the stress and coping tradition (Lazarus & Folkman, 1984). For example, in the psychoanalytic tradition there are two types of anxiety regulation. Firstly, when situational demands overwhelm the ego, one form of anxiety regulation is to avoid such situations in the future. Secondly, when strong impulses press for expression, anxiety regulation consists of defences which suppress expression of those impulses (Freud, 1959). On the other hand, in the stress and coping tradition there is a focus on adaptive, conscious coping processes. A distinction has been made between the more adaptive problem-focused coping (which aims to solve the problem) and the less adaptive emotion-focused coping (which aims to decrease the negative emotional experience) (Lazarus & Folkman, 1984).

Emotion regulation is held to differ from coping in that the focus in emotion regulation may be on the regulation of positive or negative emotions and in that emotions, as discussed earlier, are construed as relatively short-lived episodes. As with the research on coping, recent theorists on emotion regulation have also attempted to identify more and less adaptive emotion regulation strategies. There have also been attempts to classify emotion regulation strategies and these classification systems are discussed in the next section.

2.21   Classification of Emotion Regulation Strategies

A system of classification of emotion regulation strategies specifically designed for learning contexts has not been developed. However, two systems of classification have been developed by Koole (2009) and by Gross and Thompson (2007) and these have some application to classroom learning environments. These systems are now considered in turn, beginning with Koole's classification.

In reviewing literature on emotion regulation Koole (2009) has suggested a classification of emotion regulation strategies based on the two following higher order categories:

1.   The part of the emotion generation system that is targeted (that is, attention, cognitive appraisals and bodily expressions).

2.   The functions that are served by emotion regulation (for example, hedonic needs, that is wellbeing, or goal achievement).

Within this system, Koole also classifies emotion regulation strategies as either: a) need-oriented, b) goal-oriented or c) person-oriented. These are considered in turn below.

2.21.1 Need-oriented emotion regulation. Need-oriented emotion regulation promotes the satisfaction of hedonic needs (that is, minimising negative emotion and maximising positive emotion). Koole (2009) notes that need-oriented strategies of emotion regulation are associated with immediate emotional relief that often comes at the expense of long-term wellbeing, and are, therefore, not adaptive strategies. Need-oriented emotion regulation strategies related to attention include avoidance and distraction (for example, avoiding a particular lesson or thinking about something else). Need-oriented strategies related to appraisals include defensive and interpretive biases (for example, trivialising a subject or derogating the teacher)

which may serve anxiety-reducing functions. Need-oriented strategies related to bodily expressions include activities that provide immediate gratification (for example, eating and proximity seeking).   There are some links between these need-oriented strategies and the strategies to remain on the 'wellbeing track' referred to in Boekaerts' dual process model of self-regulated learning outlined earlier (Boekaerts, 2007).

2.21.2 Goal-oriented emotion regulation. Goal-oriented emotion regulation strategies are assumed to be driven by a single explicit task or goal (for example, passing a mathematics test). Goal-oriented emotion regulation strategies related to appraisals include cognitive reappraisal, during which people reduce the emotional impact of an event by changing their subjective evaluation of the event, for example, thinking "It's only a test" (Gross, 2001). There is increasing evidence that cognitive reappraisal is an adaptive emotion regulation and this is considered in more detail later.

Goal-oriented emotion regulation strategies related to bodily expression include emotion suppression, in which people actively try to inhibit their emotional expression. It has been found that expressive suppression does little to prevent the experience of unwanted emotions and is linked to low emotional wellbeing (Gross, 1998; Gross & John, 2003). Venting (giving free rein to emotional impulses) is another goal-driven strategy to regulate bodily expressions of emotion. However, venting can actually increase anger and aggression through the activation of angry thoughts and action tendencies (Koole, 2009).

2.21.3 Person-oriented emotion regulation. Person-oriented strategies of emotion regulation are viewed as having the function of promoting one's overall functioning (Koole, 2009). Strategies relevant to the current research include bodily forms of person-oriented emotion regulation, such as controlled breathing, which has a dual focus on cognitive processes and physiological processes. Tasks that load working memory (such as focusing on counting and breathing) can clear the mind of negative thoughts. Moreover, voluntarily engaging in specific breathing patterns is said to activate specific emotional states and reduce emotional distress. The effects of controlled breathing, therefore, involve both bottom-up processes, such as respiratory feedback, and top-down processes, as diverting attention to one's own respiratory

patterns prevents intrusive thoughts (Koole, 2009). Koole notes that person-oriented emotion regulation is associated with long-term benefits. He adds that the advantage of cognitive strategies (such as cognitive reappraisal, as suggested by Gross & John, 2003) over bodily strategies is only partly supported and that in the domain of person-oriented emotion regulation, bodily strategies appear to be relatively effective (Koole, 2009).

The above system of classification of emotion regulation strategies has been criticised by Gross (1998). He notes that the disadvantage in such a system of classification is that diverse ways of achieving emotion regulation are grouped together within each domain. He adds that, while specifying the target system is important, it may not be the correct level of analysis. A different, and complementary, way of classifying emotion regulation strategies has been suggested by Gross (1998) and is based on the idea of an emotion generation timeline. This is elaborated in the process model of emotion regulation which is discussed below.

2.22 Process Model of Emotion Regulation

Gross and Thompson (2007) have developed a process model of emotion regulation which classifies emotion regulation strategies according to when they occur along an assumed emotion generation timeline. Five sets of emotion regulation processes have been identified. These are:

1. Situation selection
2. Situation modification
3. Attentional deployment
4. Cognitive reappraisal
5. Response modulation

The first four of these sets of processes are antecedent-focused strategies and occur before the appraisals result in an emotional response. In contrast, response-focused processes occur after an emotional response has been generated and are concerned with managing the physiological or behavioural responses to an emotion.

Situation selection and situation modification are both antecedent strategies that help to shape the characteristics of a situation. These processes involve taking actions to ensure we are either more or less likely to find ourselves in a situation

which may elicit an emotion (an example, for some learners, might be avoiding a P.E lesson). Situation modification involves attempts to change the situation in some way (such as diverting the teacher's attention or disrupting a lesson). Another antecedent strategy is the strategy of attentional deployment which may involve a learner thinking about something else (for example, thinking about what one is going to do after school). It is suggested that the most adaptive strategy is that of cognitive reappraisal, which is considered in more detail below. Finally, response modulation occurs after an emotional response has been initiated. An example could be counting to ten or the use of controlled breathing techniques to modulate the physiological and experiential aspects of emotions.

The process model includes feedback from the emotional response back to the situation to emphasise the dynamic nature of emotion regulatory processes. For example, an emotional response (such as an angry outburst in a classroom) can alter the situation (Gross & Thompson, 2007).

In the current study, the classification of emotion regulation strategies suggested by Gross and Thompson (2007) is drawn upon due to its conceptual simplicity. In the next section the adaptive emotion regulation strategy of cognitive reappraisal is discussed in more detail.

2.23 Cognitive Reappraisal

Cognitive reappraisal is a strategy which involves construing a potentially emotion-eliciting situation in a way that alters its emotional impact (Gross & John, 2003). Cognitive reappraisal may involve attempts to view negative experiences in a positive manner or to concentrate on any positive aspects of a negative situation (Augustine & Hemenover, 2009). In this way, cognitive reappraisal is an antecedent-focused strategy; it intervenes before the emotion has been fully generated. As discussed earlier, people experience emotions when they appraise events as relevant to their goals, values, their perceptions of controllability or their wellbeing. It could therefore be argued that one means of decreasing negative emotion is to change the appraisals of the relevance of the events to one's goals. This can be accomplished by reappraising the significance of an emotion-eliciting event (for example, thinking "it's only a test") or by reappraising its outcome (for example, by seeing the test as a means of learning from one's mistakes in order to improve). Both these reappraisal strategies could circumvent the appraisal process, negating the need for further

processing of the emotional event and decreasing the intensity of negative emotion (Davis & Levine, 2012). While the cognitive reappraisal strategy can promote emotional understanding and adaptive coping (Shields & Cicchetti, 1997), it does involve abstract or representational thought and information processing capabilities which means that it may not be equally accessible to all learners.

Reappraisal processes have been the subject of research in neuroimaging studies. It has been found that cognitive reappraisal inhibits activation in emotional regions of the brain, including the amygdala and insula, and increases activation in regions that support working memory, language and long-term memory (the dorsal anterior cingulate cortex and the prefrontal cortex) (Ochsner and Gross, 2005). Similarly, in discussing research on neuroscience in education, Hinton et al. (2008) argue that, as emotion is shaped by cognitive processing, pupils can learn to regulate their emotions through using cognitive reappraisal to calm down negative emotional reactions. This process, they write, can signal to the amygdala that the situation is not as threatening as it initially seemed to be, which inhibits the fear response, allowing the pupil to focus on problem-solving and learning.

There appears to be limited information in the available literature on the range of ways in which students are able to cognitively reappraise learning activities and outcomes in the classroom. However, it would seem likely that increasing knowledge about how the brain learns as well as encouraging incremental beliefs about learning and a mastery goal orientation could facilitate pupils' ability to cognitively reappraise their experiences related to learning activities and outcomes.

Cognitive reappraisal, then, is viewed as an adaptive emotion regulation strategy which reduces negative affect, leads to a lower level of physiological-emotional arousal and is also linked to social competence and subjective wellbeing (Augustine & Hemenover, 2009; Fried, 2011; Gross, 2002; Gross & John, 2003). The next section explores empirical research into the benefits of emotion regulation on the learning process.

2.24 Impact of Emotion Regulation on Learning

It has been suggested that the ability to modify one's emotions facilitates functioning in academic and social contexts (Fried, 2011; Graziano et al, 2007; Gross & John, 2003; Gumora and Arsenio, 2012). On the other hand, the inability to

modulate the intensity and duration of one's emotional arousal is said to hinder performance and impair interpersonal relationships (Boekaerts, 2011).

Research has been carried out looking at the connection between students' positive and negative emotionality, their academic affect, emotion regulation and school performance. Correlational research was conducted in the U.S with 103 middle school students, aged 11-14 years (Gumora & Arsenio, 2002). Using student self-report measures and teacher reports, along with grade point average scores, the study found that middle school students' emotional dispositions, academic-related affect and emotion regulation were connected with school success. This was even after controlling for the influence of other cognitive variables, including academic achievement and academic self-efficacy. Students who perceived themselves as experiencing more negative emotions during academic tasks had a poorer sense of their academic competence and lower achievement scores. Moreover, students with higher levels of emotion regulation were rated by teachers as having more positive affect and these students reported less negative academic affect.

However, a limitation of the above research is that the measure of emotion regulation was task completion, rather than more direct measures of emotion regulation. A further limitation is the nature of the sample and settings. The participants were highly homogeneous in terms of race and religious/cultural background (all European-American and Jewish). Moreover, both of the schools involved were very similar in that they were academically competitive.

The effectiveness with which children can regulate their emotions may have important consequences for learning and memory. As was discussed earlier, emotions direct attention to information that seems relevant to maintaining wellbeing or attaining goals. Because attentional capacity is limited, emotions can divert attention from other information, such as educational material. It would therefore stand to reason that a child who can regulate his or her emotions has an advantage over one whose emotions continue to demand attention.

As mentioned earlier, it has been suggested that cognitive reappraisal is a more adaptive emotion regulation strategy (Davis & Levine, 2012; Fried, 2011; Gross, 2002; Gross & John, 2003). Davis and Levine (2012) carried out research with 126 6 to 13- year olds who were instructed to use either cognitive reappraisal or rumination strategies, or were given no strategy instruction at all, once they had watched a sad film. The children were tested on their self-reported level of sadness

as well as on their recall of details from an educational film watched immediately afterwards. The results showed the benefit of instructing children to use reappraisal strategies to regulate sadness. Children who were rated as less skilled in emotion regulation recalled more details of the educational film depending on whether they were instructed to use cognitive reappraisal or not. Davis and Levine (2012) state that their findings suggest that instructing children to engage in reappraisal strategies should be especially useful for enhancing learning in children with lower pre-existing emotion regulation skill. It was found in this study that children in the early elementary years were able to employ the instructed strategies to the same effect as older children. The researchers say that this indicates that children across the elementary school years could benefit from being taught to use reappraisal strategies.

Limitations of the above research are that the situation eliciting the emotion was artificial and contrived and that the research did not take place in a naturalistic setting. The regulation of emotions experienced in real-world situations, linked to children's own experiences and concerns, may involve different processes. In addition, the study only focused on one emotion: sadness. The emotion regulation strategies that are effective for managing one emotion may not be as effective with another emotion, such as anger or anxiety.

There has been little research examining the types of emotion regulation strategies students use in the classroom. However, Fried (2011) carried out survey research with 200 middle school students in Australia to find out their use of emotion and motivation regulation strategies. She found that the students in her study appeared to use emotion regulation strategies infrequently. However, this may have been due to the nature of the survey administered to them which may not have referred to all the emotion regulation strategies they used. Strategies which they reported using included: thinking about how they would feel on completion of the task; thinking about the consequences of doing poorly or well; self-talk strategies to build up confidence and the strategy of thinking about other things to make themselves feel better (Fried, 2011). Fried notes that more research is needed to understand students' use of particular emotion regulation strategies. The rationale for the two emotion regulation strategies that are included in the current research is discussed below.

2.25 Rationale for Inclusion of the Controlled Breathing and Cognitive Reappraisal Strategies

The two emotion regulation strategies included in the current intervention study are an antecedent strategy, cognitive reappraisal, and a response-focused strategy, controlled breathing. The controlled breathing strategy is included in a number of universal interventions which aim to address anxiety and social and emotional wellbeing in general with school-aged children (for example, Barrett, 2005; Kusche and Greenberg, 1994; Seiler, 2008). As discussed earlier, controlled breathing has also been reviewed by Koole (2009) as an effective emotion regulation strategy. The cognitive reappraisal strategy has been included due the evidence for its benefits which were discussed earlier.

However, the two emotion regulation strategies in the current study are not equally applicable to regulate all negative achievement emotions. Controlled breathing, for example, would not be an appropriate strategy to use when feeling an emotion such as hopelessness. Figure 1 is based on Pekrun's (2006) control-value theory (2006) and Gross and Thompson's (2007) process model of emotion regulation and provides a summary of the assumed links between achievement goals, negative achievement emotions and the emotion regulation strategy (of the two covered in the current study) which could be employed.
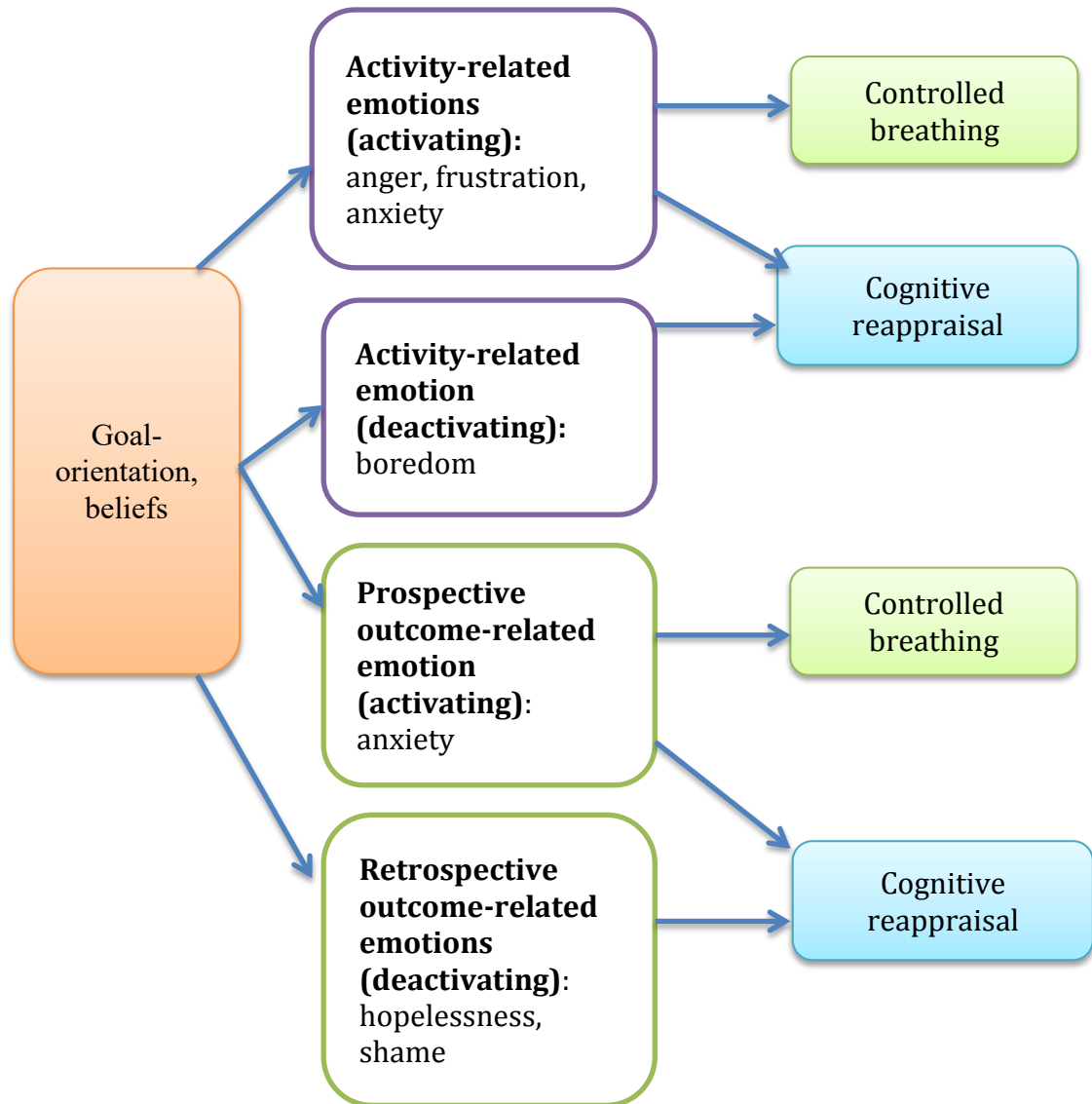
Figure 1. Figure showing the links between goal orientation, negative achievement emotion and emotion regulation strategy.

Figure 1 shows that the cognitive reappraisal strategy is more widely applicable across negative achievement emotions than the controlled breathing strategy, which can be employed when a negative activating emotion has been experienced. Nevertheless, it was felt that inclusion of the controlled breathing strategy would be important in the current study as there is a possibility that the cognitive reappraisal strategy might not be as accessible to all pupils.

Overall, the evidence appears to indicate that there are benefits associated with being able to regulate one's emotions in the classroom. However, there appears to have been a lack of research into interventions in school contexts aiming to

promote emotion regulation for learning. Nevertheless, a number of universal interventions which include an element of emotion regulation have been evaluated and these are discussed below.

2.26 Previous Research on Interventions which Include Regulation of Emotions

There have been a number of universal interventions and studies which have incorporated emotion regulation. These include the SEAL programme (DfES, 2005) which included 'managing feelings' as one of its five components, the Promoting Alternative Thinking Strategies (PATHS) curriculum (Kusche and Greenberg, 1994) which seeks to enhance pupils' ability to recognise and manage difficult emotions with the aim of enhancing social and behavioural skills and the FRIENDS for Life programme (Barrett, 2005) a programme for school-aged children based on cognitive behavioural psychology which has the primary aim of addressing anxiety.   While these programmes have had a reported impact on pupils' ability to manage their emotions, (for example, Hallam, 2009; Kusche and Greenberg, 1994), the programmes have not had a specific focus on the regulation of emotions during classroom learning activities in order to enhance self-regulated learning. There appears, therefore, to be a lack of research into ways of promoting emotion regulation related to learning activities and outcomes with school-aged children with the aim of enhancing learning.

2.27 Alternative Perspectives on Emotional Responses and Emotion Regulation in the Classroom

The social-cognitive perspective, as has been discussed, considers people's functioning in terms of an interaction between person factors and environmental factors. The focus within the present study is on individual learners' beliefs, goals and emotion regulation skills, which, it has been argued, are able to be changed. The scope of the present study, therefore, does not allow for extensive examination of environmental factors or of more stable intra-individual factors, such as temperament or attachment security (for example, Bomber & Hughes, 2013; Sroufe, 2005) which may lead to individual differences in emotional reactivity and which are likely to have an impact on emotional responses to learning tasks and outcomes (Tyson, et al., 2009).

The importance of contextual factors in influencing goal orientation has been stressed by a number of theorists and researchers (Meyer & Turner, 2006; 2007; Turner et al., 2002). Teachers can foster classroom environments that learners perceive as either performance-oriented or mastery-oriented, and these goal orientations have been found to influence learners' use of avoidance behaviours in mathematics learning (Turner et al., 2002). Home environments can also foster goal orientation adoption through direct messages about school performance (for example, being the best in the class as against learning and improving) as well as through parental attributions about their children's ability (Dweck, 2000; Tyson et al., 2009).

However, Yeager and Dweck (2012) point out that, in much implicit theory research, the teachers and parents were unaware of the incremental theory messages and that curricula and pedagogy were unchanged in their research. Furthermore, implicit theory interventions, such as the Blackwell et al. (2007) study described earlier, are argued to have improved the learners' functioning over time without any direct attempts to modify the learning environment.

2.28 Gap in the Research Literature

The growing interest in emotion regulation appears to stem from findings that effective emotion management brings a wide range of interpersonal, academic and mental health benefits for children (Boekaerts, 2002; Davis and Levine, 2012; Fried, 2011; Gumora and Arsenio, 2002). Emotion regulation enables learners to have some control over their behaviour and to remain engaged with learning. There are indications that students who regulate their emotions are more successful at learning tasks (Boekaerts, 2007; Davis & Levine, 2012; Gumora & Arsenio 2002). The inter-relatedness of cognitive, motivational and emotional dimensions of learning has been increasingly recognised (Hinton, et al., 2008; Hinton & Fischer, 2010; Mega et al., 2014; Pekrun et al., 2009). However, more direct evidence on educational interventions to promote emotion regulation for learning with school-age children is largely lacking (Boekaerts, 2011; Gullone & Taffe, 2012). There has been an increased understanding of cognitive and metacognitive aspects of self-regulated learning, however, it has been argued that motivational and emotional aspects have not been fully integrated or investigated (Ben-Eliyahu & Linnenbrink-Garcia, 2013; Mega et al., 2014). Moreover, Gullone and Taffe (2012) note that there is a dearth of

emotion regulation research examining middle to late childhood and say that this is a significant limitation of emotion regulation research given that these periods mark critical turning points in children's acquisition of cognitive, social and emotional skills.

2.29 Conclusion and Rationale for the Present Study

This literature review has outlined the psychological theories and frameworks that support the rationale behind the development of a whole class intervention which combines incremental beliefs, mastery goal orientation and emotion regulation strategies with the aim of developing learners' emotion regulation for learning.

It has been argued that incremental theories of ability can be shaped through intervention and that these have an influence on a mastery goal orientation (Blackwell, et al., 2007; Dweck, 2000). An incremental theory and mastery goal orientation have been linked with positive control and value appraisals of learning tasks and outcomes which, in turn, have an association with positive achievement emotions (Linnenbrink, 2007; Pekrun et al., 2007; 2009). The increasing acknowledgement of the role of motivational and emotional processes within the field of self-regulated learning highlights the importance of developing learners' awareness of and use of emotion regulation strategies related to the learning context (Boekaerts, 2010; 2011).

The importance of integrating theory and research in the cognitive, motivational and emotional aspects of learning has been stressed by a number of authors (for example, Ben-Eliyahu & Linnenbrink-Garcia, 2013; Hinton et al., 2008; Mega et al., 2014). It has also been noticed that there has been a lack of intervention studies specifically targeting emotion regulation related to the learning situation (Boekaerts, 2011; Gullone & Taffe, 2012). Boekaerts (2011) suggests that teachers should encourage students to build up knowledge about the obstacles that they will meet during skill acquisition and about the ways in which they can deal effectively with these obstacles, including dealing with negative emotions.

Theory and research in the fields of implicit theories, achievement goal orientation, achievement emotions, self-regulated learning and emotion regulation have provided an understanding of influences on emotions experienced and regulated in learning contexts. The intervention designed for the current study is based on the

theory and research reviewed in this chapter. The intervention is innovative in that it combines the promotion of both motivational and emotion regulation processes related to learning activities and outcomes.

It is suggested that promoting an incremental theory of ability and a mastery goal orientation will influence learners' appraisals (particularly control and value appraisals) of learning tasks and outcomes. These appraisals, in turn, are held to be associated with emotions experienced in learning contexts. An incremental theory (including learning facts about how the brain learns) and mastery orientation help learners to view challenges and setbacks differently and these are therefore assumed to promote more positive emotions and fewer negative emotions related to learning tasks and outcomes. It is also argued that promoting an incremental theory through including facts about how the brain learns, as well as promoting a mastery goal orientation, will facilitate pupils' use of cognitive reappraisal as an antecedent emotion regulation strategy. In addition, it is assumed that training children in a response-focused emotion regulation strategy (controlled breathing) may facilitate emotion regulation when a negative activating emotion (such as anxiety or frustration) has been experienced.

The 4-session whole-class intervention in this study therefore combines information and activities designed to foster an incremental theory of ability and a mastery orientation along with direct instruction in two emotion regulation strategies: cognitive reappraisal (an antecedent strategy) and controlled breathing (a response-focused strategy).

To complete the literature review, the conceptual framework for the present study is presented in Appendix A1. The overarching research question for the mixed methods study, the hypotheses for the quantitative phase and the exploratory research question for the qualitative phase are presented in the next section.

2.30 Overarching Research Question

The mixed methods research design used in the current study, that is, both the quantitative and qualitative aspects, will seek to answer the following overarching research question:

Can a whole class intervention which combines promotion of an incremental theory of ability and a mastery goal orientation along with emotion regulation strategies have an impact on 9-10 year-old pupils' emotion regulation for learning?

The quantitative aspect of the study will seek to address the following three predictive hypotheses:

1. As a result of the 'Learning Track' intervention there will be a significant increase in incremental scores over time for intervention group pupils but not for control group pupils

2. As a result of the 'Learning Track' intervention there will be a significant increase in scores reflecting a mastery goal orientation over time for intervention group pupils but not for control group pupils.

3. As a result of the 'Learning Track' intervention there will be a significant increase in cognitive reappraisal score over time for intervention group pupils but not for control group pupils.

The qualitative aspect of the study will seek to address the following exploratory research question:

What are the reported perceptions of pupils and teachers of the impact of the 'Learning Track' project?

Both sets of data will then be integrated to address the initial overarching research question.

2.31 Summary of Chapter Two

This chapter has presented the social-cognitive perspective as a framework within which to explore the different areas of related theory and research. The chapter reviewed appraisal theories of emotion. Implicit theories of ability and learning goal orientation were discussed in relation to their impact on appraisals and on emotional responses. The control-value theory of achievement emotions, which views learners' control and value appraisals as important determinants of achievement emotions, has also been discussed. The process model of emotion regulation has been described and is, in this study, located within the wider field of self-regulated learning. The chapter concluded with the study's rationale, the conceptual framework for the study and with the study's overarching research question. The three hypotheses for the quantitative phase and the exploratory

research question for the qualitative phase of the study were also presented. In the next chapter the design of the present study will be described.

Chapter Three

Research Design

3.1 Overview of Chapter Three

The present mixed methods study seeks to answer the following overarching research question:

Can a whole class intervention which combines promotion of an incremental theory of ability and a mastery goal orientation along with emotion regulation strategies have an impact on 9-10 year-old pupils' emotion regulation for learning?'

This chapter will seek to discuss the overall purpose of the current inquiry and the choices that have been made regarding the approach taken. This will include discussion of the overall research design and of the particular research methods selected and why they have been chosen. The chapter includes discussion of the following areas:

(a) theoretical positions and related methodologies;

(b) rationale for the research approach used in the current study;

(c) description of the research sample and the research setting;

(d) overview of the research design;

(e) procedure used in carrying out the research;

(f) pilot study;

(g) analysis and synthesis of data;

(h) issues of reliability, validity and trustworthiness;

(i) ethical considerations raised by the study and

(j) strengths and limitations of the study.

The chapter concludes with a brief summary.

3.2 Theoretical Positions and Related Methodologies

Mixed methods research is grounded in an essentially pragmatic philosophical position (Creswell & Plano Clark, 2011; Teddlie & Tashakkori, 2009). Kuhn (1996, cited in Teddlie &Tashakkori, 2009) argued that paradigms are philosophical models that are used within any given field and that competing paradigms may exist within a field. Denzin and Lincoln (1998) define a paradigm as a set of basic beliefs that represent a worldview. Such a worldview defines to the

holder the nature of the world and of the individuals in it. Mertens (2010) states that a researcher's theoretical orientation has implications for every decision in the research process, including choice of method. Such a theoretical orientation includes the researcher's ontological, epistemological and methodological stance.

Ontology is concerned with theories about the nature of reality and truth, about what exists, what components make it up and how the components interact with each other. The investigation of social phenomena involves consideration of whether reality exists as an external, objective entity or whether it is a product of individual, subjective consciousness (Cohen, Manion & Morrison, 2007). A related concern involves assumptions about the nature and form of knowledge and how it can reliably be acquired and communicated.

Epistemological ideas try to answer questions about the source of knowledge and whether knowledge can be gained by empirical evidence. It has been argued that the assumption that knowledge is "hard, objective and tangible" requires a different theoretical and methodological stance to the assumption that knowledge is "personal, subjective and unique" (Cohen et al., 2007, p.7). What follows is a discussion of assumptions related to different research traditions and of the pragmatist stance.

3.3 Positivism and Post-Positivism

The positivist assumptions are that a single reality exists and the researcher's aim is to discover the nature of that reality. The positivist approach has been subject to criticism when applied to the social sciences, being described as mechanistic and reductionist and denying the complexity of inner experience. Hammersley (2005, p.90) has questioned the validity of finding "simple causal relations" in educational contexts due to the unreliability of outcome measures and the dynamic, adaptive nature of pupil and teacher behaviour. Post-positivists concur with the positivist stance that an independent reality does exist. However, due to human limitations, this can only be discovered imperfectly. Post-positivists strive for objectivity, but acknowledge that the theories, hypotheses and values of the researcher can have an influence on what is observed. The post-positivist researcher aims to remain neutral to prevent possible biases and prescribed procedures are followed rigorously. The associated methodology reflects scientific paradigms, however, post-positivists acknowledge the difficulty of applying them with people. Regarding causal relationships, post-positivists believe that some reasonably stable

relationships exist among social phenomena that may be known imperfectly. Considering the generalisability of findings, post-positivists subscribe to a modified nomothetic (time and context-free) position that emphasises the importance of techniques that increase the external validity of results. When considering methodology, post-positivists prefer using either quantitatively oriented experimental or survey research to assess the relationships among variables and to explain those variables statistically.

The post-positivist approach holds that phenomena can be reduced to singular and fragmentable variables that represent reality (the state of things as they actually exist). Post-positivist researchers have a view of the social world as external to the observer. Research in this tradition tends to be primarily deductive; it begins with a pre-determined theory, a general statement that tends to organize knowledge and can be tested and confirmed. The researcher, therefore, knows in advance what they will look for (Cohen et al., 2007) .

3.4 Constructivism

The constructivist stance is that there is no external reality, independent of human consciousness (Robson, 2011). Constructivist researchers see the social world as constructed by the observer. What we perceive and experience is socially constructed and mediated through history, culture and language. The epistemological approach associated with this view suggests that diverse perspectives should be explored. Considering causal relationships, constructivists believe that all entities are simultaneously shaping each other and that it is impossible to distinguish cause and effect (Teddlie & Tashakkori, 2009). With regards to methodology, constructivists have emphasised the difference in their approach to that of post-positivists, for example, in their search for meanings and in the focus on attempting to understand the psychological conceptions of participants (Smith, Harre & Van Langenhove, 1995).

3.5 Pragmatism

A pragmatic approach rejects forced choices between post-positivism and constructivism and their associated methodologies. Pragmatism embraces features associated with both points of view and sees quantitative and qualitative methods as suitable for different purposes. They see epistemological issues as existing on a

continuum, rather than on two opposing poles. Teddlie and Tashakkori (2009) write of the emergence in the 1990s of the compatibility thesis that, they claim, resolved the paradigm debate for many researchers. The pragmatist position stated that it was acceptable to mix quantitative and qualitative methods in research studies that called for different types of data to answer research questions. Teddlie and Tashakkori (2009) write that two major characteristics of pragmatism are the rejection of the dogmatic either-or choice between constructivist and post-positivist positions and the search for practical answers to research questions.   Pragmatism views knowledge as both constructed and as based on the reality of the world one experiences and lives in.   Pragmatists agree with post-positivists on the existence of an external reality independent of our minds. They deny, however, that absolute truth regarding reality can be determined; the results of any inquiry are partial and provisional. Regarding causal relationships, pragmatists believe that these may exist but that they are transitory and hard to identify (Teddlie & Tashakkori, 2009). The pragmatic approach, then, endorses pluralism; different theories and perspectives and a mixture of methods can be useful ways to gain an understanding of people and the world.

3.6 Ontology and Epistemology of the Present Study

The present study is a mixed methods study of a whole-class intervention to promote emotion regulation for learning. The study adopts a pragmatic approach, using the methods that appear best suited to the overarching research question. Through adopting a pragmatic approach the current research incorporates elements of the post-positivist paradigm in its attempts to establish a causal relationship between variables. Furthermore, through its exploration of participants' views on the impact of the intervention, the study also includes elements of the constructivist paradigm. The study also acknowledges the contextual influences upon its outcomes.

3.7 Rationale for the Mixed Methods Approach

The problem in the current study which calls for a mixed methods design is that the quantitative study needs to be enhanced through the use of a qualitative method. In this way, the researcher subscribes to the 'complementary strengths thesis' in choosing a mixed methods approach (Creswell & Plano Clark, 2011). The aim is that the strengths of each underlying approach can be drawn upon.

Furthermore, the researcher wanted to incorporate a qualitative element as it was felt that the perceptions and experiences of the pupils could not wholly be represented by quantitative methods. In addition, it was felt that, given the complexity of the phenomena being investigated, data from more than one research method would be required.

The current study involves a fixed design in that the use of mixed methods was pre-determined and planned at the start of the research process and the procedures were largely implemented as planned. The approach used can be described as a parallel mixed methods design (Creswell & Plano-Clark, 2011) in that the two types of data were collected independently at the same time or with a short time lag. Each data set (quantitative and qualitative) was analysed according to appropriate techniques within each method. The two data sets were then integrated to increase the explanatory value of the findings.

The next section provides information on the research sample and the research setting. This will be followed by an explanation of the research design and the methods of data collection used for the quantitative and qualitative phases.

3.8 The Research Sample

The target population in the current study is primary school children aged 9-10 years. The research sample was drawn from the entire cohort of Year 5 children in two primary schools in an outer London borough. The researcher, a local authority educational psychologist, approached link schools with the possibility of setting up a research project based on promoting pupils' emotion regulation for learning. The researcher selected schools with at least 3-form entry in each year group in order to enable as large a sample in each school as possible. Two of the four local schools which met these criteria had experienced a number of recent changes of staff and leadership, one of these schools had also suffered a flood which had been disruptive. The two primary schools that agreed to participate in the study had well-established leadership teams and staff stability. The researcher, in collaboration with school staff, agreed to carry out the intervention with Year 5 pupils (aged 9-10 years) at the end of the summer term. This was so that the control group pupils could receive the intervention in Year 6.

After Head Teacher consent had been obtained (Appendix B4), the researcher met with all the Year 5 teachers in each school. The teachers were given the

project's information sheet (Appendix B1) and session outlines for 'The Learning Track Project' (Appendix B2) and the overall aims of the intervention were explained. Consent from the teachers for the study to be carried out in their classrooms with their assistance was obtained (Appendix B3). The choice of intervention and control classes was based on convenience. For example, in each school, one of the teachers had non-contact time during the planned afternoon for the intervention to be carried out, so they agreed for their class to be the control group for this reason. In school one, which was a four form entry, it was agreed that a pilot study would be carried out with one class. The teacher who was the Year 5 Leader requested that the pilot be in his class. Thus, the intervention and control groups were selected jointly with the schools on the basis of convenience and availability. The study, therefore, is quasi-experimental, involving the use of non-equivalent groups.

3.8.1 Research participants. 166 pupils took part in the study (100 boys and 66 girls). 114 pupils were in the intervention group and 52 pupils were in the control group. The mean age of pupils who took part was 10.4 (S.D .29). Demographic information was collected from school staff at the beginning of the study. In both schools, the majority of the children are of south Asian origin (Pakistan, Bangladesh, India, Sri Lanka) with pupils of Pakistani origin being pre-dominant in both schools. In school one, 70% of the sample were south Asian, in school two, 68% of the sample were south Asian. In addition, 9.5% of pupils in school one were classified as 'other Asian' and 4.9% in school two. The ethnic composition of the sample may, therefore, have implications for the generalisability of the findings. 166 pupils were present when the baseline measures were taken and 163 pupils were present at post-test. Quantitative and qualitative data was only used for the 163 pupils present at pre- and post-test.

3.9 The Research Setting

The two schools were selected as they were based in a similar catchment area, therefore, the demographic composition of the sample pupils was likely to be similar in each school. Both schools were known to the researcher as the researcher made regular visits to each as their educational psychologist. However, the researcher had not had prior involvement with any of the children involved in the

study or with any of the intervention or control class teachers. School one has 820 pupils on roll. School two has 748 pupils on roll. All the classes in each school are mixed ability and pupils had been allocated to their classes by their respective schools on a random basis

3.10 Overview of the Mixed Methods Research Design.

This overview of the research design begins with an explanation of the quantitative phase followed by a description of the qualitative phase of the study.

3.10.1 Quantitative phase. For the quantitative aspect of the study a non-equivalent groups pre-test and post-test repeated measures design was used, with an intervention group providing measures on the three dependent variables of incremental theory of ability, mastery goal orientation and emotion regulation strategy use under the condition of intervention, and a waiting list control group providing measures on the same dependent variables under the condition of no intervention. The design of the quantitative phase is summarised in Figure 2.

4 Intervention classes (n=113) receive 'Learning Track Project'

2 Control classes (n=50) Receive normal PSHE curriculum

Control group receives 'Learning Track Project'
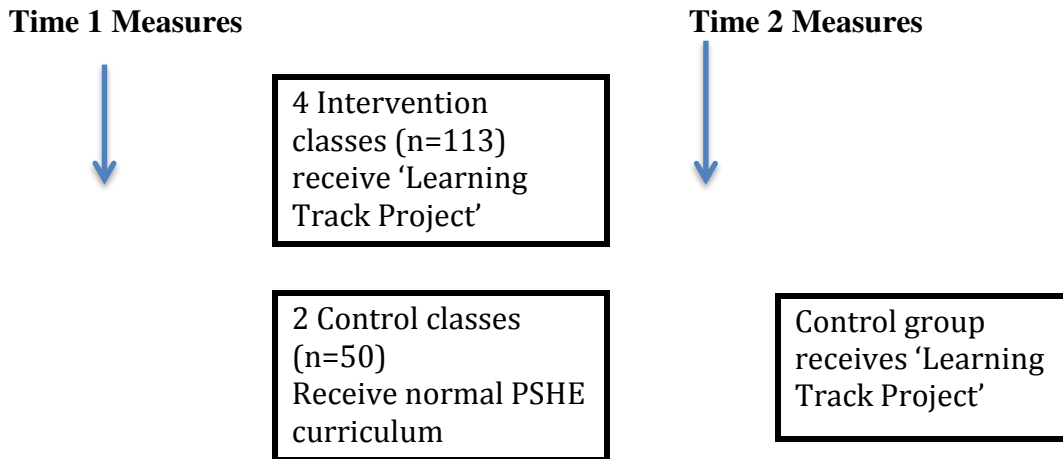
Figure 2: Research Design for the Quantitative Phase

3.10.2 Qualitative phase For the qualitative aspect of the study a questionnaire containing closed and open-ended items was administered to intervention group pupils at the end of the intervention. The aim of the questionnaire was to gain qualitative data through exploring pupils' reported perceptions of the impact of the intervention.

In addition, in order to address response bias on the children's self-report questionnaires, and to enable triangulation of research methods, post- intervention evaluation and exploratory questionnaires were collected from the four teachers of the intervention classes.

3.11 Quantitative Phase: Independent and Dependent Variables

The independent variables in the quantitative phase were condition (intervention or control group) and time (pre- and post-test).   The dependent variables were pupil self-reported ratings of their implicit theory of intelligence (incremental or entity), mastery goal orientation and use of the cognitive reappraisal emotion regulation strategy. The measures were taken at two time points, the first prior to the start of the intervention and the second following the intervention group's completion of the project and prior to the control group's participation.

A summary of the dependent variables and the corresponding outcome measures used is provided in Table 1.

Table 1

Summary table showing the hypotheses, dependent variables and measures for the quantitative phase

Hypothesis	Dependent Variable	Dependent Variable Measure(s)	Details of Measure
1. As a result of the 'Learning Track' intervention there will be a significant increase in incremental score over time for intervention group pupils but not for control group pupils	Incremental theory of ability	Implicit Theories Scale (ITS; Dweck, 2000)	A 6-item measure. Pupils rate agreement with items on a 5-point Likert scale. Mean incremental scores range from 1-5.
2. As a result of the 'Learning Track' intervention there will be a significant increase in scores reflecting a mastery goal orientation over time for intervention group pupils but not for control group pupils.	Mastery goal orientation	Task Choice Goal Measure (TCGM; Dweck, 2000) Sense of Mastery Scale of The Resiliency Scales for Children and Adolescents (MAS; Prince-Embury, 2009) Myself-as-Learner Scale (MALS; Burden, 1998)	Pupils are asked to choose one out of four task options A 20-item measure. Pupils rate how often the statements are true for them on a 5-point Likert scale. Scores range from 0-80. A 20-item measure. Pupils rate levels of agreement on a 5-point Likert scale. Scores range from 20-100

(Table 1 continues overleaf)

Table 1 (continued)

Hypothesis	Dependent Variable	Dependent Variable Measure(s)	Details of Measure
As a result of the 'Learning Track' intervention there will be a significant increase in cognitive reappraisal score over time for intervention group pupils but not for control group pupils	Cognitive reappraisal strategy use	Cognitive reappraisal scale of Emotion Regulation Questionnaire for Children and Adolescents (ERQ-CA; Gullone & Taffe, 2012)	A 10-item measure. Pupils rate how strongly they agree with items on a 5-point Likert scale. Mean cognitive reappraisal scores range from 1-5.

3.12 Details of the Quantitative Measures Used in the Study

Five measures were used to test the experimental hypotheses in the quantitative phase. These were summarised in Table 1 and a brief description as well as the researcher's rationale for choosing each measure is provided below. Further details on each measure, including reliability and validity information, are provided in Appendix B12.

3.12.1 Sense of Mastery Scale (MAS; Prince-Embury, 2009; Appendix B7). The

Sense of Mastery Scale is one of three scales that make up the Resiliency Scales for Children and Adolescents (Prince-Embury, 2009). The Resiliency Scales are brief self-report instruments to assess different aspects of resiliency. They are written at a third grade reading level (age 7-8 years) and are designed for children between 9-18 years. The scales may be used singly and may be administered to individuals or groups. The Sense of Mastery scale contains 20 items and is intended to assess a pupil's experience of mastery. The concept of 'mastery' in this scale is a broad one and consists of three content areas: optimism (positive attitudes about one's life, for example, "good things will happen to me"); self-efficacy (the sense that an individual can master their environment as well as flexibility in problem-solving, for example, "If at first I don't succeed, I keep on trying"; adaptability (reflecting the ability to ask for help and to learn from one's mistakes, for example, "I can let others help me when I need to") (Prince-Embury, 2009, p.59).   The Sense of Mastery Scale was chosen by the researcher because of its reasonable length (20 questions),

readability and suitability for use with the age-group involved in the study. Many of its key elements appeared to reflect constructs that the researcher hypothesised would be targeted through the intervention. It produces standardised scores for reliable comparisons in a universal research context. It was not modified by the researcher for the purpose of this study.

3.12.2 Revised Implicit Theories of Intelligence Scale for Children (ITS; Dweck, 2000; Appendix B8) The Revised Implicit Theories of Intelligence Scale is a self-report scale designed to assess if a child has more of an incremental or an entity theory of ability. It is designed for use with children aged 10 and over. The scale was deemed appropriate by the current researcher as the majority of the sample were 10 and over by the end of Year 5. The wording of some items was amended slightly by the researcher in order to be more easily read and understood by children with English as an additional language and this was piloted in the pilot study. For example, "You can learn new things, but you can't change your basic intelligence" was changed to "You can learn new things, but you can't change how clever you are". The slightly modified scale contains 6 statements with which pupils state their level of agreement on a 5-point Likert Scale. The original scale contains a 6-point Likert Scale. The decision was made to keep consistency among the different scales used in the study by using a 5-point scale throughout. The "mostly agree" and "mostly disagree" responses were replaced with the single mid-way response "half and half". The scale contains both incremental and entity theory items. The researcher made the decision to include incremental theory items so that the effect of completing the scale is not so negative on the participants. Responses to each scale item were summed and a mean incremental score was calculated.

3.12.3 Task-Choice Goal Measure (TCGM; Dweck, 2000; Appendix B9)   The Task Choice Goal Measure (TCGM) is a measure of mastery or performance goal orientation. It asks pupils to choose between looking clever and attempting challenging tasks. Dweck (2000) reports that a clear relation was found between the Task-Choice Goal Measure and pupils' theories of intelligence. Entity theorists prefer tasks that will allow them to demonstrate high ability or allow them to avoid demonstrating low ability. Incremental theorists prefer tasks that will allow them to meet a challenge and learn new things, at the risk of making mistakes.

The TCGM, therefore, asks pupils to choose among tasks that embody different goals. The pupils are asked to make one choice from the following:

1. *problems that aren't too hard, so I don't get many wrong*

2. *problems that I'll learn a lot from, even if I won't look so smart*

3. *problems that are pretty easy, so I'll do well*

4. *problems that I'm pretty good at, so I can show that I'm smart*

Choices one and three offer a performance avoidance goal; choice four represents a performance approach goal; choice three represents a mastery goal. Three performance goal choices and one mastery goal choice are presented in order to offset the potential desirability of the mastery goal choice.

The TCGM is deemed suitable for children aged 10 and above. It was used unmodified in the present study and the pilot study suggested that the measure was easy to understand by the sample of pupils.

As a result of their choice on the TCGM pupils were classified as having a performance goal orientation or a mastery goal orientation.

3.12.4 Myself-as-Learner Scale (MALS, Burden 1998; Appendix B10). The MALS presented a reasonably brief measure of self-concept as a learner that was easy to administer and score. It is suitable for the age group in the current study. The author of the scale cites its foundations in self-concept and self-efficacy theory. A number of its key elements reflect the constructs that the current researcher hypothesised would be targeted through the intervention, including confidence in dealing with new work, enjoyment of learning, problem-solving and learning self-efficacy. The scale was scored out of 100. Following the pilot study, the scale was used unmodified for the main study.

3.12.5 Emotion Regulation Questionnaire for Children and Adolescents ERQ-CA (Gullone and Taffe, 2012; Appendix B11). The Emotion Regulation Questionnaire for Children and Adolescents (ERQ-CA) is a revision of the adult version, the ERQ (Gross and John, 2003) and is based on Gross's process-oriented approach to emotion regulation. The self-report measure focuses on two emotion regulation strategies: cognitive reappraisal and expressive suppression. The ERQ-CA contains 10 items. Revisions made by the scale's authors include simplification of the item wording. For example, the item on the adult version: "I control my

emotions by not expressing them" was reworded to "I control my feelings by not showing them". In addition, the response scale length was reduced from 7 to 5 points between 1 'strongly disagree' to 5 'strongly agree'. The researcher of the current study has further revised the wording of some scale items to ensure they are more readily understandable by children, including children with English as an additional language and the amended scale was piloted and deemed suitable as a result of the pilot study. The ERQ-CA was validated by its authors with a sample of participants aged between 10-18 years. The authors of the scale state that it is a valuable tool with which to assess the above two emotion regulation strategies in child and adolescent samples. In the current study it is the cognitive reappraisal scale that is reported. Permission to use the ERQ-CA for the current study was obtained by the researcher from Eleonora Gullone.

3.13 Qualitative Phase: Questionnaire Design

It is perhaps important to note that the constructs of interest in the current study (incremental theory of ability, mastery orientation and emotion regulation strategy use) are hypothetical constructs. There is no direct evidence for such constructs having any real existence. What is observed are the effects of what is assumed to be the above constructs, for example, agreement with certain questionnaire items, with pupils describing what they could do to feel better during a test, and so on.

For the qualitative phase questionnaires were designed by the researcher to find out pupils' and teachers' perceptions of the impact of the intervention on the pupils' learning and emotion regulation (Appendices B13 and B14). The qualitative questionnaire contained both closed and open-ended questions. For example, the pupil questionnaire contains the closed item "*Has the Learning Track Project helped you with your learning?   Yes / No/ /Maybe*" and follows this with the question "*How*?" Two items on the pupil questionnaire explore how the pupils might apply any learning or skills gained. For example, they are asked "*Is there anything you can do to feel better when you have to take a test? Yes /No /Maybe",* followed by "*What can you do?"*. They were also asked a projective question regarding what they would advise a younger pupil to do who felt worried or frustrated when learning. Amendments to the pupil and teacher questionnaire were made as a result of the pilot study and these are discussed later.

3.14 Overview of Research Procedure

      Figure 3 provides an overview of the procedures used in the parallel mixed methods study. This is followed by an explanation of the procedures used in the quantitative and qualitative phases of the study.

Step 1

Design the Quantitative Strand
Non-equivalent repeated
measures experimental design
using pre-and post-measures.

and

**Design the
Qualitative Strand**
Pupil and Teacher
questionnaires
involving open-ended
questions.

Collect the Quantitative Data
-obtain consent
-identify sample
-allocate using intact groups to
experimental and waiting list control
conditions
-collect pre-test quantitative data
from experimental and control
groups
-implement intervention to
experimental group
-collect post-test quantitative data
from experimental and control
groups

Step 2

and

**Collect the Qualitative
Data**
-identify qualitative sample
(experimental group pupils
and teachers)
-implement intervention to
experimental group

-collect open-ended data
from pupils and teachers
using questionnaires at end
of intervention

Step 3

Analyse the Quantitative Data
- compare groups using descriptive
statistics, inferential statistics and effect
sizes

and

**Analyse the
Qualitative Data**
- using thematic analysis

Step 4

Merge Results

Step 5

Interpret the Merged Results

Figure 3: Flowchart of Procedures Used in Implementing the Parallel Mixed
Methods Design

3.15 Procedure for the Quantitative Phase of the Study

Consent for the project was initially gained from the Headteachers in each of the two schools involved. They were provided with a covering letter and a summary information sheet about the project (Appendices B1 and B4). Pupil demographic data was collected at the start of the study. This was provided from school records. Parental consent was obtained (Appendix B5).   A meeting was held with all the Year 5 class teachers and a senior member of staff in each of the two schools to explain the project and to gain teacher consent (Appendix B3). Pupil consent was obtained at the start of the project (Appendix B6). A pilot study was carried out with one Year 5 class in school one; further details of the pilot study are given later in this chapter.

The five quantitative measures (the MAS, MALS, ERQ-CA, ITS and TCGM) were administered to the experimental groups and control groups at two time points, the pre-test and post-test (see Figure 2). The pre-test was carried out at the end of May 2013 prior to the start of the intervention. The measures were administered in one afternoon session lasting 50 minutes. All pupils in each class were included in the study. There were no pupils in any class with significant learning needs. Given constraints on time and resources it was not possible to assess all the participants' learning and language levels prior to administration of the tests. The pilot study provided an indication of the suitability of the measures for the participants.

The researcher initially introduced each class to the idea of the Likert Scale through examples of expressing levels of agreement to simple statements, such as "I love dogs". The five measures were then administered to each whole class simultaneously by the researcher. The pupils were spaced out as far as was possible and were asked not to look at others' responses. The researcher read out the instructions and each item in order to control for differences in reading ability. The class teacher was present in the classroom and was able to support children with English as an Additional Language or with low reading ability. The data were collected anonymously, the use of a coding system enabled the data to be paired. The papers were collected by the researcher and kept in a secure location.

For the post-test, the administration procedures were followed by the researcher in the same way as during the pre-test. The same five quantitative measures were again administered in the same way to pupils in all six classes after

the four-week intervention. The same quantitative measures were used with the intervention and control classes.

3.16 Procedure for the Qualitative Phase of the Study

The exploratory qualitative questionnaire was administered to the intervention classes during the same session as the post-test quantitative measures, after the four-week intervention.

The class teachers of the intervention classes were also asked at this point to complete a qualitative questionnaire to find out their perceptions of the impact of the project. The qualitative questionnaires were also collected anonymously.

3.17 Content of the 'Learning Track' Project

As discussed earlier, the 'Learning Track Project' was designed to assist children aged 9-10 years to develop an incremental theory of ability, a mastery orientation to learning and to develop strategies for regulating emotions experienced in the learning context. While there are whole class intervention packages available to help foster an incremental theory of ability, for example the 'Brainology' programme developed by Dweck and colleagues (described in Dweck, 2000) or programmes to help pupils manage anxiety, for example, the FRIENDS for Life programme (Barrett, 2005) there does not appear to be a whole class intervention which combines both motivational and emotion regulation processes related specifically to the learning process. It is for this reason that the researcher designed the content of the 'Learning Track' project. The content of the project was based on the conceptual framework developed by the researcher (Appendix A1) as a result of a review of relevant literature and research in the related fields.

The intervention consisted of 4 sessions (50 minutes each) delivered once a week at the same time each week to the whole class. The sessions were delivered by the researcher in the pupils' usual classrooms with the class teacher present. The overall project title was called 'The Learning Track', based on the ideas in Boekaerts' dual process model of self-regulation (2007). It was explained to the pupils that we would be thinking about ways to help them keep on the 'learning track', especially when their emotions get in the way of learning. The titles of the four sessions are provided below (see Appendix B2 for further details of the content of each session):

- Session 1: The Learning Brain

- Session 2: The Growth Mindset

- Session 3: Emotions and the Brain

- Session 4: Thoughts and Feelings

The control group received their usual Personal, Social and Health Education teaching sessions. The researcher discussed with participating schools what the content of the PSHE curriculum would be for the control classes in each school. In school one, the control class was covering 'Ourselves in our Community' and 'Looking at the World'. In school two the control class was covering 'Everyone is different'. Neither of the control classes' PSHE sessions during the implementation of the intervention involved thinking about emotions.

3.18 Pilot study

A pilot study was carried out in order to provide a preliminary evaluation of the 4-session intervention, activities and measures. The pilot study involved one class of 30 Year 5 pupils. Parental, teacher and pupil consent was obtained prior to the pupils' participation.

The pilot study provided useful feedback on the activities and resources used in the sessions. It led to some revisions that were implemented in the main study. The decision was made to add a video clip to the final session in order to maintain interest and add variety to the session. It was also decided to add a 'maybe' response to the qualitative pupil questionnaire rather than just 'Yes/No' responses to the items. This was because a number of pilot pupils had added the words 'maybe' or 'not sure' rather than to tick 'yes' or 'no' to items 1 and 2. With some additional adult support in the classroom, it was noted that the pupils in the pilot class appeared to understand the content of the quantitative measures and that the adaptations made to two of the measures by the researcher were appropriate.

The qualitative teacher questionnaire was adapted more radically. The pilot teacher questionnaire asked the teacher to rate pre and post-intervention how strongly they agreed with statements about their class on a 1-5 Likert scale. However, as the teacher was being asked to reflect on the class as a whole, this lead to mainly mid-scale 'half and half' responses. It was therefore felt that this would be of limited use.

A post-intervention questionnaire including more open-ended questions was devised instead.

The pilot study provided initial evidence of the feasibility of the intervention. The pilot pupils' evaluation was positive and the majority felt that the project had helped them with their learning and emotions. Anecdotal responses from the pupils and the class teacher were also very positive. The limited evidence from the pilot suggested that the intervention could be helpful. The researcher considered that it was justified to carry out the project with the intervention classes.

3.19 Methods of Data Analysis and Synthesis

The quantitative and qualitative research strands were planned and implemented to answer the overarching research question. Parallel mixed methods data analysis involves two separate processes. In the current study quantitative analysis of the data involved the use of descriptive and inferential statistics for the appropriate variables. The qualitative analysis of data involved thematic analysis. The two sets of analyses were independent, however, each provided a different way of understanding the impact of the intervention. Inferences made on the basis of the findings from each phase of the study were then integrated at the end of the study.

The researcher's rationale for choice of inferential statistical analysis of the quantitative data is discussed below.

3.20 Quantitative Data Analysis

This section provides a rationale for the researcher's choice of inferential analyses that were used to analyse the quantitative data. The five measures used pre- and post-intervention, the type of data collected as well as the statistical analyses conducted are summarised in Table 2.

Table 2

Summary Table of Measures Used, Levels of Data Collected and Statistical Analysis Conducted

Measure	Level of Data	Statistical Analysis
TCGM	Nominal/categorical	McNemar's Test
MALS	Interval	2-Way Mixed ANOVA
MAS	Interval	2-Way Mixed ANOVA
ITS	Interval	2-Way Mixed ANOVA
ERQ-CA	Interval	2-Way Mixed ANOVA

3.21 Issues Influencing the Choice of Statistical Analysis.

One measure produced nominal data (TCGM), the other four measures were based on Likert-type rating scales. Two of these (MALS and MAS) produced overall scores which were standardised to produce interval level data. The ITS was scored as is indicated in the relevant research to produce an overall mean incremental score (Dweck, 2000) The ERQ-CA cognitive reappraisal scale items were scored to produce a cognitive reappraisal mean score (Gullone & Taffe, 2012). In deciding on the method of inferential analysis to use, it was necessary to consider the nature of the design and the level of data obtained. These issues are discussed below.

3.21.1 Interpreting ordinal level data. Data obtained from Likert-type rating scales may be classified as ordinal level. Field (2009) writes that a lot of self-report data are ordinal, such as rating level of agreement. He notes that in any situation in which we are asking people to rate something subjective we should probably regard these data as ordinal, although many researchers do not and there is debate regarding this issue. For ordinal level data there is an absence of equal intervals between items (for example between 'strongly disagree and disagree' or between 'disagree and half and half)'. In addition, ordinal level data is not considered to meet the assumptions of parametric testing.   However, Norman (2010) has convincingly argued that when ordinal data is summed over a number of items, as in the measures used in the

current study, it may be treated as interval level. For this reason, the researcher has decided to treat the data as interval level.

3.21.2 Non-equivalent groups designs. It has been highlighted that an essential feature of experimental designs based on pre-and post-tests with an intervention and control group is the random allocation of participants (Mertens, 2010). This was not a possibility in the present study and the lack of randomisation is not uncommon practice in much 'real world' educational research (Mertens, 2010). A consequence of the non-equivalent groups design is that it has implications for the type of data analysis that can be used. It has been noted that applying traditional parametric analyses with non-equivalent groups to compare pre-and post-test scores is questionable (Mertens, 2010). The sample selection bias inherent in non-equivalent groups design may lead to a Type 1 error, resulting in apparent post-intervention difference when there is, in fact, no treatment effect. Caution is therefore recommended when interpreting the results from non-equivalent groups designs.

3.21.3 Parametric versus non-parametric analysis. Many researchers cite random allocation as a key assumption of parametric tests (Cohen et al., 2007; Mertens, 2010). However, other writers do not emphasise this requirement as long as the data is normally distributed and displays homogeneity of variance (Coolican, 2009). On the other hand, parametric tests have been described as relatively 'robust' in that they can withstand violations of normality and homogeneity of variance to a certain degree (Norman, 2010; Robson, 2011). Dancey and Reidy (2007) write that violations of homogeneity of variance are not too serious as long as there are equal numbers in each condition (which is not the case in the current study). Non-parametric tests do not make assumptions about underlying population characteristics and can be used in a wider variety of contexts. The main disadvantage of using non-parametric measures is that they are typically less powerful than their parametric equivalents which could lead to a Type II error (Dancy & Reidy, 2007).

   With the above issues in mind, the researcher decided to conduct parametric tests on the interval level data in the current study, noting violations of assumptions when they occurred. As the study has a repeated measures design and includes two independent variables, time and condition, the decision was made to conduct two-way mixed analyses of variance (ANOVA) on the interval level data. The mixed

ANOVA analysis would be able to provide information on the effects of condition (intervention or control) and time (pre- or post-test) as well as the interaction of these two factors, thus providing a more detailed analysis of the data.

The next section provides details of the analysis of the qualitative data.

3.22 Qualitative Data Analysis

Qualitative data involves the search for themes, which are the dominant features or characteristics of the phenomenon under study. Teddlie and Tashakkori (2009) write that qualitative data analysis is predominantly inductive in nature, it involves moving from particular facts or data to a general theory, theme or conclusion. Thematic analysis was used as the method of analysing the qualitative data in the current study. The approach suggested by Braun and Clarke (2006) was followed. The process of thematic analysis is iterative and it involves the researcher being immersed in the data and searching across the whole data set for recurring patterns as well as checking that themes developed are coherent, consistent and distinctive. The researcher initially searched for recurring patterns inductively, so that the themes identified are related to the data themselves rather than to the overarching research question. The procedure used is outlined below.

i.   The researcher transcribed the questionnaires and read and re-read pupil and teacher responses. Initial ideas and observations were noted on the transcripts.

ii. The researcher analysed the data according to each questionnaire item, noting recurring ideas within responses to each item. An initial set of codes were identified and the frequency of each code's occurrence for each questionnaire item was analysed (see Initial Coding Scheme, Appendix C1 and Frequency of Responses and Codes by Questionnaire Item, Appendix C2). An initial set of codes was developed for the entire data set.

iii. The transcripts were highlighted using different colours to correspond to different codes (Appendix C2a). Codes were gradually refined (see Coding Scheme Development Chart, Appendix C3).

iv. A set of four more general themes were identified which incorporated the refined codes. These were colour-coded and applied to the whole data set (see Appendices C4 and C4a).

v. A set of descriptors was developed for each theme, with the aim of internal homogeneity and external heterogeneity (see Final Themes and Descriptors, Appendix C5, and Frequency of Final Themes, Appendix C6). The researcher also included an analysis of "Why?" and "Why not?" for each theme, as recommended by Bloomberg and Volpe (2012) (Appendix C5). The pupil and teacher transcripts were coded again for each of the four themes (Appendix C7).

vi. A thematic map was developed for each of the four themes.

vii. The coding scheme with the four final themes was given to a psychologist colleague to check for inter-rater reliability (Appendix C8).

The next section will consider the issues of reliability and validity for the quantitative study and the issue of trustworthiness for the qualitative study.

3.23 Quantitative Phase: Issues of Reliability and Validity

This section considers issues of reliability and validity for the quantitative phase.

3.23.1 Reliability. Measures are reliable if they tend to produce the same scores from the same people at different times. It is essential that the researcher stick to the same procedure and set of circumstances with all the pupils tested. In the current study, the measures were administered to all pupils in the same way by the researcher.

3.23.2. Internal Validity. A test is valid if it demonstrates or measures what the researcher thinks or claims it does (Coolican, 2009). A range of possible threats to validity were identified in the research design.

One threat to internal validity is that the apparent effect of the intervention might be caused by something unrelated to the manipulation of the independent variable, for example, the fact that non-equivalent groups are used. In the current study pupils were in mixed ability groupings in both schools and an analysis of demographic factors showed no significant difference between the two groups (Appendix D1). An additional consideration is that of construct validity. This is the

extent to which the measures of a particular construct really are measuring it. Researcher expectancy could, for example, influence the outcomes. The social interaction that occurs between the researcher and the participants (pupils and teachers) means that it is possible that, beyond the level of conscious awareness, the researcher's expectations could be a confounding variable. The researcher attempted to address this through administering the measures in a standardized way across all groups, maintaining a neutral tone of voice and stressing that there were no right or wrong answers.

Participant expectancy could also be a threat to validity. If participants who may desire approval are affected by the researcher's influence, they may be motivated to guess what might be the 'correct' answers to try to do well. There are many cues in an experimental situation that give participants an idea of what the study is about, what behaviour is under study and what changes are expected of them. Participants may want to 'please the researcher' or else may attempt to alter their response away from what is expected. There is also the possible impact of evaluation apprehension – research participants have a strong motivation to 'look good' – and to provide socially desirable answers.

To reduce the effects of expectancies and researcher bias the researcher used a set of standardised procedures identical for all the participants in both conditions. The participants were made aware of the general aims of the project, but the researcher did not explicitly inform the participants of the precise goals of the research project. A summary of the threats relating to internal validity, and how these have been addressed by the researcher is presented in Table 3.

Table 3

Summary of threats to internal validity and action researcher has taken to address these (based on Creswell, 2014; Mertens, 2010)

Threat to internal validity	Description	Action researcher has taken
History	Events can occur during intervention period that influence the outcome	Use of more than one class in each school. Use of children in same year group. Both IG and CG experience same external events.
Maturation	Participants may mature or change during the experiment which may influence results.	Use of a control group who are the same age and should experience similar maturational change.
Regression	Participants with extreme scores; scores are likely to regress towards the mean over time.	Use of mixed ability groups with range of scores; identification and adjustment of outliers.
Selection	Characteristics of participants may predispose them to have certain outcomes.	Random assignment not possible. Demographic variables examined to look for significant differences between schools and between IG and CG.
Mortality	Participants dropping out during experiment. The outcomes of these participants are not known.	Repeated measures design addresses this.
IG = intervention group CG = control group		

(table 3 continues)

Table 3 (continued)		
Threat to internal validity	**Description**	**Action researcher has taken**
Diffusion of treatment	Participants in IG and CG communicate with each other, which can influence outcome scores.	Study teachers informed of need not to discuss content of sessions; researcher delivered sessions which were not disseminated to schools until end of research.
Compensatory/resentful demoralisation	Benefits of experiment are unequal when only IG receives intervention.	Waiting list control group design.
Compensatory rivalry	CG participants feel devalued in comparison with IG.	CG advised that they are part of the project. Waiting list control group design.
Testing	Participants become familiar with the outcome measures and remember responses for later testing. Participants can learn something from the pre-test or become sensitised to contents of intervention.	Time interval between pre-and post-test (at least five weeks). All the children took pre-and post-tests so effects should balance out.
Instrumentation	Changes in instrumentation may influence outcome.	Same measures used on pre- and post-tests.
Treatment Fidelity	Changes in way intervention is delivered or measures are presented may affect outcomes.	Researcher presents measures in a standardised way at pre- and post-test. Researcher delivers intervention to all groups in the same way.
Strength of Treatment	Duration of intervention may influence outcomes.	Relatively short intervention (4 sessions) may not have been as effective.
Researcher expectancy effect	The expectations of the researcher can influence the outcome of the study.	Not possible to double blind researcher and participants.

3.23.3 External validity

External validity is concerned with whether the apparent effects can be generalised beyond the experimental setting. A summary of threats to external validity is presented in Table 4.

Table 4

Threats to external validity and action researcher has taken (based on Mertens, 2010)

Threat to external validity	Description	Response
Ecological Validity	Extent to which findings can be generalised from one set of environmental conditions created by researcher to other environmental conditions.	Use of more than one school setting.
Description of intervention	Intervention must be sufficiently described so that reader could reproduce it.	Researcher has described intervention in Chapter 3 and intervention materials are provided in Appendices.
Multiple Treatment Interference	Participants receive more than one intervention at the same time.	No other similar intervention taking place in either school which could interfere with research.
Hawthorne Effect	The idea of receiving special attention may influence IG's results.	Detailed aims of project not made explicit. CG also informed that they are taking part in a project.
Novelty and Disruption Effects	Positive results produced because intervention is novel	
IG = intervention group CG = control group		

Table 4 continued

Threat to external validity	Description	Response
Experimenter Effect	Effectiveness may depend on individual delivering intervention	Not possible to address.
Pre-test Sensitisation	Pre-tests may sensitise participants to the content of an intervention.	Both groups completed pre-test and post-test.
Post-test Sensitisation	Taking a post-test may sensitise participants' response to an intervention.	Both groups take pre-test and post-test.
History and Treatment Effects Interaction	Intervention conducted at a particular time with particular contextual factors.	Intervention takes place in two school settings. Timing may have had an impact on effectiveness.
Measurement of Dependent Variables	Effectiveness may depend on type of measure used.	Use of quantitative and qualitative methods
Interaction of Time and Measurement of Dependent Variable	Timing of post-test may influence results.	Post-test administered one week after end of intervention for all groups.

The above section has discussed the issues of reliability and validity raised by the quantitative study. The issues related to the trustworthiness of the qualitative study are discussed below.

3.24 Qualitative Phase: Issues of Quality and Trustworthiness

Mertens (2010) writes that standards for evidence and quality in qualitative research inquiries requires careful documentation of how the research was conducted and the associated data analysis and interpretation processes, as well as the thinking processes of the researcher. Criteria for judging quality in qualitative research include the following areas: credibility, transferability, confirmability and dependability.

3.24.1 Credibility. Credibility is addressed through the process of triangulation of the data – obtaining information from both the pupils and the teachers of the intervention groups, as well as obtaining quantitative data. In addition, credibility is addressed through negative case analysis.

3.24.2 Transferability. In qualitative research the researcher's responsibility is held to be providing sufficient detail to enable the reader to make a judgment regarding the degree of similarity between the study context and the receiving context. The researcher has provided demographic data regarding the pupils in the study and information regarding the contexts of the two schools.

3.24.3 Dependability. The researcher has provided details of each step in the data collection and analysis process.

3.24.4 Confirmability. To promote confirmability, the researcher provided a chain of evidence. Qualitative data can be tracked to their source and the logic that is used to interpret the data is made explicit. There is the use of peer review and an analysis of inter-rater reliability.

3.25 Ethical Considerations

This study has approval from Cardiff University's Ethics Committee. The ethical principles informing the research are based on *The British Psychological Society: Code of Ethics and Conduct: August 2009 (British Psychological Society, 2009)* and Cardiff University's *Safeguarding Children and Vulnerable Adults Policy* (Cardiff University, 2010) and Cardiff University's *Guidance for Researchers Working with Vulnerable Children and Adults* (Cardiff University, 2012). A number of ethical considerations were raised by the project and these are discussed below.

3.25.1 Standard of informed consent (BPS, 2009). The participants were children of 9-10 years of age. The researcher explained to pupils in the control and intervention classes what taking part in the project would involve and they were asked if they were willing to take part. They were given child consent forms adapted to be suitable for their age (Cardiff University, 2012) (Appendix B6). Consent was obtained from Headteachers of the schools involved (Appendix B4) and from the teachers of the intervention and control classes (Appendix B3). The letters to Headteachers and teachers contained an information sheet (Appendix B1) outlining the aims and content of the intervention and the length of time it would take place . Letters were sent to parents of both the intervention and control groups (Appendix B5) . Parents were asked to contact a designated member of school staff if they did

not wish their child to take part. Parents were also invited to contact the researcher if they would like further information. The researcher ensured that parents or guardians were informed about the nature of the study and were given the option to withdraw their child from the study if they so wish (BPS, 2010). Whilst it is acknowledged that this form of parental consent is only *passive*, this is also the method employed by the schools to obtain consent. In addition, the research procedures were deemed by the head teachers to fall within the range of usual curriculum or other institutional activities, therefore, consent from the participants and the granting of approval from a senior member of school staff could be considered sufficient (BPS, 2010).

     At the end of the study, school staff were given more detailed information regarding the aims and results of the study (Appendix B14).

3.25.2 Standard of privacy and confidentiality (BPS, 2009). Participants were advised that the data would be anonymous and would be kept in a secure place (a locked filing cabinet) and would be destroyed after two years.

3.25.3 Standard of self-determination (BPS 2009). Before measures were administered, participants were informed that they could leave out any items. Participants were informed that they could withdraw from the study and the intervention at any time should they so wish.

3.25.4 Standard of recognising limits of competence (BPS, 2009). The researcher is an experienced educational psychologist who had previously run whole class and small group interventions in primary and secondary schools.

3.25.5 Standard of general responsibility. The researcher had DBS clearance and was aware of the designated safeguarding officer in each school and of the procedures in each school for reporting safeguarding concerns (Cardiff University, 2012). The researcher was aware of the protocol outlined in Cardiff University Safeguarding Children and Vulnerable Adults Policy (Cardiff University, 2010). The researcher ensured at the beginning of sessions that participants remained willing to take part. The contents of the sessions were reviewed by relevant school staff before implementation to ensure that the content was deemed appropriate. The

participants were informed of how many sessions would take place and of how long the researcher would be working with them. The study involved working with pupils on regulating their emotional responses to learning and it was possible that some negative emotions might be evoked during the sessions. In order to avoid causing harm, the researcher endeavoured to ensure that participants left the sessions (including the session when the class completed the measures) in a positive frame of mind through a mood enhancing activity, which is a fast paced, fun 'categories game'. If a participant had appeared distressed the researcher would have informed relevant members of school staff. If at the end of the study the researcher felt that any individual child would require continued monitoring or further intervention by school staff, appropriate school staff would be informed and the most appropriate next steps would be discussed (this may include, for example, continued monitoring by school staff, meeting with parents, educational psychologist involvement or referral to the school counselling service or the Child and Adolescent Mental Health Service).

The sessions were designed to be accessible to all pupils in the year group and all pupils were included. The sessions used visual support and video clips to support the understanding of pupils with learning or language needs or pupils with English as an Additional Language. None of the classes involved in the study contained pupils with complex or significant learning needs. The class teacher was present in the classroom to monitor and ensure that all pupils had access to the content of the sessions. The pilot study provided evidence that the content of the sessions was accessible to all the pupils. The sessions took place during PSHE/Circle time sessions in order to ensure that the class was not disadvantaged by missing core curriculum areas. The materials used in the session include the use of some video clips provided freely via the internet from organisations such as The Learning Pod and Stepitup2thrive. The researcher confirmed that there would be no financial gain involved in using video clips or other materials used in the research study.

3.25.6 Ethical Principle: Integrity. At the end of the study, participating school staff were given more detailed information regarding the results of the study (Appendix B15). Data corresponding to individual children was anonymous. The

researcher coded the teachers' questionnaires so that they could be linked with the relevant class and this information was kept confidential.

The above section has looked at the ethical considerations raised by the project and at how these have been addressed by the researcher. This chapter now proceeds with a discussion of the strengths and limitations of the study.

3.26 Strengths of the Current Study

The current study makes a contribution to addressing a documented gap in the evidence base on school-based interventions to promote emotion regulation. By undertaking the design, implementation and evaluation of a project, the researcher is delivering an innovative intervention, based on current theory and research, with the aim of enhancing all pupils' learning. As well as an evaluation of an intervention, the study also provides a model of how E.Ps might work collaboratively with schools to promote self-regulated learning initiatives for all pupils.

The researcher designed the project and has a sound knowledge of the underlying psychological principles and therefore was in a strong position to reinforce these during the implementation of the intervention. The pilot study provided information on the feasibility of the intervention and the appropriateness of the measures and materials used. The researcher delivered all the sessions to all classes, ensuring treatment integrity. An additional strength of the current study is that it is carried out in a 'real world' setting rather than an artificial setting, which adds to the study's ecological validity.

A strength of the study also lies in methods used to overcome threats to the validity of the findings. For example, the study involves mixed methods, which enables triangulation of the data. In the current study triangulation is achieved through using a variety of data sources (data triangulation) and the use of multiple methods to study the research questions (methodological triangulation). Mixed methods are viewed as of particular value when the researcher is trying to solve a problem in complex educational or social contexts. It has been argued that incorporating techniques from both quantitative and qualitative research traditions enables the researcher to obtain a more complete picture of human behaviour and experience (Creswell & Plano Clark, 2011; Mertens, 2010).

A quantitative phase to the current study was felt to be appropriate as empirical evidence suggests that the constructs of interest are able to be measured

quantitatively (Dweck, 2000; Gullone & Taffe, 2012). In addition, quantitative analysis was selected as it is an efficient method of assessing change across a number of participants. An additional strength of the current study is the sample size as well as the fact that the study takes place in two settings, thus aiding generalisability of the findings. The two-group design, in which measures from an intervention group are compared with those from a control group, is recommended as providing the most economical method for demonstrating cause-and-effect relationships (McQueen and Knussen, 2006). The lack of randomisation in the non-equivalent groups design will be discussed in the next section as a limitation of the study. On the other hand, it has been pointed out that the retention of intact groups may have some advantages in applied research, for example, the participants' responses to intervention may be affected by randomisation processes (Shadish, Cook and Campbell, 2002). Demographic information, including gender, age and ethnicity was also collected in order to find out if there were any significant differences between the two groups on these variables.

For the qualitative phase a pupil and a teacher questionnaire were used. The use of the questionnaire was chosen as the advantage of the questionnaire as a research method is that it can involve a larger number of participants than, for example, interviews and focus groups. Open-ended questions were included on the questionnaires as they have several advantages. They deliver richer information, respondents do not feel frustrated by the constraints imposed with a fixed choice answer, there is less chance of ambiguity and the questioning is more realistic as we rarely have to simply agree or disagree without giving reasons (Coolican, 2009).

The above section has noted the strengths of the current study. In the next section the study's limitations will be highlighted.

3.27 Limitations of the Current Study

In the current study the classes in each school presented opportunity samples. This is because it was deemed too disruptive to have introduced randomisation procedures. This means that the study involves a non-equivalent groups design. The non-equivalent groups design entails a number of threats to internal and external validity. The lack of random allocation leads to significant limitations for the data analysis and subsequent ability to draw causal inferences in relation to the research questions. In this way, non-equivalent groups designs are more vulnerable than

randomised controlled trials in terms of threats to validity (McQueen and Knussen 2006).

Regarding the quantitative measures used in the study, an important limitation of all measures, except the MALS, is that they were standardised on either US or Australian samples. This means that caution is required when interpreting the results gained from a UK sample. When considering the qualitative questionnaires, given that the pupils had to write their responses, a limitation is that pupils with weaker literacy or language skills may not have been as able to complete the open-ended items as easily as other pupils. This may have influenced the range of views collected. In addition, in using the questionnaire method, the researcher was unable to clarify responses which were unclear or ambiguous, as is possible with methods such as interviews.

As with all 'real world' research there is a strong likelihood of interaction effects between various sources of bias (Robson, 2011). For example, the important influence of researcher bias was raised earlier. The researcher played an integral role in the design, implementation and evaluation of the project. The researcher's stance as an educational psychologist and an educational psychology doctoral student could affect neutrality in implementing and evaluating the whole-class intervention. This is in addition to the possible desire on the part of the researcher to demonstrate effectiveness to the key stakeholders (schools, EPS, Cardiff University) . Moreover, the researcher placed a value on building rapport with the class teachers and the pupils. The pupils were given praise for contributing ideas, volunteering and showing effort in engaging in the activities. The researcher was aware of the wish to make the project an enjoyable and worthwhile experience for the schools. This approach may, however, have led to bias on the part of teachers and pupils in evaluating the impact of the project through a possible desire on their part to please the researcher. As an attempt to address this potential interaction effect the researcher stressed to participants that there were no 'right' or 'wrong' answers during pre and post tests and that it would be most helpful to know what they really think.

Moreover, it has been suggested that it is important to be cautious when interpreting self-reports – which are relied upon in all the measures used in the current study - and critically to consider contextual influences on reliability, such as the interaction effects discussed above (Coolican, 2009). The application of a range

of methods, as in the current study, is suggested to strengthen the validity of self-report findings.

As the intervention proceeded the researcher became aware of a number of mechanisms involved (such as teacher involvement and interest, social relationships within the classroom, timing of the intervention) that may have produced effects upon the dependent variables. While the qualitative data contributes information on participants' perceptions of the impact of the intervention, the scope of the study, in addition to limitations in time and resources, did not allow for a detailed exploration of contextual factors.

3.28 Summary of Chapter Three

Research is not 'neutral' but reflects the researcher's own interests, values and assumptions which determine the subject of the research and influence the researcher's approach. In this research, the researcher has adopted a pragmatic approach and has selected research methods that appear to be the most efficient means of addressing the overarching research question.

This chapter has presented the mixed methods research design used in the current study and has provided details of the sample and how they were selected as well as details of the research settings. The research instruments and procedures used have been described as well as the methods used to analyse the quantitative and qualitative data. The content of the 'Learning Track' intervention has also been described. Issues related to reliability, validity and trustworthiness have been discussed. The chapter has also looked at the ethical issues raised by the research as well as the strengths and limitations of the current mixed methods study.

In the next chapter, the results of the quantitative phase of the study are presented.

Chapter Four

Quantitative Results

4.1 Overview of Chapter Four

This chapter presents the hypotheses being tested in the quantitative phase of the current study. The methods of data collection, demographic data and information on how the data were prepared for analysis are described. A descriptive analysis of the results will be presented followed by the inferential statistical analysis. The results of the inferential statistical analyses will be organised according to each of the hypotheses. The chapter will include the following sections:

i. Hypotheses for the quantitative phase

ii. Sample size and missing data

iii. Demographic data

iv. Preparation of data for statistical analysis

v. Descriptive analysis of the data

vi. Inferential statistical analysis of the data according to the hypothesis that each is testing

vii. Summary of results

4.2 Summary of Hypotheses Being Tested in Quantitative Phase

The quantitative data were collected in order to test the following hypotheses:

1. As a result of the 'Learning Track' intervention there will be a significant increase in incremental score over time for intervention group pupils but not for control group pupils

2. As a result of the 'Learning Track' intervention there will be a significant increase in scores reflecting a mastery goal orientation over time for intervention group pupils but not for control group pupils.

3. As a result of the 'Learning Track' intervention there will be a significant increase in cognitive reappraisal score over time for intervention group pupils but not for control group pupils.

4.3 Sample Size

166 pupils took part in the study (100 boys and 66 girls). 114 pupils were in the intervention group and 52 pupils were in the control group. The mean age of

participants was 10.4 (S.D 0.29). 166 pupils were present when the pre-test measures were taken and 163 pupils were present at post-test. Data from the 163 pupils present for both pre-and post-tests were used in the quantitative phase. Table 5 displays the numbers of participants by school, class and by condition at pre- and post-test.

Table 5

Number of Pupils in Study by School, Class and Condition at Pre- and Post-Test

Condition	School	Class	Pupils at Pre-test (n)	Pupils at Post-test (n)
Intervention	1	1	28	28
	1	2	29	29
	2	3	30	29
	2	4	27	27
Intervention Group Total (n)			**114**	**113**
Control	2	5	25	25
	1	6	27	25
Control Group Total (n)			**52**	**50**
Sample total (N)			**166**	**163**

The number of questionnaires that were completed pre and post-intervention is shown in Table 6.

Table 6

Number of Questionnaires Completed Pre-and Post-Intervention

Measure	Condition	Pre-test (n) (missing n)	Post-test (n) (missing n)
TCGM	Intervention	112 (2)	112 (1)
	Control	50 (2)	50 (0)
		162	**162**
ITS	Intervention	113 (1)	113 (0)
	Control	50 (2)	50 (0)
		163	**163**
ERQ-CA	Intervention	113 (1)	113 (0)
	Control	50 (2)	50 (0)
		163	**163**
MALS	Intervention	111 (3)	111 (2)
	Control	50 (2)	50 (0)
		161	**161**
MAS	Intervention	107 (7)	107(6)
	Control	48 (4)	48 (2)
		155	**155**

4.4 Missing Data

The missing data were due to incomplete questionnaires with a large number of missing data points which were removed from the study. A small number of pupils appeared to have responded with a set response, for example, ticking all 1s or all 5s on a measure and with contradictory responses. These were also removed from the study. The largest number of incomplete measures were for the MALS and MAS which were at the back of the booklet of measures and were longer than the other measures, containing 20 items each.

4.5 Demographic Data

Information was collected from the schools on the pupils' age, gender and ethnicity at the start of the project. An analysis of the demographic data was carried out in order to test for statistically significant differences between intervention and control groups on any demographic variable. In a non-equivalent groups design, where matching is not possible, the researcher is advised to use samples which are alike as possible (Cohen et al., 2007). The age, ethnicity and gender data is analysed in turn, first by school and then by condition. The purpose of this analysis for age, ethnicity and gender is to ensure that the samples from the two schools and the samples in the intervention and control groups are as similar as possible on demographic variables. A detailed analysis of demographic variables for the sample in the current study is provided in Appendix D.

The analysis of demographic data according to school indicates that there is not a statistically significant difference between the samples of children in the two schools on any of the three demographic variables collected. The demographic variables were also analysed by condition to find out if the intervention group and control group differed significantly on any of the variables. The analysis of demographic data carried out suggests that the samples of children in the intervention and control groups did not differ statistically significantly on age, ethnicity and gender variables (see Appendix D).

4.6 Preparation of Data for Statistical Analysis

Three pupils were absent for the post-test and their data were removed from the study. The interval level data were screened to identify outliers using boxplots in SPSS (Field, 2009). For the pre-test MAS, three pupils' scores were identified as outliers and on the post-test one pupil's score was identified as an outlier. As outliers can skew the data and influence the mean, the impact of the outliers was reduced by transforming the data. Extreme scores were adjusted to be one unit above the next highest score which is not an extreme score (Dancey & Reidy, 2007; Field, 2009). The data were analysed statistically using SPSS version 20

4.7 Descriptive Statistical Analysis

This section presents descriptive statistics for each of the dependent variables on the five measures used. The descriptive statistical analysis can suggest trends in the data. This descriptive statistical analysis begins with the categorical level data and proceeds to present the analysis for the interval level data. A summary table of descriptive statistical analysis of the interval level data is presented in Appendix D1. The inferential statistical analysis, in which analysis of statistical significance is carried out, is presented later. Further information on the statistical analysis can be found in Appendices D1 to D6.

4.7.1 Task Choice Goal Measure (TCGM): Descriptive Statistics. On the basis of the task choice made on the TCGM, pupils were categorised as displaying a mastery orientation or a performance orientation to learning. Table 7 shows the frequencies of pupils who made task choices relating to mastery or performance goal orientations on the pre- and post-tests.

Table 7

Frequencies and Percentages of Pupils Making Mastery or Performance Task Choices on TCGM

Condition	Pre Mastery Orientation n (%)	Post Mastery Orientation n (%)	Pre Performance Orientation n (%)	Post Performance Orientation n (%)
Intervention Group [a]	62 (55)	77 (69)	50 (45)	35 (31)
Control Group [b]	26 (52)	27 (54)	24 (48)	23 (46)
Total N (%)	88 (54)	104 (64)	74 (46)	58 (36)

a n= 112
b n = 50

Table 7 shows that there was an increase for pupils in both groups on the post-test for mastery goal orientation, the increase for the intervention group being greater. 15 intervention group pupils (or 13%) changed from having a performance goal orientation on the pre-test to a mastery goal orientation on the post-test. In the

control group one pupil (4%) changed from having a performance orientation on the
pre-test to a mastery orientation on the post-test. There was a corresponding decrease
for pupils in the intervention group on the post-test for performance goal orientation
and a slight decrease for the control group. Tables 8 and 9 show the cross-
tabulations for pre-and post-intervention task choices for the intervention and control
groups.

Table 8

Pre and Post Mastery and Performance Task Choices for Intervention Group

Pre-test Performance or Mastery	Post-test Performance or Mastery	
	Performance n (%)	Mastery n (%)
Performance	35 (31)	15 (13)
Mastery	0 (0)	62 (55)

Examination of the discordant pairs in the cross-tabulation for the intervention group
in Table 8 shows that 15 pupils in the intervention group changed from a
performance orientation on the pre-test to a mastery orientation on the post-test and 0
pupils changed from mastery to performance orientation. The discordant pairs in the
cross-tabulation for the control group in Table 9 shows that one pupil changed from
mastery to a performance orientation and two changed from performance to mastery
orientation from pre- to post-test.

Table 9

Pre and Post Mastery and Performance Task Choices for Control Group

Pre-test Performance or Mastery	Post-test Performance or Mastery	
	Performance n (%)	Mastery n (%)
Performance	22 (44)	2 (4)
Mastery	1 (2)	25 (50)

An inferential statistical analysis will be carried out in order to test for any statistical significance of the change in task choices. Descriptive statistics for the interval level data will next be presented.

4.7.2 Implicit Theories Scale (ITS): Descriptive Statistics. Table 10 presents descriptive statistics for the pre- and post-incremental mean scores on the ITS.

Table 10

Descriptive Statistics for Pre- and Post-ITS Score

Condition	N	Pre-test Mean (S.D)	Post-test Mean (S.D)
Intervention	113	3.93 (.61)	4.25 (.52)
Control	50	3.97 (.62)	3.96 (.55)
Total	163	3.94 (.61)	4.16 (.54)

Table 10 shows that the mean incremental score for the intervention group increases at post-test. The results for the control group remain relatively stable from pre- to post-test.

4.7.3 Myself-As-Learner Scale (MALS): Descriptive Statistics. Descriptive statistics for the MALS scale are shown in Table 11

Table 11
Descriptive Statistics for Pre- and Post-MALS Score

Condition	N	Pre-test Mean (S.D)	Post-test Mean (S.D)
Intervention	111	75.99 (10.72)	76.77 (10.21)
Control	50	73.98 (12.58)	73.94 (11.27)
Total	162	75.36 (11.33)	75.89 (11.01)

The results in Table 11 show that there is little change in mean score from pre- to post-test for the intervention or control groups on the MALS.

4.7.4 Sense of Mastery Scale (MAS): Descriptive Statistics. Table 12 displays the descriptive statistics for the MAS scores for the intervention and control groups

Table 12

Descriptive Statistics for Pre-and Post-MAS Score

Condition	N	Pre-test Mean (S.D)	Post-test Mean (S.D)
Intervention	107	47.16 (7.61)	46.97 (7.78)
Control	48	44.96 (10.06)	45.44 (8.90)
Total	155	46.48 (8.48)	46.50 (8.15)

Table 12 shows a decrease in mean score on the post-test for the intervention group and an increase in mean score on the post-test for the control group.

4.7.5 Emotion Regulation Questionnaire for Children and Adolescents (ERQ-CA) Cognitive Reappraisal Scale: Descriptive Statistics. Table 13 presents descriptive statistics for the cognitive reappraisal scores on the ERQ-CA for intervention and control group pupils.

Table 13

Descriptive Statistics for Cognitive Reappraisal Score on Pre- and Post- ERQ-CA

Condition	N	Pre-test Mean (S.D)	Post-test Mean (S.D)
Intervention	113	3.62 (.63)	3.89 (.59)
Control	50	3.41 (.80)	3.46 (.64)
Total	163	3.56 (.69)	3.76 (.64)

Table 13 shows that the intervention group's mean scores are higher at pre and post-test than the control group's. Both groups' scores increase on the post-test, the increase for the intervention group being greater.

4.8 Summary of Descriptive Statistical Analysis

The preceding section has presented descriptive statistics for each of the five measures pre-and post-intervention. Some initial observations have been made regarding trends in the data. The next section will present the inferential statistical analysis of the data from the five measures.

4.9 Inferential Statistical Analysis

To analyse the change in mean scores for the measures producing interval level data, four mixed ANOVAs were carried out with Condition (intervention or control group) as the between-subjects factor and Time (pre-test or post-test) as the within-subjects factor so that group differences and changes across time in the pupils' scores could be analysed.

4.10 Assumptions of Parametric Tests

For parametric tests it is assumed that the data is normally distributed, the variances are the same throughout the data, data should be measured at least at the interval level and data from different participants are independent (Field, 2009).

Tests of normality and homogeneity of variance were carried out on pre- and post-data. As the analysis involves comparing groups, the distribution within the intervention and control groups was examined using the Kolmogorov-Smirnov test (Field, 2009). If this is significant at $p < 0.05$ this means that the distribution is not normal. Homogeneity of variance was assessed for the sample as a whole using Levene's test.   Box's test of homogeneity of co-variance matrices was also assessed as an assumption for mixed ANOVA. The data relating to assumptions for the mixed ANOVA are displayed in Appendix D3

. The level of significance has been set at $p < 0.05$ as this is considered an acceptable threshold. Effect sizes will be reported along with this statistic. The effect size reported for the mixed ANOVA is partial $\eta^{2.}$ The effect size statistic can be interpreted in the following way: .01 is a small effect size, .09 is a medium effect size and .25 is a large effect size (Cohen, 1988). The inferential statistical analysis will be presented according to each of the three hypotheses. The purpose of the analysis is to consider whether any of the experimental hypotheses may be supported.

Table 14 presents a summary of the main effects and interaction effects found for the two-way mixed ANOVAs.

Table 14:

Summary table of two-way mixed ANOVA main effects and interaction effects.

Measure	Effect	F(df)	*p*	partial $\eta^{2.}$
ITS	**Main effect of Time**	21.78 (1,161)	.01*	.12
	Main effect of Condition	1.83 (1,161)	.18	.01
	Time x Condition interaction effect	24.71 (1,161)	.01*	.13
MALS	**Main effect of Time**	1.95 (1,159)	.16	.01
	Main effect of Condition	1.66 (1,159)	.20	.01
	Time x Condition interaction effect	2.39 (1,159)	.12	.02
MAS	**Main effect of Time**	.09 (1,153)	.77	.01
	Main effect of Condition	1.9 (1,153)	.17	.01
	Time x Condition interaction effect	.46 (1,153)	.50	.01
ERQ-CA Cognitive reappraisal scale	**Main effect of Time**	27.62 (1,161)	.01*	.15
	Main effect of Condition	9.01 (1,161)	.01*	.05
	Time x Condition interaction effect	14.11 (1,161)	.01*	.08

*significant at
<.05

Where significant main effects and interaction effects were found, and in line with the experimental hypotheses, further repeated measures ANOVAs were carried out on the ITS and ERQ-CA cognitive reappraisal data to examine the simple effect of time on incremental score and cognitive reappraisal score at each level of condition (that is, being in the intervention group or the control group). Table 15 provides a summary of the results.

Table 15*:*

Summary table of simple effect of time from repeated measures ANOVAs for ITS and ERQ-CA

Measure	Condition	Pre-test M (S.D)	Post-test M	F (df)	*p*	partial $\eta^{2.}$
ITS	**Intervention**	3.93 (.61)	4.25 (.52)	75.61 (1,112)	.01*	.34
	Control	3.97 (.55)	3.96 (.55)	.04 (1,49)	.75	.01
ERQ-CA cognitive reappraisal scale	**Intervention**	3.62 (.63)	3.89 (.59)	66 (1,112)	.01*	.37
	Control	3.41 (.80)	3.46 (.64)	.80	.37	.02

*significant
at <.05

Tables 14 and 15 have provided summary information of the results from the two-way mixed and repeated measures ANOVAs. The results of the inferential statistical analysis are now presented according to each of the experimental hypotheses.

4.11 Hypothesis One

> ***As a result of the 'Learning Track' intervention there will be a significant increase in incremental score over time for intervention group pupils but not for control group pupils***

Hypothesis one was tested using the ITS which produced an incremental mean score.

4.11.1 ITS: Inferential Statistical Analysis. The difference in ITS mean scores

was analysed using a two-way mixed analysis of variance (ANOVA).   There were two independent variables; the within-subjects factor of time and the between subjects factor of condition. There was a violation of the assumption of normality on the intervention group's pre- and post-ITS scores. Box's test was significant, $p <$ .001, indicating a violation of the assumption of equality of co-variance matrices,

therefore the Greenhouse-Geisser correction was used. Main effects will be presented initially followed by interaction effects.

There was a significant main effect of time on incremental score, $F(1,161) = 21.78$, $p = .01$, partial $\eta^2 = .12$. There was no significant main effect of condition on incremental score, $F(1,161) = 1.83$, $p = .18$, partial $\eta^2 = .01$.

There was a statistically significant interaction between condition and time on incremental score, $F(1,161) = 24.71$, $p = .01$, partial $\eta^2 = .13$, indicating that being in either the intervention or control group has a differential effect on incremental score over time. Further analyses were carried out to determine the simple effects of the within-subjects factor of time at each level of condition (intervention or control) on mean incremental score

Two repeated measures ANOVAs were carried out to analyse the effect of time on the intervention and control groups' scores. A statistically significant effect of time was found between pre-test ($M = 3.93$, S.D $= .61$) and post-test ($M = 4.25$, S.D $= .52$) for the intervention group , $F(1,112) = 75.61$, $p = .01$, partial $\eta^2 = .34$, but not between pre-test ($M = 3.97$, S.D $= .55$) and post-test ($M = 3.96$, S.D $= .55$) for the control group, $F(1,49) = .04$, $p > .75$, partial $\eta^2 = .01$

4.12 Hypothesis Two

As a result of the 'Learning Track' intervention, there will be a significant increase in scores reflecting mastery goal orientation over time for intervention group pupils but not for control group pupils.

 Hypothesis two was tested using three measures: the MALS, MAS and TCGM. Results for each of these measures are presented below.

4.12.1 MALS: Inferential Statistical Analysis. The intervention group's post-test scores did not meet the assumption of normality. Levene's test was significant on the post-test, $p = .04$.   A two-way mixed ANOVA was conducted to see if there was an interaction between time and condition on mean MALS score. The main effects will be reported followed by interaction effects.

No statistically significant main effect of time was found, $F(1,159) = 1.95$, $p = .16$. No statistically significant main effect of condition was found, $F(1,159) = 1.66$, $p = .20$. No statistically significant interaction effect between condition and time was found, $F(1,159) = 2.39$, $p = .12$.

4.12.2 MAS: Inferential statistical analysis. A two-way mixed ANOVA was carried out. The assumption of homogeneity of variance was violated on the pre-test MAS. Box's test of equality of covariance matrices was significant, $p < .01$, therefore the Greenhouse-Geisser correction was used. No statistically significant main effect of time was found, $F(1,153) = .090$, $p = .77$. No statistically significant main effect of condition was found, $F(1,153) = 1.9$, $p = .17$. No statistically significant interaction between condition and time was found for MAS score, $F(1,153) = .46$, $p = .50$.

4.12.3 TCGM: Inferential Statistical Analysis. As the data are categorical, McNemar's test was used to determine if there are differences in the change in task choices over time between the intervention and control groups. It was found that the proportion of mastery oriented task choices on the pre- and post-tests is statistically significantly different for the intervention group, McNemar's test statistic $(df1) = 13.07$, exact $p = .01$, but not for the control group, exact $p = 1.0$.

4.13 Hypothesis Three

> ***As a result of the 'Learning Track' intervention there will be a significant increase in cognitive reappraisal score over time for intervention group pupils but not for control group pupils.***

Hypothesis three was tested using the ERQ-CA cognitive reappraisal scale.

4.13.1 ERQ- CA Cognitive Reappraisal Scale: Inferential Statistical Analysis. A two-way mixed ANOVA was carried out to see if there is a significant interaction effect between time and condition on cognitive reappraisal score. The data were normally distributed except for the intervention group on the pre-test, $p = .01$. The main effects will be reported followed by the interaction effect. A statistically significant main effect of time was found, $F(1,161) = 27.62$, $p = .01$, partial $\eta^2 = .15$. A statistically significant main effect of condition was found, $F(1,161) = 9.01$, $p = .01$, partial $\eta^2 = .05$. There was a statistically significant interaction between time and condition on incremental score, $F(1,161) = 14.11$, $p = .01$, partial $\eta^2 = .08$. This indicates that being in either the intervention or control group has a differential effect on cognitive reappraisal score over time.

Further analyses were carried out to investigate the simple effect of the within-subjects factor of time at each level of condition. Two repeated measures ANOVAs were carried out to analyse the simple effect of time on cognitive reappraisal score for the intervention and control groups. For the intervention group, a statistically significant effect of time between pre-test (M = 3.62, S.D = .63) and post-test (M = 3.89, S.D = .59) was found on cognitive reappraisal score, $F (1,112) = 66$, $p = .01$, partial $\eta^2 = .37$. For the control group, no statistically significant effect of time between pre-test (M = 3.41, S.D = .80) and post-test (M = 3.46, S.D = .64) was found on cognitive reappraisal score, $F (1,49) = .80$, $p = .37$.

4.14 Summary of Findings for the Quantitative Phase

The results of the inferential statistical analysis relating to the experimental hypotheses for the quantitative phase of the study suggest the following:

- A statistically significant effect of time was found for the intervention group's incremental scores. No statistically significant effect of time was found for the control group's incremental scores. These results provide some support for experimental hypothesis one.
- No statistically significant main effects of time or condition or of interaction between condition and time were found on the MALS. Support is not provided from MALS scores for hypothesis two.
- No statistically significant main effects of time or condition or of interaction between condition and time were found on the MAS. Support is not provided from MAS scores for hypothesis two.
- A statistically significant difference was found in the proportion of intervention group pupils making mastery-oriented task choices on the TCGM before and after the intervention. A statistically significant difference was not found in the proportion of control group pupils making mastery-oriented task choices on the TCGM before and after the intervention. This provides some support for experimental hypothesis two.
- A statistically significant effect of time was found for the intervention group's cognitive reappraisal scores. No statistically significant effect of time was found for the control group's cognitive reappraisal scores. This provides some support for experimental hypothesis three.

4.15 Summary of Chapter Four

Chapter Four has presented the descriptive and inferential analysis and the results from the quantitative phase which examined the impact of the intervention on pupils' scores on measures of incremental theory, mastery goal orientation and cognitive reappraisal in order to find out if any of the three experimental hypotheses could be supported. These results, along with study limitations, will be integrated with the qualitative findings and discussed further in Chapter Six in order to seek to answer the overarching research question. In the next chapter the findings from the qualitative study will be presented which will explore pupils' and teachers' perceptions of the impact of the intervention.

Chapter Five

Qualitative Phase of the Study

5.1 Overview of Chapter Five

This chapter presents the key qualitative findings obtained from 113 questionnaires completed by Year 5 pupils (60% boys, 40% girls, mean age 10.4 years) who had received the intervention and from questionnaires completed by the four teachers of the intervention classes. The pupil and teacher questionnaires were completed in the whole class setting, along with the other quantitative post-test measures, and included both closed and open-ended items (Appendices B13 and B14).

The qualitative data were collected in order to answer the follow exploratory research question:

What are the reported perceptions of pupils and teacher of the impact of the 'Learning Track' project?

The findings from this qualitative phase will be merged with the results from the quantitative phase in the next chapter in order to seek to answer the overarching research question.

Following is a summary of the qualitative method used, which was outlined in more detail in Chapter Three, and a presentation of the main findings with details that support and explain each finding. Illustrative quotations taken from pupil and teacher questionnaires aim to portray participant perspectives. An attempt has also been made to find evidence from the questionnaires that may contradict or disconfirm the main findings.

5.2 Data Analysis

Data were analysed using thematic analysis. The approach suggested by Braun and Clarke (2006) was followed. The process of thematic analysis is iterative and it involves being immersed in the data and searching across the whole data set for recurring patterns as well as checking that themes developed are coherent, consistent and distinctive.   The researcher initially searched for recurring patterns inductively, so that the themes identified are related to the data themselves rather

than to the overarching research question. A brief outline of the procedure used is outlined below.

1. Familiarisation with the data and preparation of the data for analysis. The written questionnaire answers were transcribed verbatim.
2. Generating initial codes
3. Searching for themes
4. Reviewing themes
5. Defining and naming themes
6. Final analysis

A check on the reliability of the researcher's final themes was carried out using inter-rater reliability. A sample of the transcript was given to a psychologist colleague to code using the descriptors developed by the researcher. The inter-rater reliability was found to be 88% (Appendix C8).

5.3 Research Findings from the Qualitative Phase

Regarding their overall perceptions of the impact of the intervention, a majority of pupils reported that the intervention had helped them with their learning (92%) and with their emotions (76%). All four teachers stated that they would recommend the intervention to another teacher. The main findings from the data analysis which are relevant to the exploratory research question for the qualitative phase are presented below.

The researcher drew from the thematic analysis four major themes from this phase of the study regarding pupils' and teachers' perceptions of the impact of the 'Learning Track' intervention. They are presented below in order of their prevalence within the data set. Prevalence has been determined by the frequency of a theme within the entire data set (see Appendix C6). The figures cited represent the relative importance of each theme as a percentage of all responses made by pupils across the data set. These themes were also identified within the teacher responses, however, prevalence in terms of percentage of teacher responses is not given as the sample of teachers was very small (four). The four major themes identified by the researcher are:

- Self-calming: keeping calm and controlling emotions (44% of pupil responses)

- Incremental theory: believing they can improve or get better; the impact of learning new facts (22% of pupil responses)

- Mastery goal orientation: effort, persistence, use of learning strategies (21% of pupil responses)

- Thinking: using thinking strategies to feel better (5% of pupil responses)

5.4 Thematic Maps for Each Main Finding

Three thematic maps were developed from the research findings. The use of self-calming emotion regulation and using thinking strategies for emotion regulation were collapsed into one thematic map relating to the use of emotion regulation strategies in general. The use of different colours in each thematic map represents the different codes identified by the researcher. Each thematic map is followed by examples of quotations from study participants.

5.4.1 Thematic map for incremental theory of ability. The thematic map produced for the finding regarding incremental theory of ability is presented in Figure 4.
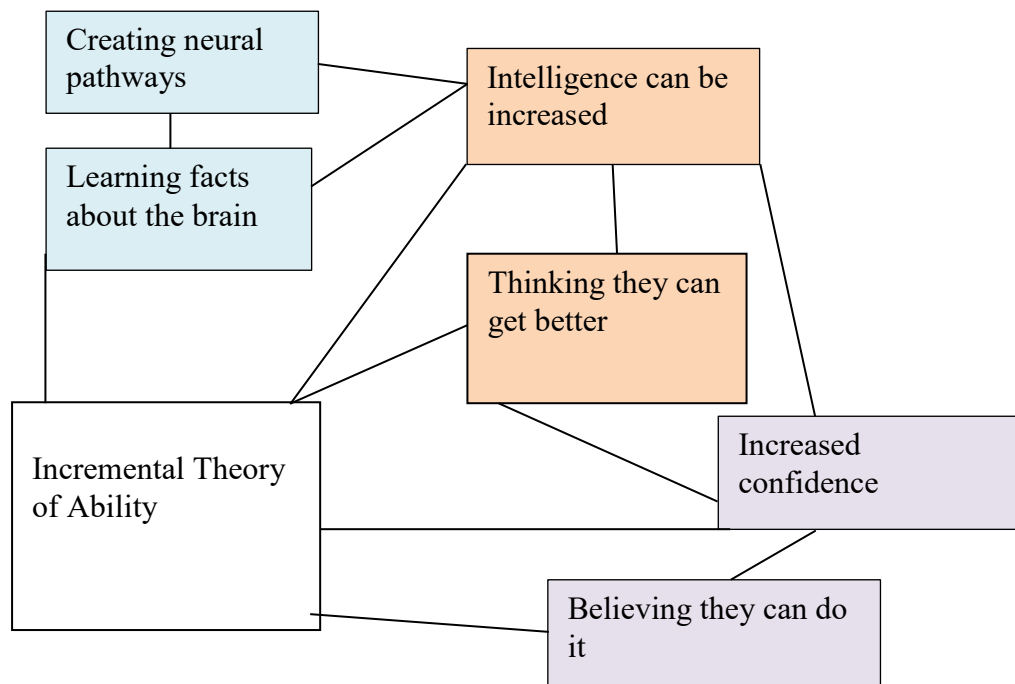
Figure 4: Thematic Map for Incremental Theory of Ability

One aim of the intervention was to foster an incremental theory of ability, according to which intelligence is a malleable, dynamic quality that can be increased (Dweck, 2000). The researcher found this theme in 22% of all pupil responses. Pupils reported that the intervention had helped them with their learning through thinking positive thoughts about learning and thinking they can get better. For example, one pupil wrote*:* "It made me feel I can get better at things which helped me get better" (Class 1 pupil). Another pupil wrote: "Because it has helped me get smarter and more confident" (Class 1 pupil).

The intervention included information about how the brain learns. Some pupils mentioned that the facts they had learnt about the brain had been helpful: "It has helped me to learn a lot and to know how the brain works" (Class 4 pupil); "It has showed me how my brain works" (Class 3 pupil) and *"*They taught me that you can create pathways to learn better" (Class 3 pupil). Similarly, reflecting on how the intervention had had an impact on her practice, one teacher noted, "I mention the pathways and the importance of practice" (Class 4 teacher). Responding to whether she had noticed children putting into practice any strategies learnt through the intervention, the same teacher commented: "A couple of times, when I've been

nagging my lower attaining maths group to practise, children have mentioned the 'pathways' ".

There were a number of mentions of increased confidence in the pupils' responses which could reflect an incremental theory of ability, such as: "I have gone more confident and I know more information about the brain" (Class 2 pupil). Another pupil commented, "It helped me because it helped me to learn and be confident" (Class 1 pupil) and: "It has made me more confident to learn and I have learnt some facts" (Class 3 pupil). One teacher also mentioned having noticed increased confidence as an impact of the intervention, albeit during the sessions themselves: "I noticed that during the sessions, children who wouldn't usually contribute did so with more confidence" (Class 1 teacher). When asked if the intervention had had an impact on their practice in the classroom, one teacher commented: "Encouraging children…to have a 'can do' approach to learning" (Class 3 teacher). The belief that they can 'do it' was seen in a number of pupils' responses. For example, a pupil reported that they could feel better when facing difficult work or a test through: "thinking I can do it" (Class 1 pupil). Other examples include: "I think 'I can do this. I have been practising.'" (Class 4 pupil) and: "It helps me think I can do it" (Class 2 pupil). When considering how they might advise a younger child, one pupil reported: "Just believe that you can do it" (Class 2 pupil). Another pupil wrote: "Do not think you can't do it" (Class 3 pupil); and "You know you have got it in you. Never say you can't do it" (Class 1 pupil).

5.4.2 Thematic map for mastery goal orientation. A thematic map for the findings relating to mastery goal orientation is presented in Figure 5.
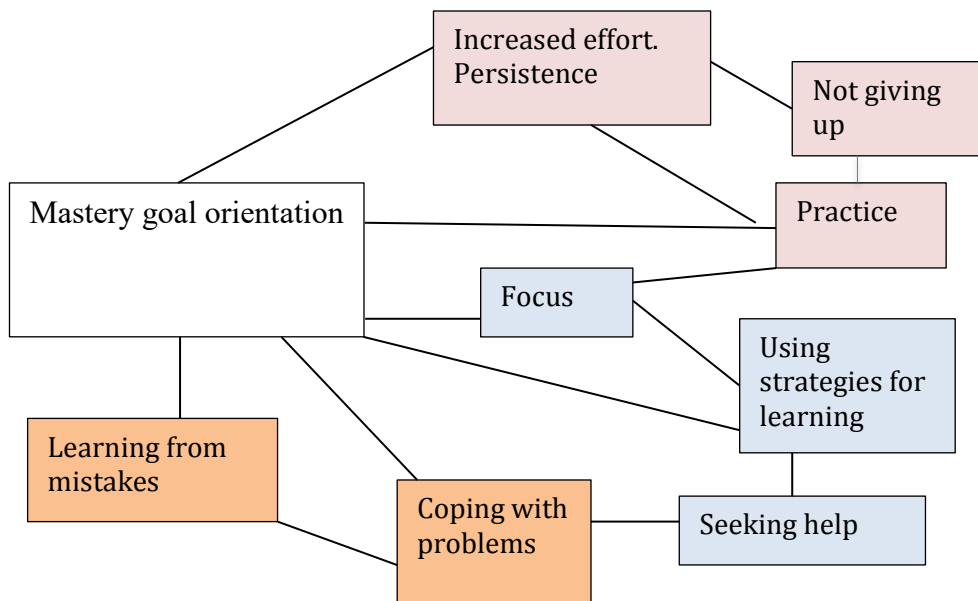
Figure 5: Thematic Map for Mastery Goal Orientation

An aim of the intervention was to foster a mastery goal orientation to
learning, where the focus is on overcoming obstacles and finding strategies for
learning (Dweck, 2000).   The researcher found the theme of mastery, including
effort, persistence, practice and use of strategies, in 21% of all pupil responses. For
example, one pupil wrote: "Yes, because it has encouraged me to do more work in
school" (Class 4 pupil). Another class 4 pupil wrote: "Now I understand how the
brain works, I will keep on practising until it's perfect".   Pupils also mentioned
having learnt ways of coping with problems, such as: "The techniques have helped
me cope with pressure and hard problems" (Class 3 pupil). When asked about how
to feel better when facing challenging work, pupils' responses included a focus on
persistence, such as: *"*Keep trying or learn from your mistakes…" (Class 2 pupil).
Another pupil wrote*:* "Try my best, keep on trying and don't give up" (Class 3
pupil).   When thinking about advising a younger child, one pupil wrote: "Say just
practise and you'll get better, I tried that and it helped." (Class 1 pupil). Another
responded: "Try and try again do not think you can't do it" (Class 2 pupil).
Another pupil wrote: "Keep on trying, don't give up, keep practising!" (Class 2
pupil).   Other responses were: "Practice makes perfect. Everybody makes mistakes.
Just keep on trying" (Class 3 pupil) and "If you get bad marks just keep on trying"

(Class 4 pupil). Such responses stress effort, practice and strategy use, which are features of a mastery orientation to learning.

One teacher agreed (through ticking a box) that she had seen a change in the pupils' effort, persistence and engagement on challenging tasks as a result of the intervention (Class 2 teacher). One teacher commented that the project had had an impact on her practice through: "Encouraging the children not to give up…" (Class 3 teacher). Another commented that, as a result of the intervention, she mentioned the importance of practice to the children (Class 4 teacher).

The pupils' responses also mentioned using strategies to help cope with challenges, such as: "I make me do it step by step" (Class 1 pupil) and: "I try to think really hard and sometimes I need to focus a bit better" (Class 2 pupil). These ideas were also present in pupil responses to the question of how to feel better when facing a test. For example, one pupil wrote: "I try to remember how I worked out the questions on the last test, I also try to remember what we have learnt" (Class 4 pupil). Another wrote: "I remember all the hard work I've done" (Class 1 pupil). Another pupil responded: "I can think about things that I do know" (Class 2 pupil).

A number of pupils' responses indicated more of a performance approach goal orientation, which entails an emphasis on the outcome of a task, rather than a mastery goal orientation (Pintrich, 2000). For example, when considering how to feel better when taking a test, the following responses were made: "Don't think you are going to fail, think positive" (Class 1 pupil). Another wrote: "You can say to yourself 'I'll get full marks'" (Class 2 pupil). One pupil said that they would advise a younger child: "If you try your best you'll get brilliant marks" (Class 3 pupil). Here, the focus appears to be, therefore, on the outcome or the performance, rather than incremental improvement. Two respondents mentioned praying when facing a test, "I pray God" (Class 1 pupil) and another pupil wrote: "I take deep breaths and pray to God so He will help me" (Class 2 pupil), which may suggest reliance on factors outside of the pupils' control.

Some pupils commented that the intervention had not helped with their learning, for example, "I feel that the learning track has helped me, but not with learning. It has helped me understand to calm." and "No, because I have not learnt about maths, English, etc, but it's helped me deal with my temper".

5.4.3 Thematic map for use of emotion regulation strategies. When the four
main findings were presented above in terms of prevalence within the data set it was
found that the use of self-calming techniques, particularly controlled breathing, was
the most prevalent finding among the pupils' perceptions of the outcome of the
intervention. The use of thinking to regulate emotions was identified by the
researcher as a theme, but was the least prevalent of the four main themes within the
data set. As both of these strategies are emotion regulation strategies, a thematic
map which incorporates the codes for both types of emotion regulation strategy,
as well as an additional code relating to feeling more positive emotions as a result of
the intervention, is presented in Figure 6.
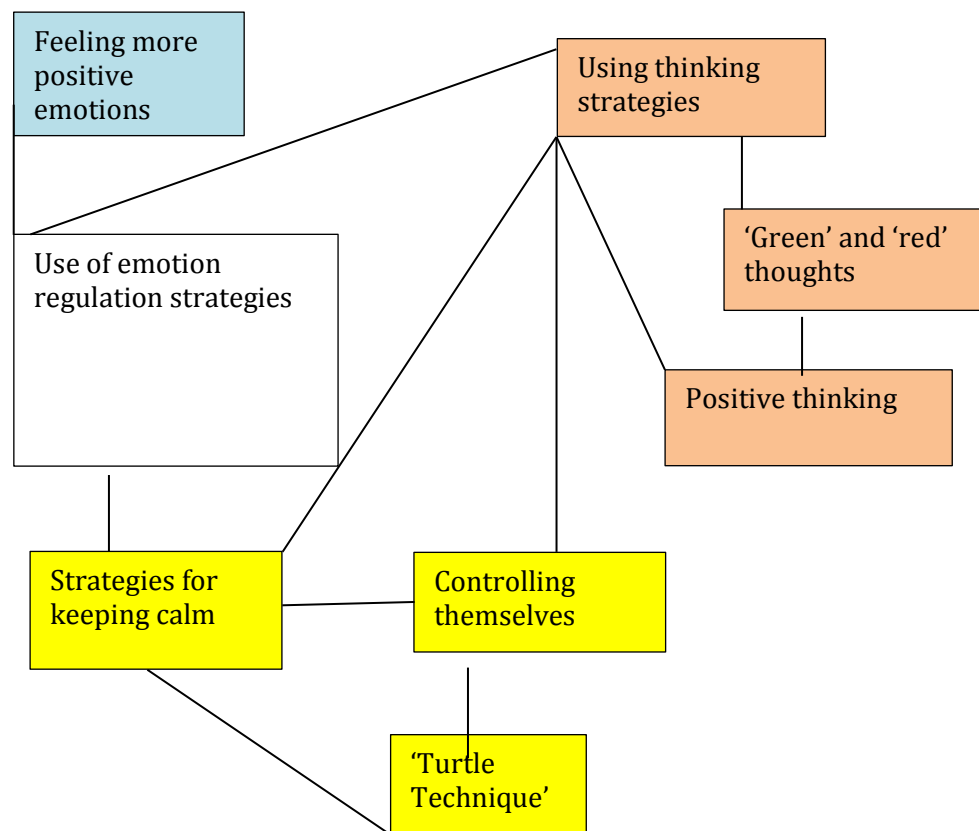
Figure 6: Thematic Map for Use of Emotion Regulation Strategies

An aim of the intervention was to help develop pupils' strategies for
regulating their emotions, including an antecedent strategy, cognitive reappraisal
(Gross & Thompson, 2007) and a response-focused strategy, controlled breathing
(Koole, 2009). When explaining how the intervention had helped with their
learning, the majority of responses mentioned that the intervention had helped with
regulating their emotions, particularly self-calming techniques such as controlled

breathing.   Responses related to self-calming occurred in 44% of pupil responses and were the most prevalent among the data set. Examples of responses include : "It has helped me a lot because it has told us about calming down techniques" (Class 1 pupil). Another wrote that the intervention had helped "because when I feel worried or angry in school I can use a technique I learnt" (Class 3 pupil). Similarly, when considering how the intervention had helped with their emotions, most pupils who responded mentioned strategies for keeping calm, such as: "In a way, because after learning that it was easier to cope with my feelings" (Class 3 pupil). Another pupil wrote: "Because I have learnt new ways to calm down my behaviour" (Class 1 pupil). A Class 2 pupil wrote: "It controls my anger and I know how to stop my anger". Another child wrote: "Because I have learnt different strategies to control myself" (Class 4 pupil). A Class 1 pupil responded: "I especially liked how we could learn to find different ways of calming down and getting less stressed."

Specific mention of the controlled breathing strategy (or 'turtle technique') was made in a number of responses. Examples include: "I really liked the turtle technique – it helped me control my feelings" (Class 3 pupil). Another pupil wrote: "It has helped me because I use the turtle technique when I get upset" (Class 4 pupil). Another pupil responded: "It has helped me that when I get scared I can use the turtle technique to make me more calm" (Class 3 pupil). The controlled breathing technique was also mentioned when pupils considered what they could do to feel better when facing difficult work, for example, "When I find work difficult I use the turtle technique" (Class 2 pupil). Another pupil wrote: "I try to relax myself so I can focus on the question by counting to 10 or using the turtle technique" (Class 3 pupil). Another pupil responded: "I could take a deep breath and try not to get too nervous or then I will lose concentration" (Class 2 pupil). This comment demonstrates an understanding of the impact of emotions on the learning process through their impact on cognitive resources (Pekrun & Stephens, 2009).

A smaller number of pupils' responses made specific mention of strategies for thinking to control their emotions. This theme was found in 5% of pupil responses. Example include: "By enabling me to think" (Class 1 pupil) and " I can use more green thoughts" (Class 1 pupil). When considering ways to feel better when facing challenging work or tests pupils mentioned using their thinking, for example, "I can think positively and think more green than red thoughts" (Class 4 pupil); "Have thoughts in your mind that you can do it and you won't give up"

(Class 2 pupil); "When I have a test, I make all my red traffic light thoughts go and let the green ones in" (Class 4 pupil) and "I remember not to get high on my red traffic light thoughts" (Class 4 pupil).

A number of pupils also mentioned using their thinking to feel positive, for example, "Make sure my feelings don't take over my thinking brain" (Class 1 pupil); "Keep practising having happy thoughts" (Class 2 pupil); "Having positive thoughts" (Class 1 pupil) ; "I say comforting thoughts in my head" (Class 3 pupil) . A number of pupils' responses as to how they would advise a younger child also mention thinking techniques, for example, "Tell him to think positive" (Class 1 pupil); "Have positive thoughts"; "Cheer up it's just a test" (Class 3 pupil) and "Think of something nice to fresh their brains" (Class 3 pupil).   Some pupils' responses also reflect an understanding of the impact of positive emotions on learning (Fredrickson, 2001) such as: "I would tell him if you are sad you are not going to do as much work but if you are happy you will do more work" (Class 1 pupil) .

An additional finding was that some pupils' responses indicated feeling more positive achievement emotions, or fewer negative achievement emotions, as a result of the intervention, for example, "It makes me feel happy in my work" (Class 1 pupil) ; "It helped me because it gave me courage and made me feel better" (Class 3 pupil); "It helps me work in peace" (Class 1 pupil); "It helps me a lot and I don't need to worry much anymore" (Class 2 pupil) and " It helped me understand how feelings form and how you can overcome sadness, etc" (Class 3 pupil). These effects can possibly be linked with previous findings from empirical research on the links between achievement goal orientation and emotion (Linnenbrink, 2007; Pekrun et al., 2007) as one aim of the current research was to promote a mastery goal orientation.

On the other hand, some pupils commented that the intervention had not helped with managing strong feelings, for example, "No, because if I am frustrated nothing would calm me down" (Class 1 pupil); "No, it hasn't because my feelings are too strong" (Class 1 pupil); "No – because I still can't control my emotions" (Class 4 pupil). Others responded that there had not been a difference, for example, "No, because I had my own way" (Class 2 pupil); "Not really because I didn't have a problem with controlling my emotions before (Class 3 pupil)".

Among teachers' responses, two teachers agreed that they had noticed changes in the pupils' ability to manage their emotions as a result of the intervention

(Class 2 teacher and Class 3 teacher).   The teachers of classes 1 and 3 agreed that they had noticed a change in how they speak to pupils about their emotions in the classroom.   Both antecedent and response-focused strategies appear to be present in teachers' responses. When considering whether the intervention had given them an opportunity to reflect on how they viewed learning and emotions, one teacher commented, "Reminded me of the different techniques that children can employ to calm down or ways of thinking to feel more positive when struggling/stressed" (Class 3 teacher).   Another teacher noted ,"Yes, encouraging turtle technique. Reminding children of positive mind track - I could learn from this too " (Class 4 teacher). These comments reflecting teachers' perceptions of the impact of the intervention on their practice in the classroom indicate that, while not an explicit aim of the current study, there may also have been an impact of the intervention on the learning environment.

5.5 Summary of Findings for the Qualitative Phase

This chapter has presented the four qualitative findings identified by the researcher through the process of thematic analysis. Data from the pupil and teacher questionnaires provided information regarding participants' perceptions of the impact of the intervention. Samples of quotations from participants have been included. By using the pupils' and teachers' own words the researcher has aimed to build the confidence of the reader by aiming to represent the reality of the persons and situations studied (Bloomberg and Volpe, 2012).

The primary finding of the qualitative aspect of the study indicated that pupils perceived that the intervention had had an impact on their ability to regulate their emotions. In particular, pupils mentioned that they had learnt ways to keep calm, especially the controlled breathing technique. This finding was identified in the descriptions across 44% of all pupil responses of how the intervention had helped them with their learning and their emotions. It was also found in three of the teachers' responses.

The second finding, identified across 22% of responses, was that pupils perceived that the intervention had had an impact on their confidence and the belief that they can improve, which the researcher has linked to an incremental theory of ability. Two of the teachers also mentioned either noticing increased confidence in the pupils or that they had noticed pupils talking about the "pathways" when

learning, implying an understanding of the incremental way in which the brain learns.

The third finding, identified across 21% of responses, was that pupils perceived that the intervention had had an impact on their mastery orientation, including effort and persistence and use of learning strategies. The theme of mastery was also identified in all four of the teachers' responses regarding the impact of the intervention.

The fourth finding, identified across 5% of responses, was the pupils' perception that the intervention had had an impact on their ways of thinking in order to feel better in learning situations (or cognitive reappraisal). Two of the teachers also referred to the idea of using thoughts to influence emotions as one impact on their own practice.

An additional finding that was identified from the data was the perception among some pupils that the intervention had led to the experience of more positive emotions related to learning.

The above findings from the qualitative phase will be merged with the quantitative results presented in Chapter Four. These will be discussed further in Chapter Six in order to seek to answer the overarching research question. In addition, alternative explanations for the findings will be considered along with a discussion of the strengths and limitations in the study's design. Links will also be made with the relevant literature and research reviewed in Chapter Two.

Chapter Six

Discussion

6.1 Overview of Chapter Six

The aim of the present mixed methods study was to investigate the impact of a whole-class intervention designed to promote emotion regulation for learning. The study was carried out in order to attempt to address a gap in empirical research on how to promote emotion regulation for learning in 'real world' classroom contexts. In this chapter, findings from the quantitative phase of the research and from the qualitative phase will be merged in order to answer the following overarching research question via a mixed method design:

Can a whole class intervention which combines promotion of an incremental theory of ability and a mastery goal orientation along with emotion regulation strategies have an impact on 9-10 year-old pupils' emotion regulation for learning?

In addition to merging the findings from the quantitative and qualitative phases of the study, the findings will be considered in more depth in order to evaluate their internal and external validity and their credibility. Furthermore, the ways in which these findings correspond with expectations from previous literature and research is also explored. Drawing on observations from the present study, the researcher considers how the findings contribute to addressing the noted gap in research on the topic and how they contribute to the wider literature on developing children's emotion regulation for learning. The researcher also considers the role of E.Ps in supporting whole-class interventions in schools and in carrying out research on ways of enhancing all children's learning.

The chapter is organised as follows: the main aims of the study are reiterated along with the conceptual framework for the intervention. This is followed by a summary and integration of the main findings from the quantitative and qualitative phases of the study. The strengths and limitations of the current study are discussed and these include a critical evaluation of the different research methods used and consideration of alternative explanations for the results.. The chapter concludes with implications of the study for school professionals and E.Ps.

6.2 Aims of the Study

The main aim of this study was to develop emotion regulation for learning in a sample of 9-10-year old pupils. The study was informed by a social-cognitive perspective which incorporates the idea of personal agency, in that individuals possess self-beliefs that enable them to exercise a measure of control over their thoughts, feelings and actions (Bandura, 1986). The conceptual framework for the intervention was based on principles derived from inter-related theory and research in the domains of self-regulated learning and emotion regulation, achievement emotions, achievement goal orientation and self-theory (see Figure 7).
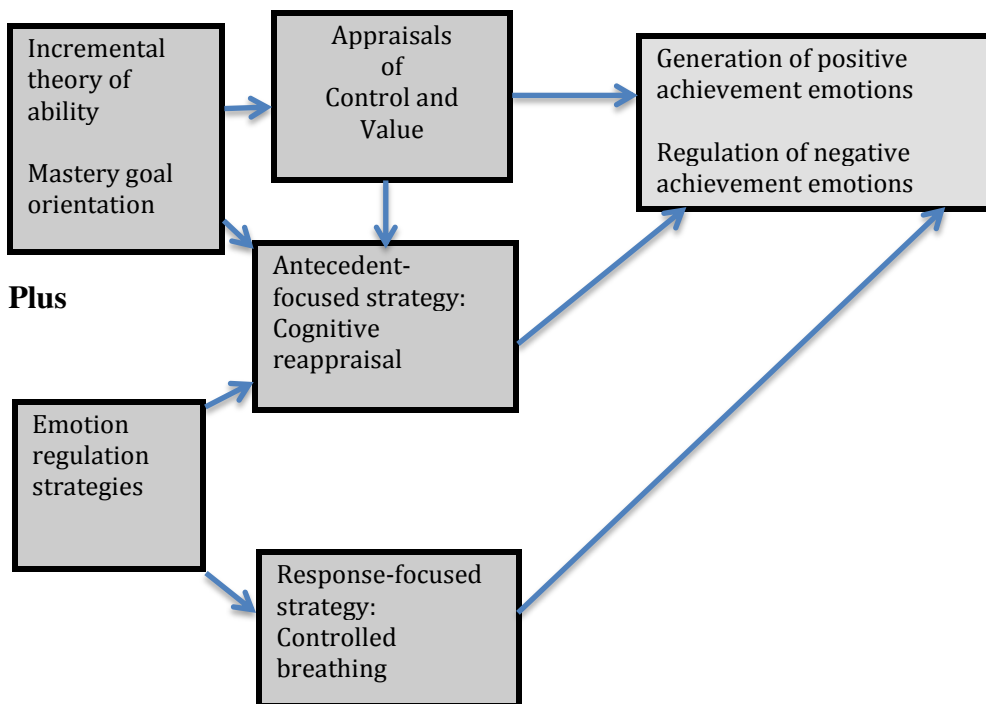
Figure 7: *Conceptual Framework for the Intervention*

The control-value theory of achievement emotions (Pekrun, 2006; Pekrun et al., 2007) provided a framework that integrated the emotional and motivational processes involved in learning situations. This theory explains the influences of self-beliefs and learning goals on the appraisal processes involved in emotion generation. Research into implicit theories of ability and their link with learning goal orientation (Blackwell, et al., 2007; Dweck, 2000) provided an insight into ways in which

learners' self- theories have an impact on motivational processes as well as information on ways in which pupils' self-theories can be changed.

The dual-process model of self-regulated learning (Boekaerts, 2007) offered a way of understanding self-regulated learning in terms of pupils' dual priorities in learning situations and of the role of emotion regulation strategies in helping learners to remain on the 'learning track'.

Theory and research in the field of emotion regulation (Gross & Thompson, 2007; Koole, 2009) provided information on ways of classifying emotion regulation strategies and evidence relating to which strategies may be more adaptive and which, therefore, were included in the intervention.

The quantitative and qualitative findings will now be discussed in relation to the overarching research question. In order to answer the study's overarching research question, the findings from each phase will be discussed in relation to the impact of the 'Learning Track' project on the following areas:

- Impact on pupils' incremental theory of ability
- Impact on pupils' mastery goal orientation
- Impact on pupils' use of emotion regulation strategies

These areas correspond to the hypotheses tested in the quantitative phase and to the main findings of the qualitative phase. They are addressed in turn in the following sections.

6.3 Impact of the Intervention on Pupils' Incremental Theory of Ability

The quantitative results will be summarised first, followed by the qualitative findings. The findings will then be integrated to provide an overall conclusion.

6.3.1 Quantitative results for impact on incremental theory. It was assumed that pupils' implicit theory of ability could be measured using the ITS, a 6-item scale asking participants to rate how much they agree with items reflecting an incremental theory of ability. It was hypothesised that there would be a significant difference in the intervention group's incremental score over time.

The statistically significant findings for the intervention group on the ITS provide some support for the experimental hypothesis from the inferential statistical

analysis. However, it should be noted that some of the assumptions of ANOVA were violated, which limits the confidence with which results can be reported.

Regarding the measure itself, the ITS contains both entity and incremental theory items. Dweck (2000) notes that the original scale included only entity theory items as it was found that the incremental theory items were too appealing and that they drew high rates of agreement. The incremental theory items were amended by Dweck and colleagues so that they were not as appealing. Dweck notes that there is still a risk that participants will drift towards the incremental items over time. In the present study, agreement with incremental items was high for both the intervention group (M = 3.93) and control group (M = 3.97) at pre-test. However, the control group's incremental scores remained relatively stable and did not display a drift towards the possibly more appealing incremental items on the post-test (M = 3.96).

The statistically significant results on the ITS for the intervention group provide some support for the hypothesis and indicate that the intervention had an impact on this group's incremental score. However, due to lack of randomisation and the violation of some assumptions, it must be noted that the results need to be considered with caution. Findings from the qualitative phase are considered in the next section.

6.3.2 Qualitative findings for impact on incremental theory. According to an incremental theory of ability, intelligence is a dynamic, malleable quality that can be increased (Dweck, 2000). Learners with an incremental belief of ability view themselves as capable of changing and improving; challenges and effort are seen as helpful to learn and grow (Dweck, 2006). Pupils reported that the intervention had helped them with their learning through increasing their knowledge about how the brain learns, through increasing their confidence and through thinking that they can improve.   The findings from the teacher questionnaires also supported the idea that the intervention had an impact on pupils' incremental beliefs about ability.

The findings from the qualitative research, therefore, appear to support the idea that the pupils' and teachers' perceptions were that the intervention had an impact on the pupils' incremental theory of ability.

6.3.3 Integration of findings from quantitative and qualitative phases for impact on incremental theory. Taken together, the above quantitative and qualitative results provide some support for the conclusion that the intervention had an impact on the participants' incremental theory of ability. While limitations in the study's design and in the nature of the statistical data have been acknowledged, there is compatibility between the present results and those of other interventions aiming to foster an incremental theory of ability (Blackwell et al., 2007). The importance of the promotion of an incremental theory of ability to the overarching research question is based on its relationship with a mastery goal orientation (Blackwell et al., 2007; Dweck, 2000) and its influence on pupils' appraisals of controllability of learning tasks and outcomes which are held to be related to positive achievement emotions (Pekrun et al., 2007). In addition, the facts acquired about how the brain learns and an incremental view of intelligence are assumed in the current study to facilitate pupils' ability to reappraise challenges and setbacks in learning or, in other words, to construe a potentially emotion-eliciting situation in a way that alters its emotional impact (Gross & John, 2003).

6.4 Impact of the Intervention on Mastery Goal Orientation

The results from the quantitative phase of the study examining the impact of the intervention on pupils' mastery goal orientation will be discussed first, followed by the findings from the qualitative phase. These will then be integrated to provide an overall conclusion.

6.4.1. Quantitative results for impact on mastery goal orientation. It was assumed that pupils' mastery orientation to learning could be measured through the use of three measures: the TCGM, the MALS and the MAS. The researcher hypothesised that there would be a significant difference between the intervention group's and control group's mastery scores over time. Findings for each of these measures are discussed below.

6.4.1.1 TGCM.   On the basis of their task choice, pupils were categorised as having either a mastery goal orientation or a performance goal orientation. It was hypothesised that, as a result of the intervention, the number of intervention pupils

making task choices reflecting a mastery goal orientation would increase following the intervention when compared to the control group.

McNemar's test was used to determine if there were any differences in the change in task choices over time between the intervention and control groups. It was found that the change in the proportion of mastery oriented task choices from pre- to post -test was statistically significantly different for the intervention group, but not for the control group. This provides some support for the experimental hypothesis.

Regarding administration of the TCGM, Dweck (2000) writes that it is important that the pupils believe that if they choose a challenging learning task, they will actually receive it, or else they may make the mastery task choice as it is more socially desirable. Both intervention and control groups were informed that they may be given some tasks at a later time, although they were not given specific tasks following the pre-test. However, some pupils may have interpreted some of the activities during the sessions as the 'tasks' which were mentioned. In any case, it appears that the task choices of the control group remained relatively stable from pre-to post-test, indicating that the impact of practice effects may not have been significant.

6.4.1.2 MALS. The MALS scores for the intervention group and the control group showed very little change from pre-to post-test. The findings from the inferential statistical analysis of the MALS data did not support the experimental hypothesis. Thus, the fairly brief 'Learning Track' project appeared not to have had any impact on learner self-concept as measured by the MALS. It is possible that a longer intervention, with an additional element of influencing classroom contextual factors, would have had more of an impact on MALS scores.

6.4.1.3 MAS. The MAS measured the pupils' sense of mastery. It was anticipated that the intervention would have led to an increase in the intervention group's mean score on the MAS when compared with the control group. However, the intervention group's mean score decreased from pre-test (mean = 46.92) to post-test (mean = 45.79), while the control group's mean score showed a slight increase. The findings from the MAS do not support the experimental hypothesis.

The MAS contains three content areas: optimism, self-efficacy and adaptability. It was chosen as a measure as many items appeared to reflect the contents of the intervention, for example, *"If I try hard, it makes a difference"; "If at first I don't succeed, I will keep on trying"* and *"I can learn from my mistakes"*. However, some of the items reflected having a positive attitude about one's life in general, and thus the scale as a whole may not have been sensitive enough to the content of the intervention. In addition, the short time-scale of the intervention may not have led to an increase in overall sense of mastery as measured by the MAS.

There are, therefore, a number of potential reasons why a stronger effect for the intervention on the sense of mastery measured by the MAS and the academic self-concept measured by the MALS was not found. One explanation is that the timescale for the intervention did not allow for significant improvements in mastery orientation and academic self-concept to be demonstrated. Intervention group pupils may have needed time to practise and apply skills learnt before demonstrating improved mastery orientation. Although evidence for the construct validity for the MAS and the MALS was considered in Chapter Three, it is possible that these measures did not capture individual changes in mastery orientation to learning and that these measures were more able to capture broad trends. A limitation of the choice of these measures is that they may not have been pitched at the appropriate level of specificity for the intervention.

Overall, there is, therefore, some limited support from the TCGM that the intervention had an impact on pupils' mastery goal orientation. However, the findings from the MALS and the MAS do not support the experimental hypothesis. The qualitative findings for mastery goal orientation are now considered.

6.4.2 Qualitative findings for impact on mastery goal orientation. An aim of the intervention was to foster a mastery goal orientation to learning, where the focus is on overcoming obstacles and finding strategies for learning (Dweck, 2000; Elliot & Pekrun, 2007; Pintrich, 2000). The researcher found this theme in 21% of all pupil responses. Some pupils' responses as to how the intervention had helped with their learning mentioned the impact of the intervention on persistence, practice, effort and focus. Previous research has indicated that students who endorse a mastery goal orientation are more likely to persist in the face of challenge (Elliot & Dweck, 1988).

There has also been a link between a mastery goal orientation and positive achievement emotions (Linnenbrink, 2007; Pekrun et al., 2007).

In the current research pupils also mentioned having learnt ways of coping with problems and using strategies for learning. Mega et al., (2014) noted that students who believe that intelligence can be increased may use different strategies to regulate their learning. Thus, the pupils' and teachers' responses in the current study mentioned effort, practice and strategy use, as well as learning from one's mistakes, which are assumed to reflect a mastery orientation.

It was noted, however, that a moderate number of pupils' responses indicated more of a performance goal orientation, where the emphasis is on the outcome, rather than incremental improvement (Dweck, 2000). However, it may be noteworthy that all of these responses reflected the generally more adaptive 'approach' rather than 'avoidance' performance goal orientation (Pintrich, 2000; Tyson et al., 2009).

6.4.3 Integration of findings for impact on mastery goal orientation. The results from the TCGM indicate a statistically significant change in goal orientation for the intervention group. The qualitative findings provide further support for the impact of the intervention on mastery goal orientation. Pupils' and teachers' perceptions indicated that the intervention had had an impact on effort, persistence and an acknowledgement of the importance of practice.

However, the quantitative results from the MALS and the MAS did not support the experimental hypothesis. Some limitations in the choice of measures (MALS and MAS), and the length of the intervention were noted in considering quantitative results for the impact of the intervention on mastery goal orientation.

Taken together, the findings from the TCGM and the pupil and teacher perceptions appear to provide some support for the idea that the intervention had an impact on pupils' mastery goal orientation. The importance of a mastery goal orientation to the overarching research question lies in the association between a mastery goal orientation and learners' perceptions of control and hence the assumed link to positive achievement emotions (Linnenbrink, 2007; Pekrun et al., 2007; Pekrun & Stephens, 2009).

6.5 Impact on Pupils' Use of Emotion Regulation Strategies

The results from the quantitative phase of the study regarding the impact on pupils' use of cognitive reappraisal will be summarised first, followed by the findings from the qualitative phase. These findings will then be integrated to provide an overall conclusion.

6.5.1 Quantitative results for impact on emotion regulation strategy use. It was assumed that the intervention would have an impact on pupils' use of cognitive reappraisal as an emotion regulation strategy. The assumption was that this could be measured by the ERQ-CA cognitive reappraisal scale. It was hypothesised that there would be a significant difference between the intervention group's and control group's use of cognitive reappraisal following the intervention.

The statistically significant results for the intervention group on the cognitive reappraisal scale of the ERQ-CA provide some support for the hypothesis that the intervention would have an impact on the pupils' use of the cognitive reappraisal strategy. In this finding there is some correspondence with the findings in Davis and Levine (2012) whose research indicated that children across the elementary school years can benefit from being taught to use reappraisal strategies.

6.5.2 Qualitative findings for impact on emotion regulation strategy use. An aim of the intervention was to help develop pupils' strategies for regulating their emotions, including an antecedent-focused strategy, cognitive reappraisal (Gross, 1998; Gross & Thompson, 2007) and a response-focused strategy, controlled breathing (Koole, 2009).

A moderate number of pupils' responses made specific mention of strategies involving thinking differently (or cognitive reappraisal) to control their emotions. This theme was found in 5% of pupil responses. A number of pupils also mentioned using their thinking to feel positive. A number of pupils' responses as to how they would advise a younger child who was feeling worried about learning also mention thinking techniques. Two teachers agreed that they had noticed changes in the pupils' ability to manage their emotions as a result of the intervention. Teachers' responses referred to both types of strategies: using thinking and self-calming techniques.

When explaining how the intervention had helped with their learning, the majority of pupils' responses mentioned that the intervention had helped with regulating their emotions, particularly self-calming techniques, such as controlled breathing. Responses related to self-calming occurred in 44% of pupil responses and were the most prevalent among the data set.

6.5.3 Integration of quantitative and qualitative findings for impact on emotion regulation strategy use. The quantitative results showed a statistically significant impact of the intervention on the intervention group's use of the cognitive reappraisal strategy. The qualitative findings provide evidence for the impact of the intervention on pupils' use of the controlled breathing strategy to regulate their emotions. There is also evidence from the qualitative findings for pupils using the cognitive reappraisal strategy of using their thoughts to help manage their emotions. However, this finding was not as prevalent in the pupils' responses as the controlled breathing strategy.

Equal amounts of time during the intervention were devoted to the controlled breathing and the cognitive reappraisal strategies. In addition, the cognitive reappraisal strategy was introduced during the last session of the intervention, so 'recency effects' might have been expected in terms of pupils' ability to recall strategies covered. Both strategies were also introduced using visual metaphors (through the ideas of the 'turtle technique' and 'traffic light thoughts') and both were practised in the sessions. However, the controlled breathing technique featured by far in the greater number of pupils' responses on the qualitative questionnaire when compared with cognitive reappraisal. It may have been the case that for the age group involved in the current study the controlled breathing strategy, which is a practical strategy, is more accessible than the more abstract strategy of cognitive reappraisal, which involves metacognitive skills in thinking about one's own thoughts and their impact on feelings. On the other hand, Davis and Levine (2012) noted that children in the early elementary years could be taught to use the cognitive reappraisal strategy. However, in the Davis and Levine study, the children were taught exactly how to reappraise a very specific situation, that is, what they had just watched in a sad film, rather than how to think differently about things in order to feel better in general.

It is important to consider how to reconcile the findings from the quantitative and qualitative phases of the study regarding the pupils' use of cognitive reappraisal. The statistically significant results on the ERQ-CA cognitive reappraisal scale indicate a large effect in terms of the impact of the intervention on use of cognitive reappraisal. However, while identified as a theme in the qualitative study, the use of thinking strategies or cognitive reappraisal was not identified as highly prevalent across the data set. It may be that the pupils in the current study agreed with the *idea* that thinking differently about something is a good way to feel better about it (as evidenced by their agreement with these items on the quantitative measure). Yet, this strategy may not have been perceived as significant to the pupils when asked to comment in general on the impact of the intervention on their learning and emotions. It is perhaps noteworthy that when the pupils were asked to reflect on specific situations (such as when they find the work difficult or when taking a test) there was greater mention of the cognitive reappraisal strategy. For example, 24% of pupils' answers mentioned using their thoughts to help themselves feel better when having to take a test (see Appendix C2). This indicates that pupils' perceptions of the impact of the intervention on their use of cognitive reappraisal may vary depending on whether they are reflecting on learning in general or on specific situations (Bieg et al., 2013). These findings may also indicate that greater practice and consolidation of using this strategy may be required when compared with the controlled breathing strategy.

Considered independently, therefore, the results from the quantitative phase of the current study appear to provide support for the idea that 9-10 year-old children can be taught to use cognitive reappraisal. On the other hand, while the qualitative findings lend some support to this idea, they provide more overwhelming support for children's receptiveness to the use of the controlled breathing strategy. Cognitive reappraisal is generally viewed as a more adaptive emotion regulation strategy in that it is an antecedent strategy which intervenes before the emotion has been fully generated (Gross & John, 2003) and negates the need for further processing of the event (Davis and Levine, 2012; Ochsner and Gross, 2005). Controlled breathing, on the other hand, is a response-focused strategy which is concerned with managing the physiological or behavioural responses to an emotion, and, in this way, could be considered less adaptive, as the possibly debilitating emotion (such as anxiety or anger) and its cognitive and physiological consequences have been experienced. The

importance of the findings from the quantitative and qualitative phases of the current study to the overarching research question is that there is some support for the impact of the intervention on pupils' use of emotion regulation strategies. The qualitative findings suggest that there was a differing impact regarding pupils' perceptions of the impact of the intervention in terms of their use of the controlled breathing and cognitive reappraisal strategies, with controlled breathing being mentioned in the greater number of pupil responses.

6.6 Additional Findings from the Qualitative Study

A rationale for the mixed methods approach used in the current study was that the methods used have complementary strengths and that each can address the weaknesses in the other (Johnson & Onwuegbuzie, 2004; Teddlie and Tashakkori, 2009). Johnson and Onwuegbuzie (2004) note that the goal of mixing methods is not to confirm findings, but to expand one's understanding. In this way, the qualitative phase of the study offered an opportunity to explore in greater depth participants' insights into and perceptions of the impact of the intervention.

The intervention had the purposes of both developing pupils' incremental theory of ability and mastery goal orientation as well as developing and practising emotion regulation strategies related to the learning context. Within the conceptual framework (see Figure 7) there is an expectation that an increase in incremental theory of ability and mastery goal orientation would lead to fewer negative emotions and more positive emotions related to learning (Linnenbrink, 2007; Pekrun et al., 2007; Pekrun & Stephens, 2009). This aspect of the study presented challenges in terms of measuring impact through quantitative research methods in a whole class setting. However, there are some indications through pupils' comments on the qualitative questionnaire that the intervention may have had an impact on emotions experienced in learning. Some pupils' responses indicated feeling more positive academic emotions, or fewer negative academic emotions, as a result of the intervention. There are links with the relevant theory and research in that, according to Pekrun et al. (2009), incremental beliefs and mastery goals lead to appraisals of control and value which foster positive academic emotions. Moreover, Linnenbrink (2007) also associates a mastery goal orientation with the experience of a pleasant affective state. It may also be that pupils in the current study benefited from

opportunities to discuss emotions experienced in the classroom and the recognition that others feel the same as they sometimes do.

6.7 Strengths of the Current Study

A strength of the current study is that it integrates theory and research on motivational and emotional processes involved in learning to address a noted gap in the research literature on emotion regulation for learning. An additional strength is the application of current psychological theory and research to inform the design of an innovative intervention carried out in a naturalistic setting. The study was carried out with the entire cohort of Year 5 children in two school settings with the aim of enhancing learning for all children. Another strength of the current study is the use of mixed methods which enable triangulation of the data. This methodological strength is discussed in more detail below.

6.7.1 Methodological strengths. Mertens (2010) notes that credibility is the parallel in qualitative research to internal validity in quantitative research. This covers the question of whether there is a correspondence between respondents' perceptions and the way the researcher portrays their viewpoints. Gathering data from more than one source and by more than one method, as in mixed methods research, is held to yield a fuller picture of the phenomenon under review (Bloomberg and Volpe, 2012). Research strategies to enhance methodological credibility in the present research include triangulation of pupil and teacher perceptions. The present study also includes triangulation of data collection methods (quantitative and qualitative research). Moreover, the steps through which interpretations of the qualitative data were made by the researcher were recorded and demonstrated as the analysis progressed. The researcher also undertook the search for discrepant evidence, or negative case analysis.

The issue of dependability, or whether the findings are consistent with the data collected, was addressed through using inter-rater reliability and through an attempt to maintain an audit trail that showed the evolution of the researcher's thinking and the rationale for choices made during the process of data analysis and interpretation (Bloomberg & Volpe, 2012).

6.7.2 Strengths of measures selected. The ERQ-CA, ITS and TCGM measures were selected as they have been used in previous research and seemed highly relevant to the purposes of the current research. The MAS and MALS were selected as they were applicable to the age-group involved, were relatively brief and included a number of items relevant to the mastery construct. Evidence of the technical quality of the tests, in terms of reliability and validity, norm group representation and type of administration, was reviewed by the researcher and deemed acceptable. The wording of the ITS and ERQ-CA was modified slightly to be more readable by children with English as an additional language. An additional strength is that the measures were piloted with a class of Year 5 children and, on the basis of this, the measures and modifications were deemed appropriate by the researcher. The measures were administered by the researcher in a standardised way with all groups.

For the qualitative study, pupil and teacher questionnaires were devised by the researcher and were piloted. A strength of the questionnaire method is that questionnaires can be completed anonymously and can be administered to a large number of participants.

The above section has considered strengths of the current study. However, there are a number of important limitations of the current study and these are discussed below along with ways in which the researcher may have tried to address them, where relevant.

6.8 Threats to the Study and How These Were Addressed

The threats to the study in terms of validity of the quantitative results and trustworthiness regarding the qualitative findings are discussed in turn below. A critique of the measures used in the study is also provided. This is followed by a discussion of the generalisability of the study's findings.

6.8.1 Quantitative results: threats to validity. There are a number of confounding variables that represent threats to the validity of the quantitative results. The difficulty of implying causal inferences from non-equivalent group designs was highlighted earlier. The lack of random assignment of participants to groups means that any differences between groups on post-test scores may be a result of random variation between the characteristics of group participants rather than due to the intervention. The researcher attempted to address this by ensuring that the groups

were as similar as possible on demographic variables. The two sample schools had similar demographic characteristics and all pupils in the study were in the same year group. The schools allocated children to classes on a random basis. Therefore, there was, in principle, an equal chance that a child would be in one class or another. However, the different contextual factors within each school may have had an impact on outcome variables. In addition, the sample sizes of the control group and intervention group were not equal, with the intervention group having more than twice the number of participants. This factor may have had an impact on the validity of the findings where assumptions of homogeneity of variance were violated.

An additional important threat to validity was the inability of the researcher to 'blind' participants to the nature of the study (Mertens, 2010). In the current research, the pupils were aware that they were taking part in a project to help with their learning. It is possible that the Hawthorne effect may have been influential in that the pupils were aware that they were taking part in a project and this fact, along with the 'novelty' effect, may have influenced their responses and perceptions (however, the control classes were also informed that they were taking part in a study, which may have provided some balance for this effect). An additional threat to validity is that the effect of prior testing may have alerted the participants to the constructs under scrutiny. This may have had an impact on their post-test responses in that the participants may have responded in a way that they perceived to be socially desirable or sought after by the researcher. The researcher attempted to address this issue through triangulation of methods used and by the use of both pupil and teacher questionnaires in the qualitative study. The researcher also stressed to participants the fact that there were no 'right' or 'wrong' answers. However, potential reactivity effects remain important limitations of the study.

The researcher identified factors which may have had an impact on the outcome of the intervention. For example, the timing of the intervention may have had an impact on the outcomes. The intervention took place in the summer term at the end of the school year. Teachers commented that it was more difficult to see the impact of the intervention on the pupils' approach to challenging tasks as they were not covering new material. The intervention also took place during Ramadan, when a number of pupils, and one teacher, were fasting. Two of the teachers commented that the intervention may have been more effective at the beginning of the school year.

6.8.2 Qualitative findings: issues of trustworthiness. Issues regarding trustworthiness in relation to the qualitative data and its analysis and the ways in which the researcher has tried to address these need to be considered.

The concept of confirmability in evaluating qualitative findings implies that the findings are the result of the research rather than an outcome of the biases and subjectivity of the researcher. The steps taken regarding dependability mentioned earlier (such as the use of an audit trail and inter-rater reliability) are also relevant to address the issue of researcher bias. The audit trail offers the reader an opportunity to assess the findings of the study. However, given that the researcher designed and implemented the study as well as carried out the data collection and analysis, potential researcher bias and subjectivity remain a major criticism of the study.

6.8.3 Critique of instruments used in the study.   An important area for discussion concerns the measures used to collect the data for this research. All of the quantitative measures used except the MALS were standardised on non-UK samples. In addition, the proportion of children in the current study from Asian backgrounds is higher than the samples on which the quantitative measures were standardised, thus cultural factors may be implicated.

The researcher questioned earlier the usefulness of some of the quantitative measures which were used over a short timeframe (the MALS and MAS). This raised questions about using measures that are not adequately sensitive to the content of the sessions and which are decontextualized in nature. On the other hand, the measures on which statistically significant results were found (the ITS, TCGM and ERQ-CA) could be criticised for being *too* closely related to the content of the sessions. Participants may have provided responses that seemed to please the researcher or which they perceived, on the basis of the sessions, to be 'correct', rather than providing responses reflecting their self-beliefs and behaviour.

The use of the questionnaire method for the qualitative data collection presents a number of limitations. The researcher may not get careful feedback as questions can be omitted or rushed. Responses to questionnaires are more limited than more time-consuming methods, such as interviews or focus groups, in that the researcher cannot follow up on responses or clarify respondents' meanings and, therefore, the researcher does not get the 'full story'. An additional limitation of the questionnaire method for the current study is that, while additional adult support was

available in the classroom, some pupils may have opted not to complete the more open-ended items due to weaker literacy or language skills. The majority of the sample of 113 children answered each question. However, response rates varied between different questionnaire items from 68%-100%. Therefore, some pupils who were uncertain about the impact of the intervention, or had weak literacy or language skills, may have chosen not to respond.

An additional concern is that some of the items on the pupil questionnaire are projective and hypothetical, asking the pupils what they *would do* in certain situations. It could be argued that this may not coincide with how they might actually behave.

A related limitation of the study is the use of self-reporting methods. It must be noted that the researcher had established a relationship with participating pupils and teachers. It is possible that the wish to please the researcher or to respond with answers perceived as desirable or 'correct' may have influenced their responses. The researcher attempted to address this by introducing questionnaires in a standardised way, by stressing that there were no 'right' or 'wrong' answers and by asking pupils to be honest in their answers.

As well as being vulnerable to the biases outlined above, a criticism of self-report measures is that they reveal little about how learners use and adapt emotion regulation strategies in authentic learning situations.

Furthermore, the social, contextual and process nature of emotion regulation for learning has been largely lacking in the present study. It would be interesting to know more about how emotions are generated, influenced and regulated in learning contexts and the influence of reciprocal relationships among individuals, peers and the learning environment. It could be argued that it is necessary, for example, to augment self-reports of emotion regulation for learning with more fine-grained analysis of actual pupil behavior while engaged in a task. This would allow a more detailed examination of the relationships between a pupil's task engagement, reflections, self-evaluations, contextual factors and emotions experienced.

6.8.4 Generalisability of the study's findings. This study is based on a pragmatic orientation, which is a practical and outcome-oriented method of inquiry. From a pragmatic theoretical perspective, current truth, meaning and knowledge are viewed as tentative and as changing over time (Johnson and Onwuegbuzie, 2004). From this

perspective, attempts to generalise from the current study's findings would need to be provisional and to be made with caution.

External validity is the extent to which findings from one study can be applied to another situation (Mertens, 2010). External validity threats arise when the researcher draws incorrect inferences from the sample data to other groups or settings. The sample in the current study was composed of a majority of Asian pupils which restricts any claims to be able to generalise from the findings. The fact that the intervention took place in two different schools may increase the generalisability of the research. However, this fact also raises questions regarding internal validity in that the different settings may have had some impact on the intervention. The sessions were all delivered by the researcher and the session plans and timings were strictly followed. However, the researcher noticed, anecdotally, contextual factors in that different responses to the intervention were noted between classes and that there was a difference in class teacher involvement, enthusiasm and engagement.

The study will need replication in other settings in order to enhance any claims about generalisability of the findings.

6.9 Suggestions for Future Research

If the current research is to be replicated it will be important to consider some changes to the design and implementation. Feedback from the teachers' questionnaire indicated that increasing the number of sessions and adding to the activities to enable consolidation of the knowledge and skills would be important.

Action research alongside a class teacher could provide further insights, particularly if the key components of the intervention (incremental beliefs, mastery goal orientation and emotion regulation strategies) are also integrated into daily classroom interactions. As has been suggested earlier, the use of different research methods, such as fine-grained analyses of pupil engagement during a task would provide more authentic, contextualised information on the impact of the intervention. These could include methods such as 'talk-aloud' procedures and the use of microanalysis (Cleary, 2011). The use of a third control group, experiencing a different intervention, would help to control for Hawthorne effects. In addition, the use of different qualitative research methods, such as interviews or focus groups, would provide more detailed insight into pupils' and teachers' perceptions of the

impact of the intervention. It would also be important to include a longitudinal element to check whether the effects of the intervention are short-lived or endure over time.

Future research could investigate the impact of the intervention on different age groups. An additional consideration would be to look at the different impact of the intervention on different groups of pupils, for example, based on gender or on ability. The latter may be of interest as researchers have noted that teaching of emotion regulation strategies may be of particular relevance for pupils who regularly meet obstacles and setbacks in their learning or whose level of emotion regulation strategy use is already low (Boekaerts, 2011; Davis & Levine, 2012). The qualitative phase of the current research found that the controlled breathing strategy was perceived by pupils as being particularly helpful (when compared with cognitive reappraisal). However, the quantitative phase found a statistically significant impact over time on the intervention group's reported use of cognitive reappraisal as an emotion regulation strategy. Further research, therefore, on ways in which different adaptive emotion regulation strategies can be promoted with pupils of differing ages and abilities as well as research on pupils' perceptions of their application of taught emotion regulation strategies in learning contexts would be informative.

Given the additional finding from the qualitative phase of a possible impact of the intervention on pupils' positive emotions experienced in the classroom, this aspect may benefit from further specific investigation. In particular, it may be useful to investigate if it was the incremental theory and mastery goal orientation sessions alone which led to more positive emotions or if it was the combination of the latter along with the discussion of emotions and emotion regulation in the classroom. In addition, it may be useful to consider if this effect was more or less likely given different contextual factors (for example, teacher engagement with the content of the sessions).

6.10   Key Implications of this Research.

The study has provided research on one way in which adaptive emotion regulation can be enhanced in the classroom for all learners. A lack of research in this area was noted in the relevant literature (Boekaerts, 2011; Fried, 2011; Gullone & Taffe, 2012; Linnenbrink & Pintrich, 2000). It was noted that self-regulation is becoming increasingly highly-valued in education (Duckworth et al., 2009; Higgins,

et al., 2014; Zimmerman, 2000a). Moreover, a focus on emotion regulation within the learning context has been recommended in order to assist teachers to develop pupils' understanding of themselves as well as to equip pupils with strategies for coping with challenges and setbacks in learning (Boekaerts, 2011).

The current study contributes to the literature on emotion regulation through combining motivational and emotional processes in learning and through applying theory and research on the processes involved in emotion regulation to a whole class intervention study carried out in a 'real world' setting.

The findings from this research support previous findings that an incremental theory of ability and a mastery goal orientation can be promoted through an intervention which focuses on the pupils' understanding of how the brain learns and their beliefs about learning (Blackwell, et al., 2007; Dweck, 2000). The findings from this research also support the idea that pupils can be encouraged to use adaptive emotion regulation strategies (Davis and Levine, 2012). The current study adds to the research literature on emotion regulation through providing evidence that adaptive emotion regulation strategies can be promoted through a whole-class intervention.

The current study suggests that the intervention had an impact on pupils' self-reported use of two emotion regulation strategies: controlled breathing and cognitive reappraisal. The findings from pupils' perceptions in the qualitative phase suggest that there was a greater responsiveness on the part of pupils in the current study to the use of the controlled breathing technique. An implication of this is that the strategy of cognitive reappraisal, which has been noted to have benefits for learning, socialisation and wellbeing (Davis & Levine, 2012; Fried, 2011; Graziano et al., 2007; Gross & John, 2003), may require greater practice and consolidation in order to be applied by the age group in the current study.

6.11 Implications of the Research for Schools and the Local Authority

This research was carried out within the context of an outer London borough. The research was relevant to concerns being raised by school staff and parents regarding individual pupils' emotional responses to learning. The schools involved in the study are considering future implementation of the research project's materials within their curriculum. The results of the study and materials used will be shared

with E.Ps and Special Educational Needs Coordinators (SENCOs) within the borough, adding to knowledge and evidence-based practice.

6.12 Implications of the Research for E.Ps

It is important for E.Ps to ensure that interventions in schools are informed by an evidence base. The researcher feels that embarking upon research within educational settings is a key role for the E.P. The present research contributes findings to the evidence base in educational psychology and, in particular, on whole class interventions that aim to improve all pupils' self-regulated learning, with a particular focus on emotion regulation for learning.

The research thus provides information on ways in which E.Ps can support schools in implementing a whole-class intervention which supports the learning of all pupils. It may also provide further reminders of the importance of integrating cognitive, motivational and emotional understandings into E.Ps' case-work and consultation.

In reflecting on E.P practice in a time of change, Gersch (2009) stresses the importance of E.Ps being seen as relevant to current challenges. This includes the development of research relevant to national developments. He adds that it is important that educational psychology is seen as a profession that delivers real benefits to the nation's well-being. Positive psychology has helped to move the focus within applied psychology away from a deficit-based model to an approach which builds on resilience, successes and a focus on what makes effective learners who are able to cope with setbacks and challenges (Seligman and Csikszentmihalyi, 2000). The present research builds on research into what we know about the self-beliefs, learning goals and self-regulatory strategies used by resilient learners who are able to remain on the 'learning track' The importance of emotions in the classroom has been highlighted in the current research with a particular focus on investigating ways of promoting emotion regulation in the classroom for all learners.

A number of suggestions for further research have been made. Further investigation and research are required using a variety of research methods to establish the validity of the findings.

6.13 Summary of Chapter Six

While acknowledging the study's limitations, the current research has provided some support for a number of tentative conclusions in response to the overarching research question. The findings of the current study enhance the evidence base relating to interventions promoting emotion regulation for learning which is of relevance to researchers, policy makers, E.Ps and schools. These tentative conclusions are summarised below:

- The 'Learning Track' intervention had a perceived and measurable impact on the intervention pupils' incremental theory of ability.

- The 'Learning Track' intervention had a perceived and measurable impact on the intervention pupils' mastery goal orientation.

- The 'Learning Track' intervention had a perceived and measurable impact on the intervention pupils' use of emotion regulation strategies.

- There appeared to be a differing impact of the intervention on the pupils' awareness and use of the controlled breathing technique when compared with cognitive reappraisal, implying that the cognitive reappraisal strategy may need greater practice and consolidation with this age group.

Chapter Seven

Conclusion

This mixed methods research study involved an evaluation of the impact of a whole-class intervention with the aim of enhancing 9-10-year old pupils' emotion regulation for learning. The study was carried out in response to concerns expressed by school staff and parents that pupils' negative emotional responses to learning can interfere with their learning and have a detrimental effect on progress. A review of relevant theory and research indicated an apparent lack of investigations into universal interventions to promote emotion regulation for learning.

The research was carried out with a sample of 166 pupils. The quantitative phase involved a non-equivalent groups pre-and post-test experimental design with a waiting list control group. The qualitative phase was based on questionnaires completed by the intervention group pupils and their class teachers. The four-session intervention was designed by the researcher and was based on theory and research in the inter-related fields of self-regulated learning and emotion regulation, achievement emotions, implicit theories of ability and learning goal orientation.

The study was carried out as a parallel mixed methods study situated within a pragmatic paradigm. The focus in the research design has been on using methods which have complementary strengths and which can address the overarching research question.

The indications from an integration of findings from the quantitative and qualitative phases are that, as a result of the intervention, there was an impact on the pupils' self-reported incremental theory of ability, mastery orientation and use of two emotion regulation strategies. Regarding the pupils' use of emotion regulation strategies, the findings from the exploratory qualitative phase suggested a greater impact of the intervention on the pupils' self-reported awareness and use of the controlled breathing technique when compared with their self-reported awareness and use of cognitive reappraisal. Limitations in the study's design mean that the quantitative and qualitative findings need to be reported with caution. However, the study has attempted to address a noted gap within the research literature on emotion regulation in a 'real world' context and has involved the application of current theory and research to plan, implement and examine the impact of an innovative whole-class intervention designed to promote emotion regulation for learning.

The researcher has identified implications of the research for researchers, educators and E.Ps and suggestions for further research have been made.

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Appendices

Appendix A
Literature Search

An electronic search was conducted using the online databases Google scholar and
the Social Sciences set of Cardiff University's electronic resources gateway, Metalib,
which includes the following databases: ASSIA, British Education Index, ERIC,
PsychINFO, SCOPUS, IBSS and EBSCO. The following search terms were used:

- Emotion regulation and
- interventions
- School/classroom/child*/pupil interventions
- Primary school
- Self- regulation and
- Emotions
- Self-regulated learning and
- Motivation/emotion
- Emotional intelligence/literacy and
- School/classroom/childhood/pupil interventions
- Emotions and
- Learning

In addition, citations and references found in key texts on emotions, self-regulation
and emotion regulation were pursued.

Appendix A1. Conceptual Framework

Existing field of knowledge:
- Appraisal Theories of Emotion and Control-Value
- Theory of Achievement Emotions
- Implicit theories and Learning Goal Orientation
- Self-Regulated Learning
- Emotion Regulation Processes

Contribution to existing field of knowledge

Theoretical Assumptions

Self-Regulated Learning, Motivation

Achievement Emotions

Control and value appraisals

Incremental theory + Mastery goal orientation

PLUS

Emotion Regulation Strategies

Proposed research:
Investigate impact of a whole class intervention combining incremental theory of ability with emotion regulation strategies. Mixed methods design.

Review of Literature

Identified gap in research and knowledge: Research on whole-class interventions to develop emotion regulation strategies for learning with primary-aged children

Appendix B1
Project Information Sheet

'LEARNING TRACK' INTERVENTION STUDY

Emotions have been found to be intertwined with many aspects of the learning process. At one time or another, a number of children experience negative emotions (for example, feeling sad, worried, angry, frustrated) before, during or after a learning task. For some children, these emotions appear to have a negative effect on their effort, persistence and problem-solving and can lead to avoidance or to self-defeating behaviours.

In this study, the focus is on developing further understanding of ways to help children to cope with negative emotions related to learning, to help them to approach learning tasks with a more positive mindset and to keep on the 'learning track'. This research will involve:

1. The researcher (Janet Rowley) meeting with relevant Year 5 teachers and the Senco for 30-40 minutes after school once before the intervention takes place as well as once after the intervention.
2. Teachers will need to distribute parental consent forms for the pupils.
3. The researcher carrying out the measures and the 4-session intervention with the pupils with the class teacher present.
4. Teachers will be asked to complete a brief questionnaire regarding their perceptions of the impact of the intervention.

The whole-class intervention will be based on current theory and research in the fields of motivation, self-regulation and emotion and will cover the following areas:

- How the brain learns through building up stronger and stronger connections through repeated practice;
- Awareness of emotions and reflection on emotions that arise in learning situations;
- Awareness of strategies for self-regulating emotions in learning situations;
- Developing an understanding of how our thoughts influence our emotions which, in turn, influence how we behave;
- Awareness of ways of keeping on the 'learning track' when obstacles and setbacks arise

Appendix B2
Session Outlines for 'Learning Track Project'

Session 1   Measures and Introduction

Session 2   How the Brain Learns

Session 3   The Growth Mindset

Session 4   Emotions and the Brain

Session 5   Thoughts and Feelings

Session 6   Measures and Summary

Session One
Objectives

To introduce the project and gain pupil consent

To carry out the measures

To carry out Mood Booster activity: the 'Categories Game'

Materials

Consent forms
Measures
Powerpoint slides – categories game

Session One
Session leader script

Every now and then we get stuck when we are learning.
Sometimes we get worried, frustrated or angry or feel disappointed with ourselves when we are completing work in the classroom. When these feelings are very strong they can get in the way of our learning.
This project is called 'The Learning Track Project' as it's designed to teach us ways of staying on the learning track when we feel stuck.

Working Together Rules
What rules will make sure we work together as a group and that everyone feels involved?
- There are no right or wrong answers
- Everything discussed is private
- We should respect other people and their ideas
- We should help each other in the group

- You can keep very private feelings and experiences to yourselves, but you may want to discuss these later with me/your teacher

Measures
Mood Booster Activity
eg 'Categories' Game: introduce as a fun activity, it doesn't matter if they get any wrong
Using powerpoint, flash a category up on screen (eg 'colours', 'sports', 'animals', 'names of teachers in the school', 'Olympic gold medal winners', 'TV programmes', 'football teams', 'crisp flavours', 'chocolate bars' etc.) Go around the class in order, each child has to mention something in that category until it randomly changes, then they have to quickly switch their answer to the next category on the screen.
Randomly change categories, the pupils have to respond at speed. No-one is 'out' for not responding, just move on.

Session Two: How the Brain Learns

Objectives
- To introduce ideas about how the brain learns through building connections
- To introduce the idea that our emotions affect how the brain works
- To introduce the idea that our brain can continue to grow (get smarter) through effort and taking on challenges
- Pupils to begin to reflect on a skills at which they would like to get better

Materials
- Video clip – the learning brain
- Powerpoint slides: How the brain learns
- 6 small soft toys/bean bags

Major Learning Outcome
Pupils should understand that the brain is continually learning through practice and taking on challenges

Session Three: The Growth Mindset

Objectives
To introduce the idea that how we think about learning has a lot to do with success.
To introduce ideas about the role of practice and learning from mistakes in learning.

Materials
- Powerpoint slides: The Growth Mindset
- Video clip: Neurons and Synapses
- Video clip: Michael Jordan

Major Learning Outcomes
Pupils should understand that the growth mindset is a belief that people can learn, change and become better at things through:
- Effort
- Practice
- Using the right strategies
- Asking for help if needed

Session Four: Emotions and the Brain

Objectives
- To provide opportunities to reflect on emotions experienced in the classroom
- To introduce ideas about how emotions can impact on thinking (fight and flight)
- To present information on emotional and 'thinking' regions in the brain
- To introduce idea of 'emotions thermometer'
- To introduce and practice the 'turtle technique' –controlled breathing

Materials
- Powerpoint slides: Emotions and the Brain

Major Learning Outcomes
Pupils should be aware that everyone feels frustrated, sad or worried in the classroom at some time.
Pupils should understand that negative emotions can have an effect on our 'thinking brain'and that there are ways to 'cool down' emotions so that our thinking brain can work more effectively. Pupils should become familiar with controlled breathing technique.

Session Five: Thoughts and Feelings

Objectives
- To introduce idea of 'traffic light' thoughts
- To reflect on ways in which our thoughts can have an impact on how we feel – positively and negatively
- To practice using thoughts to help feel better
- To carry out role play in threes – 2 pupils play red and green thoughts and 1 plays someone who is trying to learn a new skill

Materials
- Powerpoint slides: Thoughts and Feelings
- Video clip from 'Diary of a Wimpy Kid'

Major Learning Outcomes

Pupils to be aware of fact that how we think about something can affect how we feel. Pupils to be aware of ways in which we can think differently about classroom experiences (eg success or failure). Links to be made with growth mindset and how practice helps strengthen pathways in the brain.

Session Six

Measures

Summary of Project and Thanks

Appendix B3

Teacher consent letter

Dear

      I am a doctoral student in the School of Psychology, Cardiff University. As part of my degree I am carrying out a study on the effectiveness of a class intervention to help children cope with their emotions during learning tasks. I am writing to enquire whether you would be interested in your class participating in this research.

The research project is called 'The Learning Track' and is a 6-week whole class intervention for Year 5 or 6 pupils. The sessions will be planned and run by the researcher and will be delivered in collaboration with you. They will take place for up to one hour per week during school hours during the second half of the summer term 2013.

      The pupils will be given some questionnaires to complete before and after the intervention which will take about 30-40 minutes. The questionnaires will be anonymous so that no information can be traced back to any individual child. The questionnaires will explore the children's perceptions of their self-concepts as learners, their sense of mastery for learning and how they control their emotions.

      You will also be asked to complete a brief evaluation questionnaire at the end of the study. Your questionnaires will be coded by me so they cannot be traced back to you personally. All the questionnaires will be kept in a locked filing cabinet and will be destroyed at the end of the study.

      The aim is to study the effectiveness of the intervention which aims to help pupils whose emotions sometimes get in the way of their learning to stay on the 'learning track' through developing strategies to manage their emotions. A more detailed information sheet on the project is enclosed. The name of the project supervisor at Cardiff University is Dr Jean Parry.

Many thanks in advance for your consideration of this project. Please let me know if you require further information.

Regards,
Janet Rowley

Janet Rowley	Dr Jean Parry
Educational Psychologist	Research Supervisor
	Doctorate in Educational Psychology
	School of Psychology
	Cardiff University
	Park Place, Cardiff, CF10 3AT
	02920 876 497
	PARRYJI@cardiff.ac.uk

I give my consent for the Learning Track Project to take place in my class.

Signed---

Appendix B4
Headteacher Consent Letter

Dear

I am a doctoral student in the School of Psychology, Cardiff University. As part of my degree I am carrying out a study on the effectiveness of a class intervention which aims to build learner resilience through helping children cope with their emotions during learning tasks. I am writing to enquire whether you would be interested in your school participating in this research.

The research project is called 'The Learning Track' and is a 6-week whole class intervention for Year 5 or 6 pupils. The sessions will be run by the researcher and will take place for up to one hour per week during school hours during the second half of the summer term 2013.

The pupils will be given some questionnaires to complete before and after the intervention which will take about 30-40 minutes. The questionnaires will be anonymous so that no information can be traced back to any individual child. The questionnaires will explore the children's perceptions of their emotional reactivity, their self-concepts as learners and their sense of mastery for learning. The teachers involved will also be asked to complete a brief questionnaire on their perception of their class's effort and persistence as well as their emotional regulation. The teachers will also be asked to complete a brief evaluation questionnaire at the end of the study. The teachers' questionnaires will be coded so they cannot be traced back to an individual teacher. All the questionnaires will be kept in a locked filing cabinet and will be destroyed at the end of the study.

The aim is to study the effectiveness of the intervention which aims to help pupils to stay on the 'learning track' through developing strategies to manage their emotions. A more detailed information sheet on the project is enclosed. The name of the project supervisor at Cardiff University is Dr Jean Parry.

Many thanks in advance for your consideration of this project.   Please let me know if you require further information.

Regards,
Janet Rowley

Janet Rowley   Dr Jean Parry
Educational Psychologist   Research Supervisor
                                                Doctorate in Educational Psychology
                                                School of Psychology
                                                 Cardiff University
                                                 Park Place, Cardiff, CF10 3AT
                                                02920 876 497
                                                PARRYJI@cardiff.ac.uk

I---

I give my consent for the Learning Track Project to take place in my school.

Signed---

Appendix B5
Parent Consent Letter

Dear Parent/Carer

The Learning Track Project

My name is Janet Rowley. I am a doctoral student at Cardiff University. I am interested in finding out more about helping children with their emotional responses to learning. The purpose of the 'Learning Track' research project is to study the effectiveness of an intervention which teach pupils about how the brain learns, how their thinking is linked to their emotions, and about ways of managing their emotions during learning tasks so that they can keep on the learning track.

I will meet with your child's class and class teacher once a week for about 45 minutes during PSHE/Circle time sessions. The project will last for about 6 weeks.

I will ask your child to complete some questionnaires before and after the project so that I can evaluate how successful the project has been. Your child will not put their name on any of the questionnaires so no information will be able to be traced back to them personally. The completed questionnaires will be kept in a locked filing cabinet and will be destroyed at the end of the project.

You can choose for your child to be withdrawn from the project at any time.

This project has been approved by Cardiff University and permission to carry it out in school has been given by (headteacher).

*If you are **not** willing to allow your child to participate in this project, please complete the attached slip and return to your child's teacher **by (date)***

I **do not** wish for my child to take part in the Learning Track project.

Child's name--

Class--------------------------------------

Parental signature -------------------------------------

Appendix B6

Pupil Consent Letter

My name is Janet Rowley and I am a psychology student at Cardiff University. That means I study how children learn, feel and behave. I want to find out more about how to help children learn better, especially when they get fed up, angry, worried or upset when learning.

I plan to to set up a project with you called the 'Learning Track' project. I will be asking you to fill in some questionnaires – there are no right or wrong answers. I also hope to meet with your class every week for 6 weeks. We will watch some video clips, talk about them and do some games and activities.   We'll learn about how the brain learns as well as ways to feel better when you are learning so that you can keep on the 'learning track'.

I have someone to help me and check that I am doing things properly at Cardiff University called Jean.

Don't put your name on the questionnaires, just your initials. You are welcome to leave out any of the questions if you want. It is OK if you decide that you do not want to take part in the project at any time.

Consent

I agree to take part in the 'Learning Track' project and I know that this will involve completing some questionnaires and taking part in 6 weekly sessions with my class. I know that no information from the questionnaires will be able to be traced back to me. I also know that if I don't want to take part at any time, then this is OK.

Pupil Signature   Date-----------------------

-

Appendix B7

Sense of Mastery Scale (sample) (Prince-Embury, 2009)

MAS

Here is a list of things that happen to people and that people think, feel, or do. Read each sentence carefully, and circle the *one* answer (Never, Rarely, Sometimes, Often, or Almost Always) that tells about you best. THERE ARE NO RIGHT OR WRONG ANSWERS.

	0	1	2	3	4
1. Life is fair.	Never	Rarely	Sometimes	Often	Almost Always
2. I can make good things happen.	Never	Rarely	Sometimes	Often	Almost Always
3. I can get the things I need.	Never	Rarely	Sometimes	Often	Almost Always
4. I can control what happens to me.	Never	Rarely	Sometimes	Often	Almost Always
5. I do things well.	Never	Rarely	Sometimes	Often	Almost Always
6. I am good at fixing things.	Never	Rarely	Sometimes	Often	Almost Always
7. I am good at figuring things out.	Never	Rarely	Sometimes	Often	Almost Always
8. I make good decisions.	Never	Rarely	Sometimes	Often	Almost Always
9. I can adjust when plans change.	Never	Rarely	Sometimes	Often	Almost Always
10. I can get past problems in my way.	Never	Rarely	Sometimes	Often	Almost Always
11. If I have a problem, I can solve it.	Never	Rarely	Sometimes	Often	Almost Always
12. If I try hard, it makes a difference.	Never	Rarely	Sometimes	Often	Almost Always
13. If at first I don't succeed, I will keep on trying.	Never	Rarely	Sometimes	Often	Almost Always
14. I can think of more than one way to solve a problem.	Never	Rarely	Sometimes	Often	Almost Always
15. I can learn from my mistakes.	Never	Rarely	Sometimes	Often	Almost Always
					Almost

Appendix B8
Revised Implicit Theories of Intelligence Scale for Children
(adapted from Dweck, 2000)

Read each sentence below and circle the <u>one</u> number that shows how much you agree with it. There are no right or wrong answers. You can leave out any items if you want.

1.   You can learn new things, but you can't really change how clever you are.

1 Strongly agree	2 Agree	3 Half and Half	4 Disagree	5 Strongly disagree

2.   You can't change how clever you are

1 Strongly agree	2 Agree	3 Half and Half	4 Disagree	5 Strongly disagree

3. You are either good or not good at subjects like maths, Art or PE - and there's not much you can do to change that

1 Strongly agree	2 Agree	3 Half and Half	4 Disagree	5 Strongly disagree

4. You can always change how clever you are

1 Strongly agree	2 Agree	3 Half and Half	4 Disagree	5 Strongly disagree

5.   You can always get better at subjects like maths, Art and PE

1 Strongly agree	2 Agree	3 Half and Half	4 Disagree	5 Strongly disagree

6. No matter who you are, you can always change how clever you are.

1 Strongly agree	2 Agree	3 Half and Half	4 Disagree	5 Strongly disagree

Appendix B9
Task-Choice Goal Measure

Sample instruction:

We may have more time later. If we do, which kind of task would you like to work on most? Mark only one answer.

I would like to work on:
- Problems that aren't too hard, so I don't get many wrong

- Problems that I'll learn a lot from, even if I won't look smart

- Problems that are pretty easy, so I'll do well

- Problems that I'm pretty good at, so I can show that I'm smart

Appendix B10
Myself-as-Learner Scale (sample) (Burden, 1998)

Definitely agree
Agree a bit
True half the time
Don't agree
Strongly disagree
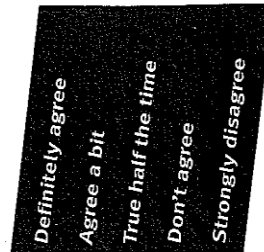
1. I'm good at doing tests.   a b c d e

2. I like having problems to solve.   a b c d e

3. When I'm given new work to do, I usually
   feel confident I can do it.   a b c d e

4. Thinking carefully about your work helps
   you to do it better.   a b c d e

5. I'm good at discussing things.   a b c d e

6. I need lots of help with my work.   a b c d e

7. I like having difficult work to do.   a b c d e

8. I get anxious when I have to do new work.   a b c d e

9. I think that problem-solving is fun.   a b c d e

10. When I get stuck with my work I can usually
    work out what to do next.   a b c d e

11. Learning is easy.   a b c d e

12. I'm not very good at solving problems.   a b c d e

13. I know the meaning of lots of words.   a b c d e

14. I usually think carefully about what I've got to do.   a b c d e

Appendix B11
**Emotion Regulation Questionnaire for Children and Adolescents
ERQ-CA (adapted from Gullone and Taffe, 2012)**

Tick the box:

1. When I want to feel better, I try to think about something else.

Strongly Disagree	Disagree	Half and half	Agree	Strongly Agree

2. I keep my feelings to myself.

Strongly Disagree	Disagree	Half and half	Agree	Strongly Agree

3. When I want to feel less bad (e.g sad, angry, worried) I try to think about something else.

Strongly Disagree	Disagree	Half and half	Agree	Strongly Agree

4. When I am feeling happy, I try not to show it.

Strongly Disagree	Disagree	Half and half	Agree	Strongly Agree

5. When I am worried about something, I try to think about it in a way that makes me feel better.

Strongly Disagree	Disagree	Half and half	Agree	Strongly Agree

6. I control my feelings by not showing them.

Strongly Disagree	Disagree	Half and half	Agree	Strongly Agree

7. When I want to feel better about something, I change the way I am thinking about it.

Strongly Disagree	Disagree	Half and half	Agree	Strongly Agree

8. I control my feelings about things by changing the way I think about things.

Strongly Disagree	Disagree	Half and half	Agree	Strongly Agree

9. When I am feeling bad (eg sad, angry, worried) I try not to show it.

Strongly Disagree	Disagree	Half and half	Agree	Strongly Agree

10. When I want to feel less bad (eg sad, angry or worried) about something, I try to change how I think about it.

Strongly Disagree	Disagree	Half and half	Agree	Strongly Agree

Appendix B12
Additional Information on Quantitative Measures

Sense of Mastery Scale of the Resiliency Scales for Children and Adolescents (Appendix B7)

Reliability of the Sense of Mastery Scale. The Resiliency Scales were standardised in the U.S with a child sample (aged 9-14) and an adolescent sample (aged 15-18). Reliability and validity evidence is provided for each age band.

Internal consistency. It is important to ensure that items within the scale assess the same constructs. Prince-Embury (2009, p.85) reports that Cronbach's alpha coefficients were computed for each scale within each age band and were also computed for the subscales within each scale. The Sense of Mastery Scale showed moderate to high alpha coefficients for the standardization sample of children aged 9-11 (0.85). The Sense of Mastery subscale coefficients were 0.77 for Self-Efficacy, 0.69 for Optimism and 0.56 for Adaptability.

Test- Re-test Reliability. Test-retest reliability coefficients for the child sample were computed based on a sample of 49 children who responded to the Resiliency Scales twice (with a mean interval of 12 days). Correlation coefficients for the Sense of Mastery Scale for the test-retest sample were moderate to high, indicating some degree of stability over time (0.79).

Construct Validity. Confirmatory factor analysis was used to test the factor structure specified by the authors of the scale. The results confirmed that the three factor model with three Sense of Mastery subscales on the Sense of Mastery factor fits best and that this result was consistent across all age groups (Prince-Embury, 2009, p.95).

Convergent and Divergent Validity. Scores on the Resiliency Scales were correlated with scores on other assessment instruments to provide evidence of convergent and divergent validity. It was expected that scores on the Sense of Mastery scale would correlate positively with positive self-concept and negatively with measures of negative affect, such as depression, anxiety, anger and disruptive behavior for example, the Beck Youth Inventories – Second Edition and the Piers-Harris Children's Self-Concept Scale, Second Edition. The developers found validity

support in that correlations were strong and in the predicted direction (Prince-Embury, 2009, p.106).

Implicit Theories Scale ITS (Appendix B8)

Standardisation, Reliability and Validity. Data from six validation studies are available on the reliability and validity of the measure. The implicit theory of intelligence measure had high internal reliability (alpha coefficients ranged from 0.94 to 0.98). The test-retest reliability over a 2-week interval was 0.80.

Myself-as Learner Scale MALS (Appendix B10)

Standardisation, reliability and validity information. The scale was standardized on sample of 389 Year 7/8 pupils attending an urban comprehensive school. The set of norms produced suggest that a score between 60 and 80 out of 100 (mean 71, SD 10.5) fell within the average range. An alpha reliability index of 0.85 was reported indicating strong internal consistency. No test-retest reliability is reported.

Emotion Regulation Questionnaire for Children and Adolescent ERQ-CA (Appendix B11)

Standardisation, reliability and validity. The ERQ-CA was standardized by its authors with a sample of 827 Australian participants between 10 and 18 years. Reliability and validity of the scale were examined according to 3 age groups, (10-12 years, 13-15 years and 16-18 years).

Reliability. For the 6-item cognitive reappraisal scale the alpha reliability coefficient was 0.82 for the 10-12 year-olds. For the 4-item emotion suppression scale the alpha reliability coefficient was 0.69 for this age group. The authors report that the findings indicate that the ERQ-CA has sound internal consistency.

Test-retest reliability is reported as moderately sized. The time difference between the assessments was 12 months. For the cognitive reappraisal scale the correlation coefficient ranged from 0.37 to 0.47 (results are not cited for 10-12 year-olds). For the emotion suppression scale the coefficient for 10-12 year-olds was 0.40. The authors note that a higher level of stability would be expected for older participants as it is consistent with theoretical proposals that strategy use becomes more trait-like with increasing age.

Validity. The goodness of fit for the two factor model was examined. The comparative fit index for the two factor model is given as 0.962 for the 10-12 year-olds. The authors report that there is support for the soundness of the ERQ-CA factor structure.

Convergent validity was examined through correlations with the Children's Depression Inventory and with the Big Five Questionnaire for Children. It was found that reports on the two scales of the ERQ-CA correlated in the expected directions with self-reported depressive symptoms on the CDI. A significant positive association was found between scores on the CDI and the emotion suppression scale of the ERQ-CA. Significant negative correlations (0.2) were found between scores on the CDI and cognitive reappraisal scores. Cognitive reappraisal was negatively associated with neuroticism on the BFQ-C (-0.2) and positively associated with extraversion (0.2). Emotion suppression was positively correlated with neuroticism on the BFQ-CA (0.23) and higher emotion suppression scores were negatively associated with extraversion.

The authors conclude that the ERQ-CA is a valid and reliable tool for the assessment of two emotion regulation strategies.

Appendix B13
Pupil Questionnaire for the Qualitative Phase

1. Has the 'learning track' project helped you with your learning?

    yes/ no/maybe

    How?

2. Has the learning track project helped you cope with your feelings?
    yes/ no/maybe

    How?

3. Is there anything you can do to help you feel better when you find the work difficult? yes/ no/maybe

    What can you do?

4. Is there anything you can do to help you feel better when you have to take a test? yes/no/maybe

    What can you do?

5. What would you tell a Year 4 child who felt worried, frustrated or sad when doing school work?

6. What did you like about the sessions?

7. What would make the sessions better?

Thank you for completing the questionnaire

Appendix B14
Teacher Questionnaire (post-Intervention)

I would like to find out your views in order to evaluate the impact of the 'Learning Track' intervention. Please do not refer to individual children by name. You are welcome to leave out any questions.

1. What went well?

2. What would have made it better?

3. Has this project had an impact on the class in general? If so, please give details.

4. Please tick if you have noticed changes in any of the following as a result of the project:

   - Classroom cohesion (feelings of belonging and connectness between pupils)
   - Pupils' effort, persistence and engagement on challenging tasks
   - Pupils' ability to manage their emotions
   - How you talk to pupils about their work or effort
   - How you speak to pupils about emotions in the classroom

5. Has the project given you an opportunity to reflect on how you view learning and emotions? If so, please give details

6. Have you noticed children in your class putting into practice any of the knowledge and strategies learnt through the project? Can you give any examples?

7. Would you recommend participating in the project to another teacher?

Thank you for completing the questionnaire.

Appendix B15
Debriefing Letter to Schools

The 'Learning Track' Project

Thank you for taking part in the above study which took place with Year 5 and Year 6 children from May 2013 to July 2014. The aim of the study was to find out whether the intervention helped children manage negative emotions associated with learning. It was hypothesised that through helping the children to adopt a 'mastery' orientation to learning (that is, improving competence through effort and practice) as well as through raising their awareness of ways of managing their emotions they would be more able to keep on the 'learning track'.

The children completed questionnaires. The information from these cannot be traced back to any individual child. These questionnaires will be destroyed at the end of the study. The teachers also completed brief questionnaires. These have been coded by me so that it is not possible to trace them back to any teachers personally. These are kept in a locked filing cabinet and will destroyed at the end of the study.

The results of the study have been analysed. All the teachers said that they would recommend the project to another teacher. The vast majority of pupils reported that the project had helped them with their learning and with their emotions.   It was found that the intervention appeared to have a significant impact on pupils in the intervention classes' beliefs about ability, mastery orientation to learning and their use of emotion regulation strategies related to the learning context. However, there were some limitations in the study's design which may have affected the results.

The contents of the intervention are available should the school wish to incorporate them into the PSHE curriculum.

My contact details as well as those of my supervisor's at Cardiff University are provided below, as well as contact details in case of complaint.
Thank you once again for your participation which has made this study possible.

Yours sincerely,

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Appendix C1

Initial coding scheme based on pupil questionnaire items

Q1. **How has LTP helped you with learning?**

Thinking – More positive, confidence, think I can do it,

Keeping calm, not feeling nervous, not as shy, turtle technique, feel happy, breathing

Learning – more focused, concentrate more, progressing , pace myself, helped me learn, keep trying, do more work, cope with pressure, practice

Learnt new things/ Taught about brain/ neurons/ pathways/

Didn't help

Other (vague)

Q2. **How has LTP helped you cope with your feelings?**

Calm/turtle technique/breathing/ control my anger, nerves/help with feelings, feeling scared/ help at home/ it explained feelings/

Help with thinking
More courage/can cope with tests

Other

Q3. **What can you do when you find the work difficult?**

Thinking – positive thoughts

Turtle technique/ self-calming/ breathing

Ask for help

Use strategies – step by step/ practice/ take time/change strategy

Effort/ keep trying/ persist/ learn from mistakes

Q4 **What can you do when you have to take a test?**

Thinking – positive thoughts/ confident/ use thinking

Strategies – remember what I've learnt/ focus/ method/ come back to question

Keep calm/ control feelings/ relax/ turtle technique

Q5 How would you advise a Y4 child?

Keep calm/ turtle technique/ be happy/ don't worry

Practise/ ask for help/ focus/ listen/ mistakes are OK/ try

Have positive thoughts

Q6 What did you like about the sessions?

Learning facts/ new things/ interesting/ fun activities/ games/ quiz/ role play

Green/red thoughts

Ways to keep calm/controlling emotions/ turtle technique

Initial Codes (5)

1. Using turtle technique – pink

2. Keeping calm, controlling feelings – dark blue

3. Learning new facts – turquoise

4. Using thinking techniques – green

5. Positive thinking – yellow

Appendix C2
Frequency of Responses and Codes by Questionnaire Item

Table C2.1
Responses for Question 1: Has the 'learning track project' helped you with your learning?

	Yes		No		Maybe			
	N	**%**	**N**	**%**	**n**	**%**	**Total n**	**Total %**
Class 1 (n=28)	26	93%	0	0%	2	7%	28	100%
Class 2 (n = 29)	27	93%	2	7%	0	0%	29	100%
Class 3 (n = 29)	26	90%	0	0%	3	10%	29	100%
Class 4 (n= 27)	25	92%	1	4%	1	4%	27	100%
Total (n = 113)	104	92%	3	3%	6	5%	113	100%

How?
1. Emotional regulation (help with keeping calm/controlling feelings)
2. Mastery orientation (persistence, practice, effort, focus)
3. Incremental beliefs/positive thinking (thinking I can get better, thinking I can do it, coping with hard problems, thinking positive thoughts)
4. Learning facts (about the brain, about feelings)

Table C2.2:
Analysis of themes for responses to Question 1

Theme/code	N	%
Emotional regulation	38	43%
Mastery orientation	7	8%
Incremental beliefs/positive thinking	10	11%
Learning facts	33	38%
Total	88	100%

Table C2.3:
Responses for Question 2: Has the 'learning track project helped you cope with your feelings? Yes/No/Maybe

	Yes		No		Maybe			
	N	%	N	%	n	%	Total n	Total %
Class 1 (n=28)	19	68%	3	11%	6	21%	28	100%
Class 2 (n = 29)	24	83%	2	7%	3	10%	29	100%
Class 3 (n = 29)	20	70%	4	13%	5	17%	29	100%
Class 4 (n= 27)	23	85%	2	7.5%	2	7.5%	27	100%
Total (n = 113)	86	76%	11	10%	16	14%	113	100%

How?
1. General strategies to help with controlling emotions/keeping calm
2. Specific mention of turtle technique to keep calm
3. Help with thinking/thoughts

Table C2.4 :
Analysis of themes for responses to Question 2

Theme/code	N	%
Strategies for controlling emotions	38	47%
Turtle technique	40	49%
Thinking	3	4%
Total	81	100%

Table C2.5:
Responses for Question 3: Is there anything you can do to help you feel better when you find the work difficult?

	Yes		No		Maybe			
	n	**%**	**N**	**%**	**n**	**%**	**Total n**	**Total %**
Class 1 (n=28)	19	68%	6	21%	3	11%	28	100%
Class 2 (n = 29)	24	83%	3	10%	2	7%	29	100%
Class 3 (n = 29)	27	93%	1	3.5%	1	3.5%	29	100%
Class 4 (n= 27)	20	74%	4	15%	3	11%	27	100%
Total (n = 113)	90	80%	14	12%	9	8%	113	100%

1. Self-regulated learning: use of strategies, effort, persistence, focus
2. Emotional regulation through using thinking strategies
3. Emotional regulation through self-calming techniques

Table C2.6:
Analysis of themes for responses to Question 3

Theme/code	**N**	**%**
Self-regulated learning	41	49%
Thinking	7	8%
Self-calming	36	43%
Total	84	100%

Table C2.7
Responses for Question 4: Is there anything you can do to help you feel better when you have to take a test?

	Yes		No		Maybe			
	N	**%**	**N**	**%**	**N**	**%**	**Total n**	**Total %**
Class 1 (n=28)	21	75%	5	18%	2	7%	28	100%
Class 2 (n = 29)	24	83%	4	14%	1	3%	29	100%
Class 3 (n = 29)	24	83%	3	10%	2	7%	29	100%
Class 4 (n= 27)	20	74%	3	11%	4	15%	27	100%
Total (n = 113)	89	79%	15	13%	9	8%	113	100%

1. Self-regulated learning: use of strategies, effort, persistence, focus
2. Emotional regulation through using thinking strategies
3. Emotional regulation through self-calming techniques

Table C2.8:
Analysis of themes for responses for Question 4

Theme/code	N	%
Self-regulated learning strategies	20	23.3%
Thinking	21	24.4%
Self-calming	45	52.3%
Total	86	100%

Question 5: What would you tell a Year 4 child who felt worried, frustrated or sad when doing school work?
1. Self-regulated learning strategies
2. Emotional regulation through thinking
3. Emotional regulation through self-calming

Table C2.9
Analysis of themes for responses to Question 5

Theme/code	N	%
Self-regulated learning strategies	53	40%
Thinking	16	12%
Self-calming	64	48%
Total	133	100%

Teacher Questionnaire Responses

Table C2.10
Teacher Responses on Teacher Questionnaire

Changes Noticed	Class 1 Teacher	Class 2 Teacher	Class 3 teacher	Class 4 Teacher
Pupils' effort, persistence and engagement		Yes	Commented "hard to see at this time of year"	
Pupils' ability to manage their emotions		Yes	yes	

Changes Noticed	Class 1 teacher	Class 2 Teacher	Class 3 teacher	Class 4 teacher
How you talk to pupils about their work or effort	**Yes**			**Yes "I mention the pathways and the importance of practice"**
How you speak to pupils about emotions in the classroom	**yes**		**yes**	

Appendix C2a
Colour-Coding of Transcript Using Initial Codes by Questionnaire Item (Sample)

Question 1: Has the 'Learning Track ' project helped you with your learning? How?

School 1 Class 1
When I think better and more positive about myself it helps me learn.
It's taught me how to calm down and think according to the situation. It made me feel I can get better at things which helped me get better.
It helped and taught me about many things to do with the brain.
It's taught me about many things I never even knew about.
I more focus and not shy.
It helps you because in a test if you feel nervous the turtle technique.

Because it has helped me get smarter and more confident.
Because every time I learn I discover things.
I am now confident.
Because it can help me concentrate more.
It teaches you how to calm down and teaches you about your brain.
I am now progressing in my learning.
Boosted my confidence.
Because I know the turtle technique.
It has showed me how to keep calm and has also showed me how my brain works.
Yes because I can do the turtle technique.
Because I didn't know what the neurons did.
No -I have come across many things and do like it but some techniques did not help me.
No -Because if I am frustrated nothing would calm me down.
It taught me to calm down when I am in a situation.
Because I got to learn about the brain, turtle technique and Michael Jordan.
It makes me feel happy in my work.
Because it has made me pace myself while learning.
This helped me learn how to calm myself down when I was angry by using the Turtle Technique.
School 1, Class 2
Because Miss taught me a lot and it can change me.
I feel that the learning track has helped me but not with learning. It has helped me understand to calm.
It's helped me in different ways like how to make myself calm down when I'm angry, etc.
It helps me a lot with my brain and it helps my feelings.
The breathing in and out.
By using the turtle technique.
I really like the techniques they teach me because they really help.
I say 'kind of' because if you make more entertainment it would be better.
It's because I have learnt different ways to calm down.

The learning track project has helped me because it has shown me how to be calmer at certain situations.

It helped me because it helped me to learn and be confident.

Because I've learnt that when your upset you can't talk and when your too happy you can't learn.

Yes,because now I know what to do if I get frustrated.

It helps me think "I can do it".

Because the lessons helped me to control myself and I should always try again.

That when I get angry I do the turtle technique.

I have gone more confident and I know more information about the brain which I have been sharing with my family.

Yes It has helped me to learn a lot and to know how the brain works.

It was very useful and this helps through life.

I has helped me because now I am able to control my feelings.

It is very useful for things in life.

School 2 Class 3

Because of the way the teacher explained it.

It has helped because I learnt how to understand my feelings

Because I learned how the learning track works.

It taught me about the brain and feelings

I explained how my brain works.

Because it just taught me about the brain.

It has made me more confident to learn and I have learnt some facts.

Yes, because I have learnt how to control my emotions and feelings.

It has helped me a lot because it has told us lots about calming down techniques and we learnt lots of facts about the brain.

No – because I have not learnt about maths, English, etc etc, (But it's helped me to deal with my temper).

It has given me facts about the brain and has taught me how to control my feelings.

It told me how the brain works and the turtle technique.

It told me how the brain works and other things.

Yes, because it made me learn a lot of things (eg turtle technique).

Because I know how to control my temper (TT) and I know more about the brain.

Because know more about brain.

School 2, class 4

Yes, the turtle technique.

I know what a neuron is and what it does.

It helped me to learn how the brain works.

It helped me because I didn't know anything about the brain, now I know what happens to the brain and the turtle technique.

It helps me to calm down.

I found out you can do more work when you are happy.

Because it was always talking about people and how they feel.

Yes, because it has encouraged me to do more work in school.

Because when I feel worried or angry in school I can use a technique I learnt.

I know a lot about the brain now and it is interesting.

The techniques have helped me cope with pressure and hard problems.

Because if I feel scared then I could use the turtle technique.
Yes, because it is helping me to concentrate more.
It taught me how to keep calm and cope with my feelings.
Now I understand how the brain works. I will keep on practising until it's perfect.
The turtle technique.
How the brain works and learning lots of things like the turtle technique.
It has shown me techniques on how to cope with problems.
Learning about the brain.
It has told me how to calm down my anger and it helps me communicate with my table.

Question 2: Has the learning track project helped you cope with your feelings? How?
School 1, class 1:
It helps me when I am angry I use the turtle method.
It has taught me the turtle technique which helps me control anger, frustration and sadness.
I now act like I used to but it has helped me to control my anger.
I use the turtle technique to calm myself down.
I think M R has been telling me different ways to feel calm.
It kind of helped me with my feelings.
Because I have learnt new ways to calm down my behaviour.
Because I use the turtle technique when I get angry or nervous.
The turtle technique.
I can now control my feelings.
Taught how to be calm.
Because I do the turtle technique
Because instructions given helped me back home.
No- it hasn't because my feelings are too strong.
By enabling me to think.
Because I learnt how to be calm.
Because I did not know what the turtle technique was.
By breath in and out.
The turtle technique.
When I am angry I use turtle technique.
No- because I still can't control my emotions.
At home, when I had just come back from school, I was angry because I felt very crowded but I calmed myself down.

School 1, class 2
Because I always call people rude stuff and one day I controlled myself.
I can now calm down more easily after learning the techniques.
Because it helped me explain my feelings in front of the whole class.
It controls my anger and I know how to stop my anger and also the turtle technique.
When I get angry – talk about it and breathing.
The turtle technique really helps me because when I'm breathing in I know I need to control myself so I don't hurt anyone's feelings.

Appendix C3

Coding Scheme Development Chart

Developmental Phases of Analytic Framework	Explanation and Description of Changes to Coding Scheme
1. After collecting questionnaires the researcher noted recurring themes and ideas according to each questionnaire item.	Initial coding scheme developed and transcript colour coded (5 colours): Yellow – positive thinking/incremental beliefs Green – using thinking strategies Pink – using turtle technique/controlled breathing Dark blue – self-regulated learning strategies/persistence/practice Turquoise – learning new facts
2. Colour coded transcript analysed for frequency of themes.	Coding scheme refined: 1. emotion regulation/controlling emotions/self-calming 2. mastery orientation/Self-regulated learning 3. incremental beliefs/positive thinking 4. learning facts 5. thinking techniques 6. turtle technique – specific mention
3. Data analysed according to research questions.	Further refinement of codes. Turtle technique is included within emotion regulation/self-calming 1. self-calming 2. mastery orientation 3. incremental theory 4. thinking strategies 5. learning facts
4. Transcript coded with new codes	Further refinement – 'learning facts' is reconsidered as a separate code as the facts relate to incremental theory. Decision made to include this as part of incremental theory code. Four remaining codes emerge as 'main findings'.
5. New coding of transcript. Minor modifications made as transcript is read and re-read, eg changes to descriptors. This version is now the final coding scheme, but remains flexible.	Disconfirming evidence considered. Evidence for entity belief and performance orientation in transcript. Evidence for lack of impact on learning and emotions.

FINAL CODING SCHEME and DESCRIPTORS

IT = feel I can get better/confidence/think I can do it/ learning new facts about
    brain and feelings

M = effort, trying, focus, persistence, concentration; use of learning strategies

TH = using thinking strategies/green and red thoughts

SC = use of strategies to calm down, controlled breathing

X = has not helped

? = unsure

Appendix C4
Second Colour-Coded Transcript of Pupil Questionnaires (sample)

Appx IT SC TH M X ?

Appendix: Qualitative Results – coded

Question 1: Has the 'Learning Track' project helped you with your learning? How?

School 1 Class 1

TH **IT** When I think better and more positive about myself it helps me learn.

TH **SC** It's taught me how to calm down and think according to the situation. It made me feel I can
IT better at things which helped me get better.

IT It helped and taught me about many things to do with the brain.

IT It's taught me about many things I never even knew about.

M I more focus and not shy.

SC It helps you because in a test if you feel nervous the turtle technique.

IT Because it has helped me get smarter and more confident.

IT Because every time I learn I discover things.

IT I am now confident.

M Because it can help me concentrate more.

IT It teaches you how to calm down and teaches you about your brain.

M I am now progressing in my learning.

IT Boosted my confidence.

SC Because I know the turtle technique.

IT It has showed me how to keep calm and has also showed me how my brain works.

SC Yes because I can do the turtle technique.

IT Because I didn't know what the neurons did.

X No -I have come across many things and do like it but some techniques did not help me.

X No -Because if I am frustrated nothing would calm me down.

SC It taught me to calm down when I am in a situation.

IT Because I got to learn about the brain, turtle technique and Michael Jordan.

? It makes me feel happy in my work.

Appendix C4a
Colour-Coded Transcript of Teachers' Questionnaires

Teacher Questionnaires

1. What went well?

School 1, teacher 1   Activitie'

The acting scenarios. The growth mindset. The video clips. Pair work.

School 1, teacher 2

I noticed that during the sessions, children who wouldn't usually contribute did
so with more confidence.
Children looked forward to each session.

School 2, teacher 3

The children were very interested (as was I). Interesting to watch the children's
interaction with each other and the teacher.

School 2, teacher 4

The children were very interested. It was a good use of a Friday afternoon when
they are usually flagging!

2. What would have made it better?

School 1, teacher 1

-

School 1, teacher 2

More follow-up opportunities/activities to re-inforce the topics covered each
week.

School 2, teacher 3

Being in a heatwave on a Friday afternoon when some children have been fasting
has been testing.

School 2, teacher 4

I can't think of anything, really. I suppose a longer course or additional course, to
embed/build on what they have learnt would be beneficial.

Earlier in the year.

Appendix C5

Final Themes and Descriptors

Theme	Descriptor	Why?	Why not?
IT (incremental theory)	Feel I can get better/ confidence/ think I can do it/ learning new facts about brain and feelings.	Learners with an incremental belief view themselves as capable of changing and improving; challenges and effort are seen as helpful to learn and grow (Dweck, 2006)	Pupils may be responding with answers perceived to be desirable or which might please researcher. Hypothetical questions asking what pupils can do or would do may not coincide with how they would actually behave. Could some responses be interpreted as reflecting an entity theory?
M (Mastery goal orientation)	Putting in effort, trying, focus, persistence, concentration, use of learning strategies.	With a mastery or learning goal orientation the focus is on developing one's competence (Dweck and Leggett, 1988) Pupils with mastery orientation use strategies (such as positive self-talk and self-motivating instructions) and increase effort when confronting a challenge (Dweck, 2000).	Some of the positive self-talk, eg "Believe in yourself" could in fact reflect a performance orientation, eg believing one can out-perform others or obtain a good grade, rather than believe you can improve, which would reflect a mastery orientation. It is not always clear from pupils' responses what the belief is. As mentioned above, some responses could be to please the researcher or could reflect pupils' perceptions of desirable responses. Hypothetical responses may not reflect what pupils might actually do.
TH thinking	Using thinking strategies/green or red thoughts	Cognitive reappraisal involves interpreting emotion-eliciting situations in ways	Some of the responses, eg "Think positive thoughts about yourself" may not involve reappraisal.

		that limit emotional responding (Ochsner and Gross, 2005).	
SC (self-calming)	Use of strategies to calm down, controlled breathing	References to 'turtle technique' and to finding ways to keep calm.	Some mentions of calming down are not related to learning context
X	Intervention has not helped	References to nothing having changed, intervention hasn't helped. Pupils were asked to write what they really think.	Reactivity effects may mean that some pupils may have recognised aim of intervention and have wanted to subvert this. Intervention may have needed longer to be embedded – see teacher responses.
?	Miscellaneous, eg vague responses, responses that cannot be categorised.	Researcher unable to clarify with pupils meaning of their response. Eg "It is useful for things in life" and "loads of things".	

Appendix C6

Table C6.1:

Frequency of Final Themes from Pupil Questionnaires

Theme	Frequency	% of responses
SC: Self-calming	223	44%
IT: Incremental Theory	110	22%
M: Mastery Goal Orientation	105	21%
TH: Thinking strategies	27	05%
? – unclear/ unsure	36	07%
X hasn't helped	07	01%
Total	508	100%

Appendix C7
Coding of Transcript with Final Themes (sample)

Question 1: Has the 'Learning Track ' project helped you with your learning? How?
School 1 Class 1
IT When I think better and more positive about myself it helps me learn.
SC It's taught me how to calm down and think according to the situation. It made me feel I can get **IT** better at things which helped me get better.
IT It helped and taught me about many things to do with the brain.
IT It's taught me about many things I never even knew about.
M I more focus and not shy.
SC It helps you because in a test if you feel nervous the turtle technique.
IT Because it has helped me get smarter and more confident.
IT Because every time I learn I discover things.
IT I am now confident.
M Because it can help me concentrate more.
IT It teaches you how to calm down and teaches you about your brain.
M I am now progressing in my learning.
IT Boosted my confidence.
SC Because I know the turtle technique.
IT It has showed me how to keep calm and has also showed me how my brain works.
SC Yes because I can do the turtle technique.
IT Because I didn't know what the neurons did.
X No -I have come across many things and do like it but some techniques did not help me.
X No -Because if I am frustrated nothing would calm me down.
SC It taught me to calm down when I am in a situation.
IT Because I got to learn about the brain, turtle technique and Michael Jordan.
? It makes me feel happy in my work.
M Because it has made me pace myself while learning.
SC This helped me learn how to calm myself down when I was angry by using the Turtle Technique.
School 1, Class 2
IT Because Miss taught me a lot and it can change me.
X I feel that the learning track has helped me but not with learning. It has helped me understand to **SC** calm.
SC It's helped me in different ways like how to make myself calm down when I'm angry, etc.
IT It helps me a lot with my brain and it helps my feelings.
SC The breathing in and out.
SC By using the turtle technique.
M I really like the techniques they teach me because they really help.
X I say 'kind of' because if you make more entertainment it would be better.
SC It's because I have learnt different ways to calm down.
 SC The learning track project has helped me because it has shown me how to be calmer at certain situations.
IT It helped me because it helped me to learn and be confident.

? Because I've learnt that when your upset you can't talk and when your too happy you can't learn.

M Yes,because now I know what to do if I get frustrated.

IT It helps me think "I can do it".

SC/M Because the lessons helped me to control myself and I should always try again.

SC That when I get angry I do the turtle technique.

IT I have gone more confident and I know more information about the brain which I have been sharing with my family.

ITYes It has helped me to learn a lot and to know how the brain works.

? It was very useful and this helps through life.

SC I has helped me because now I am able to control my feelings.

? It is very useful for things in life.

School 2 Class 3

? Because of the way the teacher explained it.

IT It has helped because I learnt how to understand my feelings

IT Because I learned how the learning track works.

IT It taught me about the brain and feelings

IT I explained how my brain works.

IT Because it just taught me about the brain.

IT It has made me more confident to learn and I have learnt some facts.

SCYes, because I have learnt how to control my emotions and feelings.

IT It has helped me a lot because it has told us lots about calming down techniques and we learnt lots of facts about the brain.

X No – because I have not learnt about maths, English, etc etc, (But it's helped me to deal with my   SC temper).

IT / SC It has given me facts about the brain and has taught me how to control my feelings.

IT It told me how the brain works and the turtle technique.

IT It told me how the brain works and other things.

 IT Yes, because it made me learn a lot of things (eg turtle technique).

IT/ SC Because I know how to control my temper (TT) and I know more about the brain.

IT Because know more about brain.

School 2, class 4

SC Yes, the turtle technique.

IT I know what a neuron is and what it does.

IT It helped me to learn how the brain works.

IT It helped me because I didn't know anything about the brain, now I know what happens to the brain and the turtle technique.

SC It helps me to calm down.

IT I found out you can do more work when you are happy.

? Because it was always talking about people and how they feel.

M Yes, because it has encouraged me to do more work in school.

SC Because when I feel worried or angry in school I can use a technique I learnt.

IT I know a lot about the brain now and it is interesting.

M The techniques have helped me cope with pressure and hard problems.

SC Because if I feel scared then I could use the turtle technique.

M Yes, because it is helping me to concentrate more.

SC It taught me how to keep calm and cope with my feelings.

M Now I understand how the brain works. I will keep on practising until it's perfect.
SC The turtle technique.
IT How the brain works and learning lots of things like the turtle technique.
M It has shown me techniques on how to cope with problems.
IT Learning about the brain.
SC It has told me how to calm down my anger and it helps me communicate with my table.

Question 2: Has the learning track project helped you cope with your feelings? How?
School 1, class 1:
SC It helps me when I am angry I use the turtle method.
SC It has taught me the turtle technique which helps me control anger, frustration and sadness.
SC I now act like I used to but it has helped me to control my anger.
SC I use the turtle technique to calm myself down.
SC I think M R has been telling me different ways to feel calm.
SC It kind of helped me with my feelings.
SC Because I have learnt new ways to calm down my behaviour.
SC Because I use the turtle technique when I get angry or nervous.
SC The turtle technique.
SC I can now control my feelings.
SC Taught how to be calm.
SC Because I do the turtle technique.
? Because instructions given helped me back home.
X No- it hasn't because my feelings are too strong.
Th By enabling me to think.
SC Because I learnt how to be calm.
SC Because I did not know what the turtle technique was.
SC By breath in and out.
SC The turtle technique.
SC When I am angry I use turtle technique.
X No- because I still can't control my emotions.
SC At home, when I had just come back from school, I was angry because I felt very crowded but I calmed myself down.
School 1, class 2
SC Because I always call people rude stuff and one day I controlled myself.
SC I can now calm down more easily after learning the techniques.
? Because it helped me explain my feelings in front of the whole class.
SC It controls my anger and I know how to stop my anger and also the turtle technique.
SC When I get angry – talk about it and breathing.
SC The turtle technique really helps me because when I'm breathing in I know I need to control myself so I don't hurt anyone's feelings.
SC Yes, because now I know how to calm down if anyone bullies you.
SC It is because now I can cope with the tests because of the turtle technique.
IT It helped me because it gave me courage and it made me feel better.
IT I understand the feelings to learn and I did learn a lot and I was happy.
M Yes, because I know I can do things more fluently.

X A bit – sometimes it works because I am not really angry but not when I am sad, frustrated and worried.
SC By using the turtle technique.
X It has not helped me because it is not working.
SC I can cope feelings with getting angry.
SC I have most certainly learnt how to control my feelings with the help of the turtle technique and try to control my temper as well.
? Yes and no because only works sometimes in a certain situation.
SC When a boy say bad words about me breathe four times.
? At certain problems, I refer to the learning track.
School 2, class 3
SC The turtle way helped. When I am angry or sad it helps.
SC In a way, because after learning that it was easier to cope with my feelings.
SC I get less angry. I know some of it.
SC It taught me about the turtle techniques and how to control my feelings.
X No – because I had my own way.
SC Because of the turtle technique.
SC When we learnt the turtle technique
SC It has helped me that when I get scared I can use the turtle technique to make me more calm.
SC Because I have learnt different strategies to control myself.
SC the turtle technique has taught me something about controlling my feelings and the scale to 10.
SC Because when I feel sad I can calm down.
X I haven't really noticed a difference.
X Not really because I didn't have a problem with controlling my emotions before.
SC Because I can use the turtle technique I have learnt.
SC It has helped me because I use the turtle technique when I get upset.
SC The turtle technique has helped me when I am angry.
SC Yes, because it calms me down.
SC Yes, because when I get into a bad mood I can use the turtle technique to help.
SC I think now I know some techniques I can keep calm longer.
SC I really liked the turtle technique: it helped me control my feelings.
SC Yes it does because help my feelings it help me control.
SC To calm down.
SC I can now control some of my anger.
SC Because of the turtle technique.
SC The turtle technique

Appendix C8

Inter-rater Reliability Check

... I learned how the learning track works.

It taught me about the brain and feelings

I explained how my brain works.

Because it just taught me about the brain.

It has made me more confident to learn and I have learnt some facts.

Yes, because I have learnt how to control my emotions and feelings.

SC+

IT

It has helped me a lot because it has told us lots about calming down techniques and we learnt lots of facts about the brain.

No – because I have not learnt about maths, English, etc etc, (But it's helped me to deal with my temper).

It has given me facts about the brain and has taught me how to control my feelings.

It told me how the brain works and the turtle technique.

It told me how the brain works and other things.

IT   Yes, because it made me learn a lot of things (eg turtle technique).

IT   Because I know how to control my temper (TT) and I know more about the brain.

Because know more about brain.

School 2, class 4

Yes, the turtle technique.

I know what a neuron is and what it does.

It helped me to learn how the brain works.

It helped me because I didn't know anything about the brain, now I know what happens to the brain and the turtle technique.

It helps me to calm down.

I found out you can do more work when you are happy.

Because it was always talking about people and how they feel.

Yes, because it has encouraged me to do more work in school.

Because when I feel worried or angry in school I can use a technique I learnt.

I know a lot about the brain now and it is interesting.

The techniques have helped me cope with pressure and hard problems.

3   24

Appendix D

Quantitative Analysis

Analysis of Demographic Data

1. Age of Participants by School. The mean age of all pupils who participated in the project is 10.40, with a standard deviation of .29 (see Table D1).

Table D1*:*

Mean Ages and Standard Deviations of Participants by School

School	Mean age	S.D
1	10.42	.29
2	10.39	.29
Total sample	10.40	.29

As the data were not normally distributed, the Mann-Whitney U non-parametric test was used to compare mean ages between the two schools. The test was non-significant, $p = .58$.   The samples in the two schools do not differ significantly according to age.

2. Ethnicity by school. In both schools, the majority of the children are of south Asian origin (Pakistan, Bangladesh, India, Sri Lanka), with pupils of Pakistani origin being pre-dominant in both schools. The ethnicity categories were provided by the schools from their own data (see Figure D1).
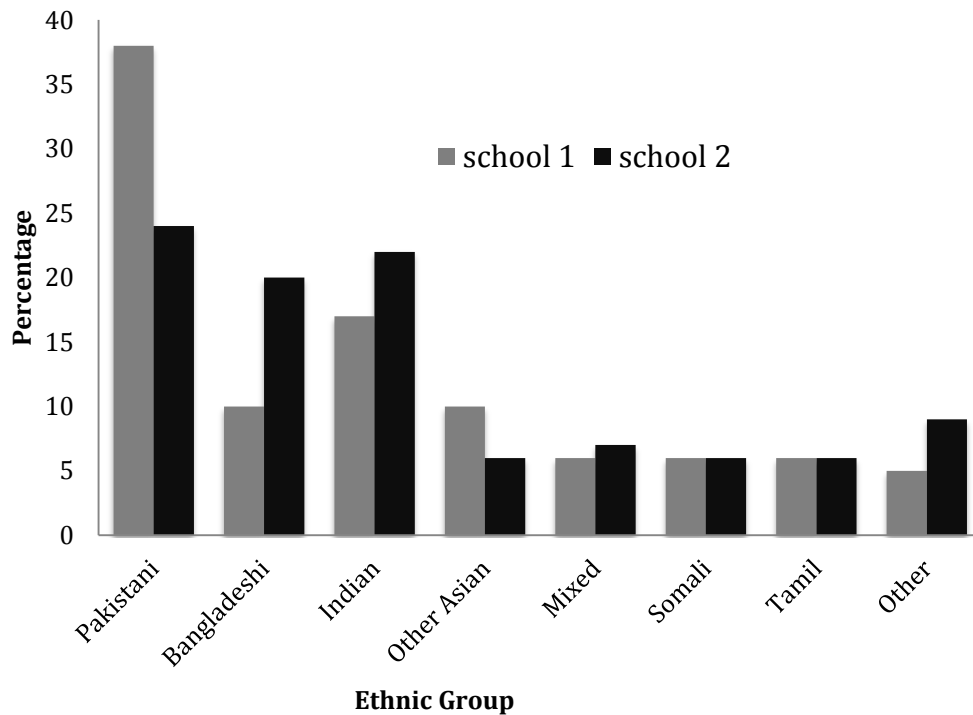
Figure D1:Percentage of Ethnic Groups by School

The chi-square test was used to test for any significant association between school and ethnicity. Fisher's exact test was used as 14 cells had an expected count of less than 5. A significant association was not found between school and ethnicity, $\chi 2$ (11) = 13.59, p = .23.

3. Gender by school.

Table D2:

Frequencies and Percentages of Boys and Girls by School

School	Boys (n) (%)	Girls (n) (%)	Total (N) (%)
1	50 (60)	34(40)	84 (100)
2	50 (61)	32 (39)	82 (100)
Total (N) (%)	100 (60)	66 (40)	166 (100)

A chi- square test was carried out to test for significance. A significant association was not found between school and gender, $\chi 2$ (1) = .37, p = .88

4.Age by Condition

Table D3:

Mean Ages and Standard Deviations of Participants by Condition

Condition	Mean age	S.D
Intervention	10.40	.29
Control	10.42	.29
Total sample mean	10.40	.29

As the data were not normally distributed, a non-parametric Mann-Whitney U test was used to compare means between intervention and control groups. The distribution of age was not found to be significantly different across categories of intervention or control group, *p* = .68.

5 Ethnicity by condition. The majority of pupils in both the intervention group and the control group were of south Asian origin (see Figure D2). A chi-square test was used to test for significance. A significant association was not found between condition and ethnicity, $\chi2$ (11) = 11.37, *p* = .38.   .
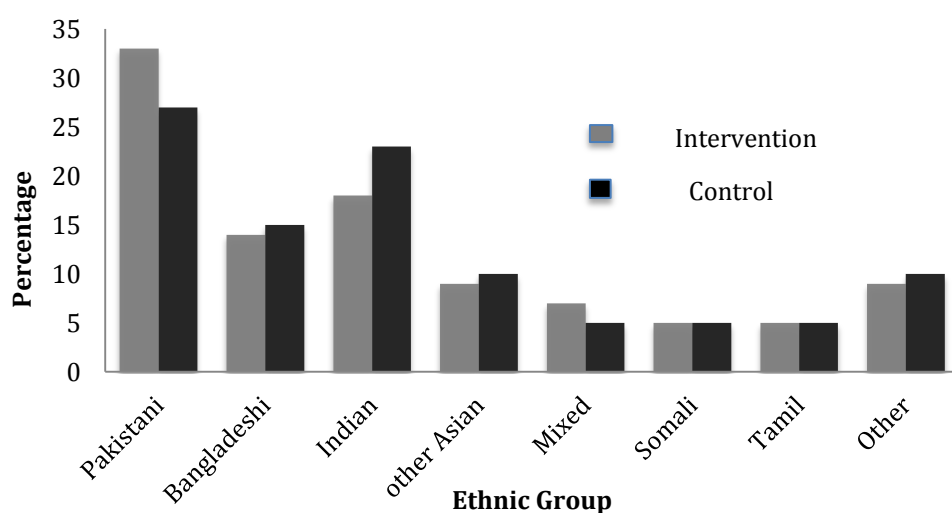
Figure D2: Percentage of Ethnic Groups in Intervention Group and Control Group

6 Gender by Condition.

Table D4:

Frequencies and Percentages of Boys and Girls by Condition

Condition	Boys	Girls	
	n (%)	n (%)	Total %
Intervention	69 (60.5)	45(39.5)	100
Control	31 (59.6)	21(40.4)	100
Total N	100	66	

A chi-square test was carried out and a significant association between gender and condition was not found, $\chi2$ (1) = 0.12, p =1.00.

Appendix D1

Table D.1.1

Summary Table of Descriptive Statistics for Interval Level Data

Measure	n	Intervention Group				n	Control Group			
		Pre-test M (S.D)	C.I	Post-test M (S.D)	C.I		Pre-test M (S.D)	C.I	Post-test M (S.D)	CI
ITS	113	3.93 (.61)	3.82-4.05	4.25 (.52)	4.15-4.35	50	3.97(.63)	3.79-4.15	3.96(.55)	3.80-4.12
MALS	111	75.99 (10.72)	73.97-78.00	76.77 (10.21)	74.85-78.70	50	73.98 (12.58)	70.41 -77.55	73.94 (12.48)	70.39-77.49
MAS	107	47.16 (7.61)	45.70-48.62	46.97 (7.78)	45.48-48.46	48	44.96 (10.06)	42.04-47.88	45.44 (8.90)	42.85-48.02
ERQ-CA	113	3.62 (.63)	3.50-3.74	3.89 (.59)	3.78–4.00	50	3.41 (.80)	3.19-3.64	3.46 (.64)	3.28-3.64

C.I = confidence interval

Appendix D2

TCGM Inferential Analysis

Table D2.1
McNemar's Test for Intervention Group's TCGM Data

pre performance or growth & post performance or growth[a]

pre performance or growth	post performance or growth	
	performance	Growth
Performance	35	15
Growth	0	62

a. exptal or control = experimental group

Figure 2.1 Hypothesis test summary for Intervention Group

Table D2.2

McNemar's Test for Control Group's TCGM Data

pre performance or growth & post performance or growth[a]

pre performance or growth	post performance or growth	
	performance	Growth
Performance	22	2
Growth	1	25

a. exptal or control = control group

Figure D1.2 Hypothesis test summary for Control Group

Appendix D3
ITS: Inferential Statistics

Table D3.1:
Normality test for ITS

Tests of Normality

	Condition	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	Df	Sig.	Statistic	df	Sig.
pretest incremental score	experimental	.121	113	.000	.949	113	.000
	Control	.113	50	.135	.960	50	.091
posttest incremental score	experimental	.120	113	.000	.952	113	.000
	Control	.107	50	.200[*]	.946	50	.023

Table D3.2
Homogeneity of Variance for ITS

Levene's Test of Equality of Error Variances[a]

	F	df1	df2	Sig.
pretest incremental score	.005	1	161	.945
posttest incremental score	.147	1	161	.702

Table D3.3
Box's Test for Equality of Covariance Matrices

1. **Box's Test**

Box's M	28.378
F	9.301
df1	3
df2	191282.112
Sig.	.000
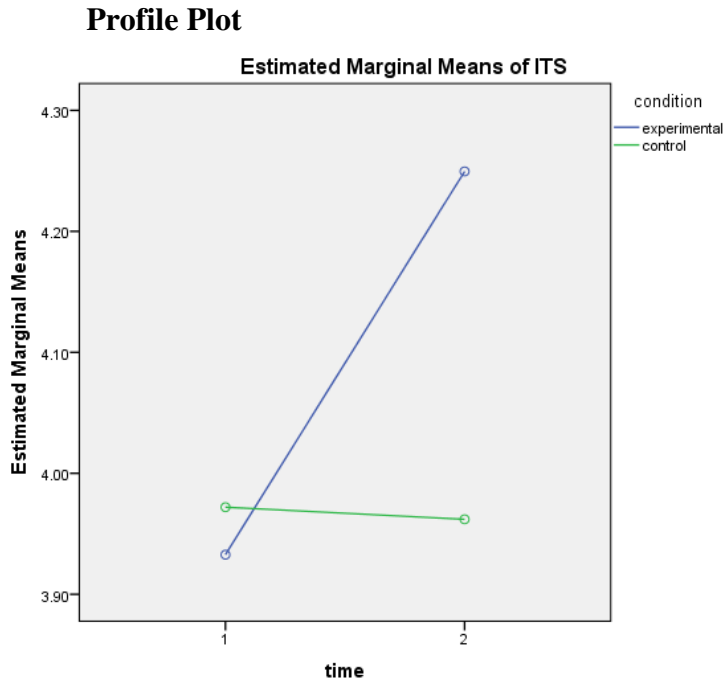
Profile Plot

Figure D3.1 Profile Plot for ITS

Table D3.4
Main Effect of Time and Time x Condition Interaction Effect for ITS

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Time	Sphericity Assumed	1.631	1	1.631	21.777	.000	.119
	Greenhouse-Geisser	1.631	1.000	1.631	21.777	.000	.119
	Huynh-Feldt	1.631	1.000	1.631	21.777	.000	.119
	Lower-bound	1.631	1.000	1.631	21.777	.000	.119
time * condition	Sphericity Assumed	1.851	1	1.851	24.709	.000	.133
	Greenhouse-Geisser	1.851	1.000	1.851	24.709	.000	.133
	Huynh-Feldt	1.851	1.000	1.851	24.709	.000	.133
	Lower-bound	1.851	1.000	1.851	24.709	.000	.133
Error(time)	Sphericity Assumed	12.062	161	.075			
	Greenhouse-Geisser	12.062	161.000	.075			
	Huynh-Feldt	12.062	161.000	.075			
	Lower-bound	12.062	161.000	.075			

Table D3.5
Main Effect of Condition for ITS

Tests of Between-Subjects Effects

Measure: ITS

Transformed Variable: Average

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	4501.545	1	4501.545	7706.125	.000	.980
condition	1.069	1	1.069	1.829	.178	.011
Error	94.048	161	.584			

Table D3.6
Repeated Measures ANOVA: Simple Effect of Time for Intervention Group's ITS Scores

Tests of Within-Subjects Effects[a]

Intervention Group

Measure: incrementalscore

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Time	Sphericity Assumed	5.671	1	5.671	58.652	.000	.344
	Greenhouse-Geisser	5.671	1.000	5.671	58.652	.000	.344
	Huynh-Feldt	5.671	1.000	5.671	58.652	.000	.344
	Lower-bound	5.671	1.000	5.671	58.652	.000	.344
Error(time)	Sphericity Assumed	10.829	112	.097			
	Greenhouse-Geisser	10.829	112.000	.097			
	Huynh-Feldt	10.829	112.000	.097			
	Lower-bound	10.829	112.000	.097			

a. condition = experimental

Mean Square Time / Mean Square Error = 5.67 / .075 = F (1,112) = 75.61

Table D3.7

Repeated Measures ANOVA: Simple Effect of Time for Control Group's ITS Scores

Control Group .

Tests of Within-Subjects Effects[a]

Measure: incrementalscore

Source		Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Time	Sphericity Assumed	.003	1	.003	.099	.754	.002
	Greenhouse-Geisser	.003	1.000	.003	.099	.754	.002
	Huynh-Feldt	.003	1.000	.003	.099	.754	.002
	Lower-bound	.003	1.000	.003	.099	.754	.002
Error(time)	Sphericity Assumed	1.232	49	.025			
	Greenhouse-Geisser	1.232	49.000	.025			
	Huynh-Feldt	1.232	49.000	.025			
	Lower-bound	1.232	49.000	.025			
Total		2597.740	163				
Corrected Total		61.243	162				

a. R Squared = .018 (Adjusted R Squared = .012)

Mean Square Time / Mean Square Error = 003/.075 F= .04

Appendix D4

MALS: Inferential Analysis

Table D4.1
Normality test for MALS

Tests of Normality

	condition	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	Df	Sig.	Statistic	df	Sig.
MAL pre-test	exp	.061	111	.200[*]	.979	111	.071
	control	.112	50	.163	.949	50	.032
MAL post-test	exp	.092	111	.021	.983	111	.167
	control	.126	50	.047	.942	50	.017

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Table D4.2

Test of Homogeneity of variance for MALS

Levene's Test of Equality of Error Variances[a]

	F	df1	df2	Sig.
MAL pre-test	3.982	1	159	.048
MAL post-test	4.543	1	159	.035

Table D4.3

Box's test of Equality of Covariance Matrices for MALS

Box's Test of Equality of Covariance Matrices[a]

Box's M	7.222
F	2.367
df1	3
df2	196825.363
Sig.	.069

Profile Plot
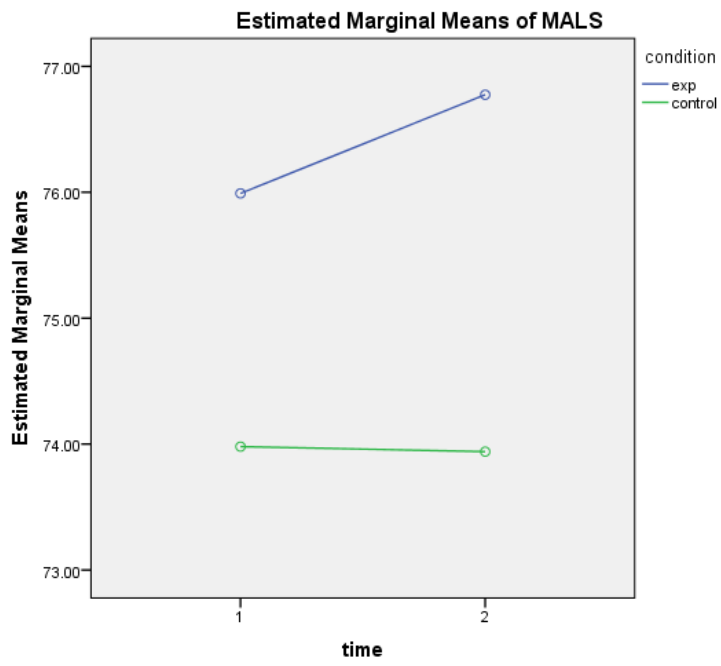
Figure D4.1 Profile Plot for MALS

Table D4.4

Mixed ANOVA for MALS: Main Effect of Time and Interaction Effect

Tests of Within-Subjects Effects

Measure: MALS

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Time	Sphericity Assumed	9.535	1	9.535	1.953	.164	.012
	Greenhouse-Geisser	9.535	1.000	9.535	1.953	.164	.012
	Huynh-Feldt	9.535	1.000	9.535	1.953	.164	.012
	Lower-bound	9.535	1.000	9.535	1.953	.164	.012
time * condition	Sphericity Assumed	11.697	1	11.697	2.395	.124	.015
	Greenhouse-Geisser	11.697	1.000	11.697	2.395	.124	.015
	Huynh-Feldt	11.697	1.000	11.697	2.395	.124	.015
	Lower-bound	11.697	1.000	11.697	2.395	.124	.015
Error(time)	Sphericity Assumed	776.365	159	4.883			
	Greenhouse-Geisser	776.365	159.000	4.883			
	Huynh-Feldt	776.365	159.000	4.883			
	Lower-bound	776.365	159.000	4.883			

Table D4.5
Main Effect of Condition for MALS

Tests of Between-Subjects Effects

Measure: MALS

Transformed Variable: Average

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	1558342.267	1	1558342.267	6396.905	.000	.976
Condition	404.727	1	404.727	1.661	.199	.010
Error	38733.795	159	243.609			

Appendix D5

MAS: Inferential Analysis

Table D5.1
Normality test for MAS

Tests of Normality

	exptal or control	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
pre scores on mastery scale	experimental group	.086	107	.050	.975	107	.043
	control group	.077	48	.200[*]	.967	48	.198
post scores on mastery scale	experimental group	.081	107	.082	.986	107	.321
	control group	.129	48	.045	.950	48	.040

Table D5.2
Homogeneity of Variance Test for MAS

3.Levene's Test of Equality of Error Variances[a]

	F	df1	df2	Sig.
pre scores on mastery scale	6.257	1	153	.013
post scores on mastery scale	2.139	1	153	.146

Table D5.3
Box's Test of Equality of Covariance Matrices for MAS

Box's M	32.612
F	10.681
df1	3
df2	179742.106
Sig.	.000

Table D5.4

Mixed ANOVA: Main Effect of Time and Interaction Effect for MAS

Tests of Within-Subjects Effects

Measure: MASscore

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Time	Sphericity Assumed	1.415	1	1.415	.089	.766	.001
	Greenhouse-Geisser	1.415	1.000	1.415	.089	.766	.001
	Huynh-Feldt	1.415	1.000	1.415	.089	.766	.001
	Lower-bound	1.415	1.000	1.415	.089	.766	.001
	Sphericity Assumed	7.351	1	7.351	.462	.498	.003
	Greenhouse-Geisser	7.351	1.000	7.351	.462	.498	.003
	Huynh-Feldt	7.351	1.000	7.351	.462	.498	.003
	Lower-bound	7.351	1.000	7.351	.462	.498	.003
Error(time)	Sphericity Assumed	2433.120	153	15.903			
	Greenhouse-Geisser	2433.120	153.000	15.903			
	Huynh-Feldt	2433.120	153.000	15.903			
	Lower-bound	2433.120	153.000	15.903			

Table D5.5

Main Effect of Condition for MAS

Tests of Between-Subjects Effects

Measure: MASscore

Transformed Variable: Average

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	564133.163	1	564133.163	4636.506	.000	.968
Condition	231.125	1	231.125	1.900	.170	.012
Error	18615.824	153	121.672			

Appendix D6
ERQ-CA Cognitive Reappraisal: Inferential Analysis

Table D6.1
Normality Test for ERQ-CA CR Scale

Tests of Normality

	Condition	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	Df	Sig.	Statistic	Do	Sig.
pre cognitive reappraisal score	Experimental	.115	113	.001	.973	113	.020
	Comparison	.120	50	.071	.952	50	.042
post cognitive reappraisal score	Experimental	.081	113	.067	.976	113	.043
	comparison	.114	50	.112	.956	50	.058

Table D6.2
Test of Homogeneity of Variance for ERQ-CA CR scale

Levene's Test of Equality of Error Variances

	F	df1	df2	Sig.
post cognitive reappraisal score	4.093	1	161	.045
	.037	1	161	.848

Table D6.3
Box's Test of Equality of Covariance Matrices for ERQ-CA CR scale

Box's Test of Equality of Covariance Matrices[a]

Box's M	6.103
F	2.000
df1	3
df2	191282.112
Sig.	.112

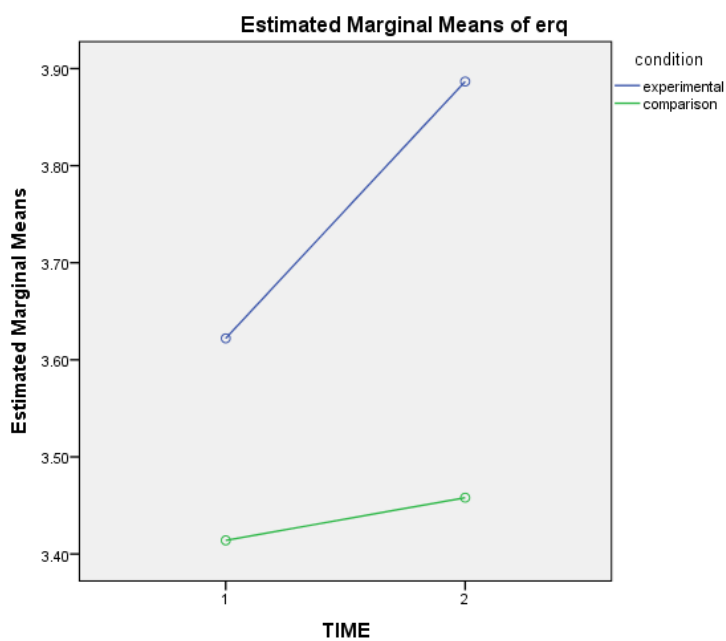**Estimated Marginal Means of erq**

Figure D6.1 Profile Plot for ERQ-CA cognitive reappraisal scores

Table D6.4

ERQ-CA Mixed Anova: Main Effect of Time and Interaction Effect of Time and Condition

Tests of Within-Subjects Effects

Measure: cogreappraisalscore

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Time	Sphericity Assumed	1.651	1	1.651	27.621	.000	.146
	Greenhouse-Geisser	1.651	1.000	1.651	27.621	.000	.146
	Huynh-Feldt	1.651	1.000	1.651	27.621	.000	.146
	Lower-bound	1.651	1.000	1.651	27.621	.000	.146
time * condition	Sphericity Assumed	.843	1	.843	14.114	.000	.081
	Greenhouse-Geisser	.843	1.000	.843	14.114	.000	.081
	Huynh-Feldt	.843	1.000	.843	14.114	.000	.081
	Lower-bound	.843	1.000	.843	14.114	.000	.081
Error(time)	Sphericity Assumed	9.621	161	.060			
	Greenhouse-Geisser	9.621	161.000	.060			
	Huynh-Feldt	9.621	161.000	.060			
	Lower-bound	9.621	161.000	.060			

Table D6.5
Main Effect of Condition for ERQ-CA CR scale

Tests of Between-Subjects Effects

Measure: ERQ

Transformed Variable: Average

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	3584.264	1	3584.264	4594.259	.000	.966
Condition	7.029	1	7.029	9.010	.003	.053
Error	125.606	161	.780			

Table D6.6
Repeated Measures ANOVAs Simple Effect of Time for ERQ-CA CR scale for Intervention Group

Tests of Within-Subjects Effects[a]

Measure: cogreappraisalscore

Source		Type III Sum of Squares	Do	Mean Square	F	Sig.	Partial Eta Squared
Time	Sphericity Assumed	3.956	1	3.956	65.258	.000	.368
	Greenhouse-Geisser	3.956	1.000	3.956	65.258	.000	.368
	Huynh-Feldt	3.956	1.000	3.956	65.258	.000	.368
	Lower-bound	3.956	1.000	3.956	65.258	.000	.368
Error(time)	Sphericity Assumed	6.789	112	.061			
	Greenhouse-Geisser	6.789	112.000	.061			
	Huynh-Feldt	6.789	112.000	.061			
	Lower-bound	6.789	112.000	.061			

a. condition = experimental

F = Mean Square/ Mean Square Error = 3.96/ .06 = 66

Table D6.7

Repeated Measures ANOVAs Simple Effect of Time for ERQ-CA CR scale for Control Group

Tests of Within-Subjects Effects[a]

Control Group on ERQ-CA Measure: cogreappraisalscore

Source		Type III Sum of Squares	Do	Mean Square	F	Sig.	Partial Eta Squared
Time	Sphericity Assumed	.048	1	.048	.838	.365	.017
	Greenhouse-Geisser	.048	1.000	.048	.838	.365	.017
	Huynh-Feldt	.048	1.000	.048	.838	.365	.017
	Lower-bound	.048	1.000	.048	.838	.365	.017
Error(time)	Sphericity Assumed	2.832	49	.058			
	Greenhouse-Geisser	2.832	49.000	.058			
	Huynh-Feldt	2.832	49.000	.058			
	Lower-bound	2.832	49.000	.058			

a. condition = comparison

$F = .05/.06 = .8$