To what extent can girls' levels of academic risk-taking be raised in Year 6 maths lessons

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Research and Development Project

To what extent can girls' levels of academic risk-taking be raised in Year 6 maths lessons?



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Abstract

When starting my first teaching job at an all girls' school, I was struck by the disparity that I saw in the classroom between the number of times that pupils were willing to put their hands up in maths lessons compared to English lessons. It was clear that something was preventing the girls from fully participating in maths and that they generally seemed less confident. One year later, after carrying out a scoping study, it was clear that there was a difference in opinion between many parents and teachers over mistakes, success and what should motivate children. For me, this was of greater significance as my class were aged between 10 and 11, about to go through puberty and its associated self-image changes and were soon to leave Junior School for Senior School. Thus, this research and development project emerged with an aim to merge the home and school views on risk-taking, success and failure, and ultimately to help the girls to take more academic risks.

The study centered around a school-based intervention which was administered to all pupils in my class. The risk-taking lessons were designed to educate the girls about what risk-taking was and allowed the girls to analyse their motivation, their responses to failure and success, and the changes that they could make to help improve these. All of this lesson material was then sent to participating parents, who were able also to become educated over the school attitudes towards risk-taking. Pupils were encouraged to explain these lessons to their parents to strengthen this home-school link.

Parent and pupil questionnaires and lesson observations were used to collect data, which started to show some positive changes. Some pupils started to put their hands up more often, they responded more positively in lessons to failures or disagreements, and they became more aware of what risk-taking was. In addition, parents felt more able to support risk-taking at home, reflected some similar language surrounding risk-taking to pupils, and some felt that their daughters were less upset by failures. However, the study was limited by that fact that interviews were not included and follow up interviews would be necessary to validate some of the findings. It would also be of benefit to extend the study period, so that subtle changes over a greater time could be studied.

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Introduction:

Whilst completing my NQT year, I was struck by the differing attitudes with which girls approached maths and English lessons. The girls were more willing to offer answers in English lessons than in maths, indicating that something was preventing them from feeling able to share their ideas so freely in maths. Moreover, it became apparent that this unwillingness to participate extended more broadly to responding negatively to failure. This created gaps in learning and achievement between English and maths and hence this study attempted to bridge this gap, to improve girls' academic risk-taking in maths.

In order to design an intervention targeting improved academic risk-taking, it was first necessary to carry out a scoping study. This took place a year previously, where pupil interviews, pupil and parent questionnaires and lesson observations helped to uncover the main influences of a pupil's propensity to take risks. What emerged through the data collection and accompanying review of current literature, was that both teachers and parents (and their views regarding risk-taking) are of influence when reviewing why children do not take academic risks (Brooks, 1994; Urdan & Schoenfelder, 2006). However, the clear gap within published research was literature combining these two factors. I have seen how home and school environments can bring about changing pupil attitudes towards success and failure, yet there is little research on how these environments interact with one another (Brooks, 1994). Therefore, further research must be carried out. If this research did not take place, it is probable

that children will receive mixed messages from home and school about success and failure, affecting their learning and attainment (Brooks, 1994).

As well as this observed lack of continuity between home and school attitudes towards risk-taking, patterns emerged from the scoping study which suggested that parents held a variety of views on what constituted success and failure at school tasks. Again, this was an issue which needed addressing, as Kernis, Brown and Broody (2000) highlighted that negative responses from parents regarding their children's mistakes could lead to a lessening of learner self-esteem. Hence, it was necessary to design a research study which attempted to merge the home and school views on mistakes and success, to see whether this would help to raise the levels of academic risk-taking amongst the students.

Looking beyond my own classroom, there is a growing trend for girls to feel underconfident in class, where they think that they are not able to achieve the same successes as others, or that they are defined by their mistakes (O'Reilly, Penn & deMarrais, 2001)). The idea of perfectionism becomes apparent for girls, particularly as they reach puberty, making it all the more necessary and important to investigate means by which these negative society attitudes can be diminished and ignored (Hawkins, Watt & Sinclair, 2006). This also shows the significance of carrying out research on Year 6 pupils, at the start of puberty and such confidence changes.

Therefore, a study was designed where risk-taking theory, resilience and mistake-making were discretely taught and exposed to pupils and parents. Focus was given to fostering a positive relationship between home and school, where the attitudes and language used around risk-taking could become more aligned. This study also aimed to educate the girls clearly about what risk-taking was, how they saw it in their own educational experiences, and how they could work to improve their resilience.

Literature Review

At the heart of understanding academic risk-taking, is an awareness of the ways in which children are motivated in their learning and towards achievement (Byrnes et al., 1999; Urdan & Schoenfelder, 2006). One of the early thinkers in the realm of motivational theories was Atkinson (1957), who proposed that student motivation is linked inextricably to a child's anxieties about failing their task. Atkinson (1957) highlighted a distinction between two broader theories of motivation, one with an intention of maximising success (approach tendencies), with the other focusing on minimizing pain and negative experiences (avoidant tendencies). Therefore, within these two theories, a pupil would be motivated to self-select their own task at their own risk-level, which would satisfy these tendencies to avoid or approach risk (Atkinson, 1957).

Motivational Theories and Learning Goals

Based on the work of Atkinson, Weiner et al., (1971) proposed an attribution theory. This suggested that the achievements that children will make in the future were brought about by the individual's perception of the causes of their success and failure within academic subjects (Covington, 1984). Through this theory, the main drives for one's successes are effort, ability, luck and the level of task difficulty (Weiner et al., 1971). Weiner et al., (1971) suggest that learners draw on these factors when they are explaining their success or failure at a task. Hence, some learners would attribute their attainment to their effort levels, while others would put it down to luck. It is this difference in explanation which draws distinction between being success orientated or failure avoiding

pupils. Thus, the achievement goal becomes a foundation for learners to adapt their behaviours and classroom practices based on their evaluations of their own successes and what will prevent them from failing (Ames, 1992). It is a theory which focuses solely on the individual's mastery of a subject and does not concern the achievement of others; that is to say, there is a strong value placed upon the individual's learning (Butler, 1987; Ames, 1992). Conversely, within a performance-oriented goal, learners are heavily motivated by their outcome relative to their peers, or by succeeding without expending great effort (Ames, 1984; Covington, 1984). These learners have a strong desire to be publicly recognised for their achievement, and to show themselves to be greater than the rest (Covington & Beery, 1976; Meece et al., 1988). For these learners, a strong value is placed upon learning being a facilitator of surpassing others in a task (Nicholls, 1979, 1989). Thus, it appears that within the group of learners who can be classified as success orientated, there is a further distinction to be made in terms of which goal ultimately motivates them.

Dweck (1986) builds upon these theories, by considering the child's confidence when approaching a task, particularly when they have a performance goal motivation. Dweck (1986) notes that for these learners, they must regard their own ability highly if they are to accept a challenge. That is, they will not take on a task of greater difficulty than they are used to, unless they have confidence that their ability is superior to that which the task demands. These learners will not select tasks where there is a chance that they will not do well, as their performance goal motivation drives them to be seen favourably amongst their peers (Covington & Beery, 1976; Dweck, 1986).

Interestingly, Elliot and Dweck (1988) theorised that there are times where children will favour looking intelligent in front of their peers to challenging themselves appropriately, by selecting a task that is significantly lower than their ability. Looking again at the pupil's confidence when completing a task, Dweck (1986) found that at times, those with a performance goal motivation attribute failure in a task to their ability, which is often associated with a mastery goal orientation (Covington, 1984). Moreover, these learners can take these failures further, and assume that they are likely to be met by further failure if they continue to carry out tasks of the same difficulty, resulting in a shift in their behaviour as they withdraw from those tasks (Covington & Omelich, 1979; Ames, 1984).

In addition to this, it is often seen that those learners who strive to achieve their own learning goals, who are focused predominantly on their individual academic success, will view a failure in a task as a personal obstacle, encouraging them to increase their own effort level (Dweck, 1986). Therefore, when looking at the broader picture of student motivation, learners will approach challenge, and the associated failures, with different attitudes, depending on their overall learning motivations and goals. This is not to say that pupils hold these same goals across all subjects: these views may change across the curriculum. Such a change in motives was noted by Hedegaard (2012), who said that as the subjects which children study change, so do their motivations. In addition to this, Winther-Lindqvist (2012) noted that as children progress through school, the expectations which are placed on them for

different subjects change and the child's reaction to this can influence their long-term motivations for that subject.

These arguments have focused predominantly on those learners who are aiming to achieve success, where there are different drives within their desire for such success. However, as stated above, it is important to consider those learners whose motivation is centred on avoiding failure and its associated pain and upset (Atkinson, 1957). Not only does this theory highlight the desire of learners to avoid experiencing the pain of failure, but it also touches on the peer aspect of humiliation that one experiences when failing in front of a peer group (Atkinson, 1957). The notion of task selection and challenge was explored on page 9 but it is necessary to see how this relates to those failure avoidant leaners. Covington (1984), found that for this set of learners, there is a tendency for them to select tasks which are evidently too difficult or too easy for them. Through doing so, the learner does not truly fail, as they would be expected to achieve poorly in the challenging task (Covington, 1984). Such behaviours have been termed by Meijers and Wardekker (2003) as 'boundary experiences' as they occur when pupils have a strong emotional reaction to the failure of a task, which causes them to re-evaluate their self-image so that they can improve. This results in the pupil's motivation towards their own learning being aimed at self-image stability and the evasion of negative emotions as opposed to academic improvement (Wardekker et al., 2011).

This is in stark contrast to the learning-goal oriented student discussed above. However, as already highlighted, it cannot be assumed that a single pupil acts as one type of learner across the board. It is likely that within different subjects, their motivational patterns and views towards failure will vary. Examples of this from my own teaching practice include those pupils who will happily struggle at drawing a picture in art but are terribly embarrassed by getting a question wrong in maths. Additionally, Hedegaard (2002) highlights that pupils can have multiple motivations towards a particular task, such as achieving a particular award for homework (such as a housepoint) whilst also building on their knowledge of that subject to achieve highly on a future test. That is to say, just as they may approach different subjects in a different way (desiring a different outcome), they may also have different possible desirable outcomes for a particular task.

Discussing this notion of task selection, Dahlbäck (1990) highlighted that when learners feel in a position of academic risk, they may consider the relative positive and negatives of their task selection in greater depth. Dahlbäck (1990) relates to this decision making as a conflict perspective, focusing on the impulsiveness of decision making, which he theorises varies within different learners. Perhaps then, it is those students with a poor risk-taking attitude who are less impulsive when making decisions, as they consider the options and their potential outcomes in greater detail (Dahlbäck, 1990). Although similar to the findings of Covington (1984), this work does not go as far to suggest that the final selection will necessarily be different based on the potential for failure, but rather that the time taken on task selection increases for those with low risk-

taking tendencies. Additionally, the theories thus far have suggested that children are often given autonomy in their task selection in the classroom. While this is often likely to be correct, from my own teaching practice it is evident that there are times where all pupils are given equal activities to carry out. This would result in there being little pupil autonomy or choice. The impact of these tasks must also be explored, particularly in cases where a pupil, had they been given the chance, would not choose to select that particular challenge level.

Learner Self-Image and self-esteem

When pupils are not given the choice of task within their comfort zone, there are likely to be associated failures. Having not been able to avoid these failures, it must be considered what wider, deep-rooted impacts this will have on the learner's self-esteem and self-image. For children to develop a strong academic self-esteem, it is vital that they be given control and autonomy over their decision making, as this will lead to increased resilience (Brooks, 1994). Dweck (1986) suggested that when a pupil experiences failure, or a drop in their overall ability, it can result in them avoiding tasks in the future, where they will disengage in the classroom. If this behavioural pattern were to continue, it could lead to those pupils not developing their skill set fully, which could have ramifications for their whole leaning journey for that subject (Dweck, 1986). Therefore, by forcing children into completing a task that has not been their choice, the impact could be far more extreme and longer lasting than would be anticipated by the teacher. However, it could be argued that for those learners who choose to select tasks lower than their ability, they are in need of being challenged by others, to encourage them to take risks. Without such

encouragement, there is a chance that they would continually underperform and not reach their potential. This will be discussed in greater depth later, when the role of parents and teachers is discussed (pages 20 and 28)

Learner self-esteem can be defined as the feelings that the learner has regarding their self-worth and how positively or negatively they view their own ability to complete a task and consequently how likely they are to commit to completing a task (Kernis, Brown & Brody, 2000; Urdan & Schoenfelder, 2006). This self-esteem is inextricably linked to motivational theories. Those learners with high self-esteem evaluate their successes as being due to their own effort levels and ability (Brooks, 1994). These learners have a strong academic resilience and are likely to understand how to bring about similar success in the future by having control over their learning (Brooks, 1994). Conversely, those children who have lower self-esteem do not cope with their failures well and they make the assumption that in the future, they are likely to make similar errors, and will have fewer successes (Brooks, 1994). The overall confidence of these leaners is lowered, which has a long-lasting impact on their perception of their ability and the potential for their ability to change; they assume that they lack knowledge or intelligence, and that their errors are not easily rectifiable (Brooks, 1994). What is interesting here, is that these learners already hold strong views about their own ability, and Brooks (1994) seems to suggest that these are traits which are set and inbuilt within the learner. Similarly, there is a strong sense that negative views that learners can start to hold of themselves can become self-perpetuating cycles, with failures feeding into a poor view of one's self-worth (Kernis, Brokner & Frankel, 1989).

However, many theorists have proposed that this is something which can be altered throughout the school life of a child. For example, if pupils are provided with tasks built around easily achievable short-term plans, they are more likely to devote the necessary effort, which raises their effort levels towards their learning as a whole (Schunk, 1984). Furthermore, when pupils hold a performance goal motivation and are determined to win or beat others, they are likely to develop a more negative self-esteem than those who are learning-goal oriented, and focused on their own achievements (Ames, 1984). Similarly, in his self-conception theory, Bem (1972) noted that through a child's own actions and learning behaviours, they learn the most about themselves. To take this further, it is clear that the ideas that learners hold about themselves greatly impact upon their future behaviours. However, as has been continually highlighted, this relates to learners who already have a clear sense of their ability and have developed their own self-esteem. What must be considered is the ways in which this self-esteem is initially established, and how it continues to be impacted upon throughout the academic life of a child.

When considering the resilience of a child, it is necessary to determine not only whether they hold a high or low self-esteem, but also the stability of this self-esteem; that is, how likely it is to be changed due to the results of academic tasks (Rosenberg, 1986; Kernis, Brody & Brown, 2000). Having an unstable self-esteem as explained above, could result in overgeneralisations being made towards one's ability, which are overly negative (Kernis et al., 1998). This results in there being a strong correlation between self-esteem of pupils and their motivation in the classroom, with the successes or failures they experience

having an impact upon that child's self-esteem and therefore their continued motivation (Waschull & Konis, 1996). Again, this highlights the complex links between motivation and self-esteem, and further suggests that these cannot be considered in isolation.

This learner self-esteem underpins many other psychological aspects which have a bearing on how pupils perform in the classroom. One such aspect is that of the learner's self-regulation. By enabling children to acquire appropriate self-regulation skills, they are given a toolkit for approaching learning scenarios throughout their life (Nota, Soresi & Zimmerman, 2004). However, this does suggest that 'self-regulation' is an easily obtainable skill which can quickly be taught, though it is interconnected with other aspects such as motivation. Zimmerman and Schunk (1989) found that those learners who had a good self-regulation would actively seek and participate in their learning, in terms of being motivated as well as emotionally and cognitively invested in the learning. By being self-regulated, these children actively seek out new knowledge in lessons, by directing their own actions in the classroom towards deep engagement with a task, rather that coasting (Nota & Sonesi, 2000). In the context of the discussion above about motivational patterns, it could be said that these learners have a strong learning drive to achieve for the sake of their own learning, and therefore that they are highly motivated. Thus, a consideration which must be made is how to promote the development of such self-regulated learners in the classroom, as there are likely to be many children who do not hold such motivations from the start of their learning journeys.

In addition to this, another element which fundamentally links to self-esteem is the notion of self-worth. Covington (1984) theorised that students aim to maintain and protect their sense of self-worth when they are at school, which can come above other learning desires and thus alter their usual behaviours. One of the key elements of this protection process is the perception that the learner has of their academic ability, with some children attaching a high sense of self-worth to the existence of ability itself (Covington, 1984). Thus, it is evident that, if pupils are devoting a large proportion of their in-school motivations to developing and maintaining their sense of self-worth, then they cannot be as focused on improving their own levels of academic achievement. However, there is a contradiction here with the above discussed motivational theories, if we are to understand Covington (1984) as proposing that all learners are concerned significantly by their self-worth, which suggests that the relationship between self-worth and one's motivational goal is more complex and inter-related than it first appears.

In support of this, Covington and Beery (1976) go further to state that beyond the idea of self-worth being purely the student's preservation of their sense of their ability, self-worth is linked more closely to how the learner believes their success and failures are caused. This causality aspect of the theory is linked more closely with the motivational theories earlier discussed and adds another dimension to the desire of a child to reduce failure and maximise success at school. Therefore, there is a risk here that, as pupils are aiming to avoid failures so that they can maintain their self-worth, they focus on deploying failure reducing strategies which does not allow them to take risks in the classroom

(Covington, 1984). Consequently, it becomes apparent that in order to raise one's self-worth, it is a balanced process which must take place, through the level of failure that they experience in school, so that they are able to become less reliant on failure avoiding strategies. If this balance was not to be met, there is a risk of continued negative thoughts to arise within the learner, which may become self-perpetuating in the classroom (Kernis, Brokner & Frankel, 1989).

Many of the ways in which this negativity can come about are in the responses that learners have towards their failures on tasks in school, such as by overreacting to a mistake, or by interpreting a situation in a negative light, when that was not the reality (Kernis, Brown and Brody, 2000). Therefore, it can become difficult to reason with the learner once they have reached this cycle of negatively, as they are seeing situations in an exaggerated light, as far more severe than they actually are. Hence, it is necessary to establish a stable self-esteem and sense of self-worth, so that these learners can move on to raise their self-esteem (Kernis et al., 1998). Linked closely to this negative outlook on mistakes is the teaching tool designed by James Nottingham (2017) called 'The Learning Pit'. Within this model, Nottingham (2017) highlights how mistakes and 'cognitive conflict' are necessary to deepen knowledge and understanding of subjects. He goes further to say that achieving success after failing a task leaves the learner applying their own problem-solving skills, rather than learning via rote (Nottingham, 2017). This work shows how it can be easy for learners to fall into viewing mistakes negatively, but that they should desire to view them as

a wider part of their learning. However, the interconnections with motivation should be considered, as it is not clear which causes the other to change.

Academic Risk-Taking

Underpinning all of this discussion is the idea of academic risk-taking. Whenever a child takes a risk, it is because there is potential for a negative outcome to be achieved (Gullone & Moore, 2000). Fundamentally, if one is unsure of whether a particular action will bring about success or failure, then one is taking a risk in carrying out that action (Rosenbloom, 2003). Ciftci (2006) built on this definition to say that it is the desire of one to make mistakes or to find solutions to more complex and non-linear problems which makes it a risk. Within both of these definitions, it seems that for one to take a risk, there is a risk of failure in the task and, as discussed above, learners can react to failure in differing ways, with differing degrees of severity. Those who feel able to deal with the consequences of failure (i.e. have a stable self-esteem and are motivated by a learning-goal), are most likely to decide to take on such a risk within their academic work (Atkinson, 1957; Dahlbäck, 2000; Kernis, Brown & Brody, 2000). However, it is important that children are able to take risks, as it enables learners to reach greater academic success, through more complex problem solving in situations which they will not be familiar with (Tay et al., 2009). In these new situations, pupils will not be wary of how to achieve success, or what will lead to failure, and hence they need to choose to take a risk. Moreover, Clifford, Lan and Chou (1989) found that when taking academic risks, leaners achieved greater levels of academic performance compared to when they were just working hard. Thus, children need to be pushed from their current motivational levels to achieve, and this raising of their comfort zone

requires them to take a risk. Evidently, it is important to understand how to maintain and raise these risk-taking levels in children, so that they are able to achieve their highest possible academic standard.

Theoretically, then, there is a complex motivational background to every child, and therefore the way that they will approach a learning task will differ. However, as educators, it is important to support each individual child, and in order to do so it becomes necessary to develop an understanding of why they approach tasks as they do and to change and improve upon this so as to benefit their academic success as much as possible. Practically speaking, there are a number of factors which give a learner the attitudes that they hold in the present day and unpicking the root of these may help to change the learner for the better. Ryan, Stiller and Lynch (1994) stated that at the core of a child's motivational patterns and sense of self-worth are their relationships with others. That is, by feeling supported by a number of people, children are more likely to develop positive motivational goals as well as have more of a positive self-regard as a learner, as they are happier overall (Bowlby, 1973). However, this is a sweeping generalisation, and it should be highlighted how intangible terms such as "happiness" are. It is necessary to look in more depth at this and to examine just how these trusting relationships present themselves in the child's life and how this interacts with their education.

Parental influences

When talking about the relationships that children have around them, an obvious starting point would be the relationship that a pupil has with their parents. Buri (1989) found that there is a link between the responses that children have to their own parenting and their general self-esteem (Brewin et al., 1992). For example, it was found that in some cases, when parents are focused on being disciplinarian, it can have a negative effect on self-esteem of a child, particularly on boys (Sears, 1970; Backman, 1982). Other research has suggested that this clear focus on discipline by parents sets clear boundaries for children (most notable for boys) and can lead to a raising of self-esteem as a result (Coopersmith, 1967). Hence, it may be that the subtleties of the parenting itself, and the view that each child has of this parenting, can have a variety of effects on learner self-esteem. This highlights clearly the importance of the family context and home life in considering how children develop their self-worth and self-esteem; the praise and manner in which parents speak about their children can significantly influence the view which children hold of themselves, which will translate into the classroom (Grecas & Schwalbe, 1986). It is not just the way in which parents verbally affirm their views of their children which can have an effect on self-worth, but also the actions themselves (Grecas & Schwalbe, 1986).

The work of Coopersmith (1967) highlights many useful ways in which this parental influence on self-esteem and self-worth are established. For example, factors which correlated with children of high self-esteem included how well the

child was accepted by their parent and whether the child had defined, and regulated boundaries for behaviour (Coopersmith, 1967). This raises the important point of how parents accept their children, with Kernis, Brown and Brody (2000) stating that the extent to which parents are perceived as being critical towards their children's mistakes can lead to the child developing unstable self-esteem. It is important to note the word 'perceived' here, as there are occasions where children will inevitably interpret the actions and words of their parents incorrectly. Hence, this raises the further point that the language that parents use towards their children when discussing their successes and failures needs to be age appropriate and easily understandable. With some parents, if the focus of their communication with their children is on the child's mistakes and on their poor behaviour, then any hostile environment created could lead to children actively changing their behaviour for the worse, as they are attempting to protect their current poor self-esteem and compensate for its further lessening (Rogers, 1959; Ginott, 1963). Hence, these parental interactions have the potential to bring about significant changes in a child's sense of self-worth and self-esteem, which they will bring with them into the classroom. This begins to show the importance of educators having an understanding of the home lives of children, so that they can support them with their learning most appropriately.

Having established that parental views are instrumental to self-esteem of a child, their motivations at school, and therefore their tendency to take risks, it is interesting to discuss the developmental stages in a child's life where these parental views are most influential. During the early developmental stages,

parents are a dominant force on a child's perceptions of themselves, from which the child develops their first sense of self-worth (Ryan, Stiller & Lynch, 1994). The work of Rosen and D'Andvade (1959) and Winterbottom (1953) goes further to say that when learners are accepted by their parents in their own right, for themselves not just for their successes or failures, the children are more likely to develop a positive learning attitude. Children begin to make mistakes from an early age, and the responses that their parents give them to these early mistakes can influence their whole learner mindset as they grow up. While children are young, they are only able to interpret their early caregiver's feelings towards them through the behaviour of these caregivers, which makes their actions, whether directed at the child or not, important (Grecas & Schwalbe, 1986). Again, this highlights the significance that early interactions have upon a child and the development of their self-worth. It is possible that there will be times where a parent won't necessarily realise the extent to which their child is picking up on their body language or on their response to a mistake, and the deep-rooted effects that these small actions can have upon the self-representation that the child has.

Others (such as Hechtman, 1991) have theorised that while these early childhood experiences are clearly important and influential on the child's attitudes as they progress through their schooling, it is in fact the changing home environment which is of most significance (Hechtman, 1991, Brooks, 1994). The concept of a family places a child within a specific and highly influential context, where the interactions and relationships formed with family members shape the child, who absorbs many of the views and attitudes shared

by this family (Rosenberg, 1979; Grecas & Schwalbe, 1986). Hechtman (1991) stated that some of the most notable areas of a child's life relating to the development of their resilience are the family and their wider social environment. The family environments which were seen as most likely to foster children with a high level of resilience were those that were supportive, warm, full of affection, and which had clear behavioural expectations (Rutter, 1985; Werner, 1993). It was found that those children who had less resilience were more likely to be from homes that had more family disagreements, were less warm, and which were at times more hostile (Brooks, 1994). These are sweeping generalisations, but it can be seen that, more broadly, it is the entire environment within which the child finds themselves which can influence their self-worth and resilience in life, rather than just their parents.

In addition, subtle differences are seen between those views of the influences of home environments. Hetchman's (1991) and Brooks' (1994) work suggests more readily that there can be change for the child, that their reliance or self-worth is not set from their early childhood experiences, but instead has the potential for change as their environment also changes. This idea of the continued importance of the presence of a supportive family and of parenting is noted by Cicchetti, Cummings, Greenberg and Mann (1990), who stated that while early childhood experiences are crucial, the changes that take place within the family dynamic will continue to affect a child's view of themselves (Ryan, Stiller & Lynch, 1994). Hence, throughout their time in school, if children are to be positively motivated to take academic risks and to grow resilient to their failures, a stable and established home environment is required.

Therefore, it is necessary to gain a deeper understanding of the parental role, and to establish the specific behaviours and attitudes which play such an influential role on the development of young children. One of the most significant ways through which a parent can influence a child's self-worth and motivation (ultimately leading to their tendency to take academic risks), is through their praise and acceptance of failures. In particular, those children who receive approval from their parents and who have their positive behaviour noticed, are most likely to have stable self-esteem, which in-turn will lead to them feeling more confident with taking greater academic risks at school (Briggs, 1975). For those children who are met predominantly with more negative reactions to their failures, to which they are already likely to be sensitive, it becomes natural for the child to question their abilities and can bring about a lessening of their self-esteem and self-worth (Harter, 1993). The effects that this would have on the child would be extensive across their schooling, both socially and academically, and would likely lead to a reluctance to take risks through a fear of failure (Kernis, Brokner & Frankel, 1989). While this suggests that parents are either constantly positive or negative towards their child's success and failures at school, it is vital that a balance be considered. The majority of parents will, at times, react more strongly to their child's failure, particularly if they feel it has come about through a lack of effort, or some other factor which can be changed by the child. Hence, perhaps the conclusion which must be drawn here is that parents are easily able to have a long-lasting impact upon the educational attitudes of their child, and that there is a fine balance which must be found when encouraging hard work yet placing a value on overcoming mistakes.

While it has been established that a parent's direct attitudes towards their child's failures or successes are of great importance and influence on their overall self-esteem, and hence risk-taking attitudes, the more implicit messages from parents must also be noted. It is not unusual to expect parents to have aspirations for their children, whether academic or not (Bandura et al., 1996). One key part of these parental influences is the control which the parent believes they have over the educational outcomes of their child (Elder, 1995; Gross, Fogg & Tucker, 1995). That is to say, if a parent believes that they can have a positive influence on the educational outcomes of their child, they may be more highly motivated to bring about such a change and play a very active role in that child's education (Elder, 1995; Gross, Fogg & Tucker, 1995). Bandura et al., (1996) commented that, although the research in this field was limited at the time, the children were often able to achieve the successes that the parents were assisting them with. Additionally, children of parents who are invested in their education and who are keen and willing to participate in that learning process with them, often gain a positive feeling of self-worth from their parents (Grecas & Schwalbe, 1986). As already discussed, by having an increased sense of self-worth, it is more likely that that child will take academic risks (Kernis, Brokner & Frankel, 1989). While this does not distinguish between the nature of the aspirations that the parent holds (whether highly academic or not), it does show how powerful a parent can be when assisting with a child's self-esteem and learning attitudes. However, the nature of this 'active parenting' is not clear, as there are a number of differing ways in which parents can support their child (e.g. emotional, method-based learning support etc.) (Werner, 1993). It must also be established how willing these children are to

accept this parental support, particularly as they grow older and more independent. This issue therefore becomes far less clear and simplistic and it is necessary to look further at what drives these parents. It is possible to suggest that, in fact, the ways in which parents were treated over their own success and failures, both at school and home, can impact upon the way that they choose to raise their children. Hence, the very literature concerning children can be related to adults as well.

Thus, by looking at the nature of these aspirations, it was also clear that parents play a powerful part in the development of learning attitudes in their children (Bandura et al., 1996). Based on their own educational and life experiences, it is clear that parents are likely to expect their children to achieve a certain level in exams, at university, and with their careers (Sewell & Shah, 1968). Those parents who hold high aspirations for their children are also likely to be heavily invested in their child's education, as they are hoping that their child succeeds at school (Fan & Cheng, 2001). Some researchers have found that there is a good positive correlation between the aspirations that parents hold and communicate frequently to their children, and the child's level of academic attainment (Sewell & Shah, 1968; Epstein, 1991). However, it seems appropriate to consider the methods that parents will use to convey their desires for their children and the forms of encouragement which are given. While many parents may thoughtfully and positively try to influence their children's educational experiences, Deci and Ryan (1987) highlighted the tendency for some parents to use guilt-inducing techniques to encourage particular exam results or educational choices. Such means of trying to

influence their child's educational outcomes can have significant negative consequences, both in the students' attitudes towards their success and failure, and their overall attitudes towards the sincerity of their parents' affections (Rogers, 1959; Deci & Ryan, 1987). However, it must be considered that, while this seems in some way malicious, it is likely that the parent is acting with their best intentions for their child. It is also important to highlight that this is unlikely to happen in many cases, particularly based on my own teaching experiences.

An additional means through which parents who hold high aspirations for their children are able to influence the education of their child is through their children's teachers. These parents are likely to give the teacher a clear indication of the desired educational outcomes for their child, and the level of importance which they place on this (Bandura et al., 1996). Bandura et al., 1996 found that when such conversations take place between a parent and teacher, it often motivates the teacher to take extra care with the attention and focus that they give that individual in their class which, in the majority of cases, naturally leads to them making greater educational advancements. Thus, the parents have instructed the teacher on the educational expectations which they should expect from the child and are thus making a distinct and dramatic impact on the education which their child receives (Bandura et al., 1996). There are clearly instances when the extent to which the parent negotiates with the teacher will determine whether this will be beneficial or not. It can be conceived that if teachers are treated professionally and respected for their expertise and subject knowledge, then being aware of the desired outcomes of students, from parents, is unlikely to be harmful. However, if there appeared to be a lack of

respect from the parents towards the teacher, then there are chances that the teacher will be less willing to succumb to the demands of the parent. More importantly, this highlights the distinct need for a clear and open communication to be had between the parents and school teachers if the child's education is to be benefitted as greatly as possible.

School influences

There is great importance placed upon the whole environment which a child is within and how this will have an impact upon their propensity to take risks. While it has been established that the home environment is of greatest significance from a young age, once a child reaches school age, they experience other influences on them regarding their learning, such as a new learning environment, peer interactions, and teacher feedback (Bandura, 1986). As children move into a school setting, they are faced with greater demands, from people who they are not accustomed to, and it forces the child to realign their motives with the new school setting (Hedegaard and Edwards, 2014). This exposure to a new environment and a new attitude towards daily life will inevitably take a while for the child to adapt to but could clearly form the basis of learning goal motives. Schools have been found to have the potential to raise a child's level of self-esteem and academic resilience hence impacting heavily on their risk-taking (Brooks, 1991; Zunz, Turner & Norman,1993). Therefore, one can assume that while the parents are instrumental in the construction of the home environment, it appears that the role of the teacher becomes

fundamental to the school environment, and should be studied in greater depth (Brooks, 1994).

Teachers will usually identify the motivational goals that their pupils have and adapt their lessons accordingly. For example, a child who is motivated to out-class their peers on a task may be given a task by a teacher which has this competitive element inbuilt, feeding their performance orientation (Atkinson, 1957; Ames, 1992). It is possible to imagine that if a teacher were to look at a poorly motivated student, they may not envisage being able to improve that motivational mindset, but it has been suggested that they could easily do so just by changing the tasks for that child (Urdan & Schoenfelder, 2006). Similarly, with those pupils who are poorly motivated by any school task, it is probable that the teacher will attribute this lack of motivation to factors outside of the teacher's control (Urdan & Schoenfelder, 2006). Thus, these learners are often treated as having low levels of motivation, with little being done to help change their motivation and to boost their learning self-esteem.

Brooks (1994) reinforced the notion that any one single adult has the potential to make a significant difference to a student's life, whether they are aware of it or not. For this to happen effectively, the individual adult must show care towards the child, to show them that they are invested in their school development and that they see it as a positive journey towards improvement (Brooks, 1994). That is to say, the adult does not view their pupil's progress as unattainable, but rather that they can see the potential within the child, and that

this view is shared clearly with them in a supportive way. Urdan and Schoenfelder (2006) also commented that when a teacher cares for a pupil, as a parent might, then these behaviours can have a positive impact on the child's academic attainment. Therefore, from this one can highlight that as a part of nurturing a positive view of the attainment of the students in their class, a teacher is likely to offer them opportunities for academic success (Schunk & Miller, 2002). In practice, this is often seen through the differentiation of tasks, so that those of all abilities are working at their current level, while, importantly, are being encouraged to challenge themselves and extend their learning. Whilst it is necessary to highlight the caring nature of teachers and how this impacts upon their pupils' academic attainment, I know from my own practice that it is unlikely that any teacher in the profession is not acting out of care for their pupils. Individuals become teachers because of their desire to make a difference to the lives of young learners. Therefore, it is most probable that there are other factors within the day-to-day lessons and teaching style which are responsible for improving a child's risk-taking, leading to greater academic attainment (Dweck, 1986).

To observe the behaviours and practices of teachers themselves which can bring about significant changes in their pupils' attainment, it is necessary to turn one's attention back to the fundamental motivational goals which students have. Skinner (1954) noted that through a behaviourist way of teaching, children can be motivated or demotivated to complete a task, and to carry out the same task in the future. To elaborate on this, if a teacher offers praise or positive rewards to a child for completing a task in a particular way, then that

child can be more inclined to repeat this behaviour, by completing the task again (Urdan & Schoenfelder, 2006). Conversely, if a child does not receive a reward or praise for their work, they are less likely to want to complete the same task again (Urdan & Schoenfelder, 2006). Such a behavioural pattern can resonate more strongly with those learners who are motivated by their achievement relative to their peer group and who are less invested in their own learning development (Atkinson, 1957). For these children then, the teacher's practice of giving praise may elicit a motivational change in a pupil, and through carrying out stretching and extending tasks, could lead to those pupils improving their attainment level. Here, it is necessary to consider that this is a strategy used by the teacher which is only likely to benefit those learners who are responsive to such behaviourist techniques, and who are looking to receive teacher praise above their own personal development.

Similarly, feedback to students' work needs to consider the quality of work praised. Often, it can be assumed that teachers should award praise to those students who have completed work which is faultless – where all of their answers are correct (Clifford, 1988). However, in doing so, this reinforces among the whole cohort of students that it is perfect work which is good (i.e. worthy of praise), and that making errors and mistakes is not desirable (Clifford, 1988). Such a view of mistake making can lead to a lessening in a child's academic resilience, and hence discourages them from taking future risks in class (Clifford, 1988). In addition to this, Clifford (1988) highlighted that, at times, achieving low scores in a test and the associated impact of negative self-esteem that this has, can bring about a complete behavioural change in the

child, where they are more likely to misbehave at school. However, in defence of the teacher, it is often a school, or national, strategy to focus predominantly on grades, leaving the teacher in a difficult position (Covington, 1984). That is to say, that while educators are most likely to want to promote critical thinking and view education for its own sake (not merely a means to an end), they are under pressure from senior leadership to have the children in their care reach a certain academic standard. Therefore, perhaps a wider stance needs to be considered, where it is not solely the role of the teacher that is taken into account, but also the broader ethos of the school setting.

By contrast, there are instances where the praise given by a teacher can aid children to improve their sense of self-esteem towards their learning. Rutter (1985) highlighted that for those children who are accustomed to receiving poor grades in exams or who feel that they are not competent in any academic subjects, receiving praise and experiencing achievement through one subject, can be enough to raise their self-esteem to a sufficient level for them to tackle more challenging areas of the curriculum. Therefore, teachers are in a powerful position where they are able to change dramatically the overall self-esteem that a pupil has across their time in school, and their attitudes towards certain difficult subjects, purely by giving them genuine opportunities for success in one field. Brooks (1994) termed these successes as ‘islands of competence’, where a child who is used to failure is finally given one academic outlet through which they can achieve highly. Most importantly, Brooks (1994) stipulates that if this is to have the desired effect of allowing children to approach less successful subjects with greater self-esteem and risk-taking attitude, then it is necessary to

have a cohesion between the approaches of parents and teachers. In this sense, the child needs continuity on the positive messages received in praise for their successes and how this can aid their future work. Hence, this raises the important issue of having parents and teachers in communication with each other about the attitudes to approach children with when discussing success and failure at school.

Furthermore, the manner through which praise is given by a teacher to a whole cohort of students can have a long-lasting impact upon each individual student. For example, if teachers focus their individualised feedback on tasks to their pupils on comparing them to others within the class, it can bring about critical changes to a child's overall motivation within the subject, as they may view themselves as being significantly different from everyone else (Ames, 1992). This could mean that a low attaining child could be made acutely aware of the fact that they are performing far below the rest of the class. Introducing a notion of competition to the classroom can also lead to children developing a motivation to beat their peers, that is becoming performance oriented, as opposed to focusing just on their own personal learning improvements, i.e. having a mastery goal orientation (Covington, 1984). Similarly, it is often the case that children are acutely aware of their social standing and the peer dynamics within a class (Connell & Wellborn, 1990). Children can often become more risk-avoiding if they see that their failures in class are received poorly by their peers, in that they feel in some way ashamed or humiliated (Ames, 1992). Therefore, the adult in control of those situations (i.e. the class teacher) has the responsibility of creating a positive environment, which emphasises the effort

that children put into tasks and where praise is differentiated for the level of the child (Brooks, 1994).

Similarly, Ames (1992) commented that offering students autonomy over their task selection can allow them to focus their attention on their own learning and understanding, which may lead to greater risk taking. Alongside this task selection, pupils' autonomy extends to listening to the desires of the pupils and to providing them with the opportunities to approach and solve tasks in their own ways (Assor & Kaplan, 2001; Black & Deci, 2000). In doing so, the individual is given the power over their own learning and is not made to feel like they cannot conform to the same standard as everyone else in the class (Deci, Nezlek & Sheinma, 1981). Thus, they feel more focused on their own learning and are likely to be happier to take personal risks, such as through their own task selection. Thus, it is the teacher who is creating such an autonomy focused environment and who provides children with the opportunities to take risks by selecting tasks outside of their comfort zone. If this is combined with a view that correct work is not always what is sought, and that the feedback to such tasks is formative, as well as summative, then the overall learning environment is conducive for children to raise their self-esteem and hence their levels of academic risk-taking (Clifford, 1988; Ames, 1992).

However, it is important to remember that, practically speaking, it is not always suitable or convenient for a teacher to give the task selection to the children, and it would take the pupils some time to understand fully why such a

learning environment was being created for them to use it sufficiently. Hence, this element of the role of the teacher must be taken in conjunction with the before mentioned practices. In addition to this, students will require close guidance from a teacher if they are to be motivated to select an appropriate task. This becomes of particular note when reflecting on the work of Covington (1984) and the tasks that pupils can select to avoid failure. More broadly, this small example highlights the interrelated nature between the actions of a teacher in the classroom and the psychology of the child (much of which has developed due to their home life) and shows how critical it is to explore the relationships between these factors further.

Research Questions

Thus, it is clear that there is evidence in the literature to suggest that children's school-based motivations are influenced heavily by both their home and school environments (Hechtman, 1991; Brooks, 1994). This motivation which a child holds for a particular subject will be entwined with how they view their success and failures within that subject (Dweck, 1986; Urdan & Schoenfelder, 2006). Bandura et al., (1996), and Urdan and Schoenfelder (2006), highlighted that these attitudes towards success and failure are also highly dependent on the parent and teacher responses to them, signifying another area where these two environments impact upon a child's view of their learning. Moreover, the tendency that a child has to take academic risks is linked incredibly closely to the attitudes they hold towards their own mistakes and successes (Rosenbloom, 2003; Ciftci, 2006). Finally, this review of literature has shown that there is little research linking both parents and teachers together with regard to supporting a child's risk-taking propensity,

particularly when considering how these two influential environments can be combined. Therefore, the following research questions are considered:

1) To what extent can teachers' practice help raise the levels of girls' academic risk-taking at school?
2) How far can girls' academic risk-taking be raised through creating a parent-school partnership?

Research Design:

Context of Study:

To investigate levels of academic risk-taking among primary aged pupils further, a small-scale study was carried out at an independent girls' school in the south of England. My Year 6 class was chosen to focus the study on, as the girls were used to me. This also gave me full control of adapting the learning environment for the study and I had a pre-existing rapport with the parents taking part in the study. Four girls were chosen to participate in the study.

Research Design:

The design of this study took a similar form to the Action Research design first set out by Kurt Lewin (Tomal, 2010) (Fig.1).

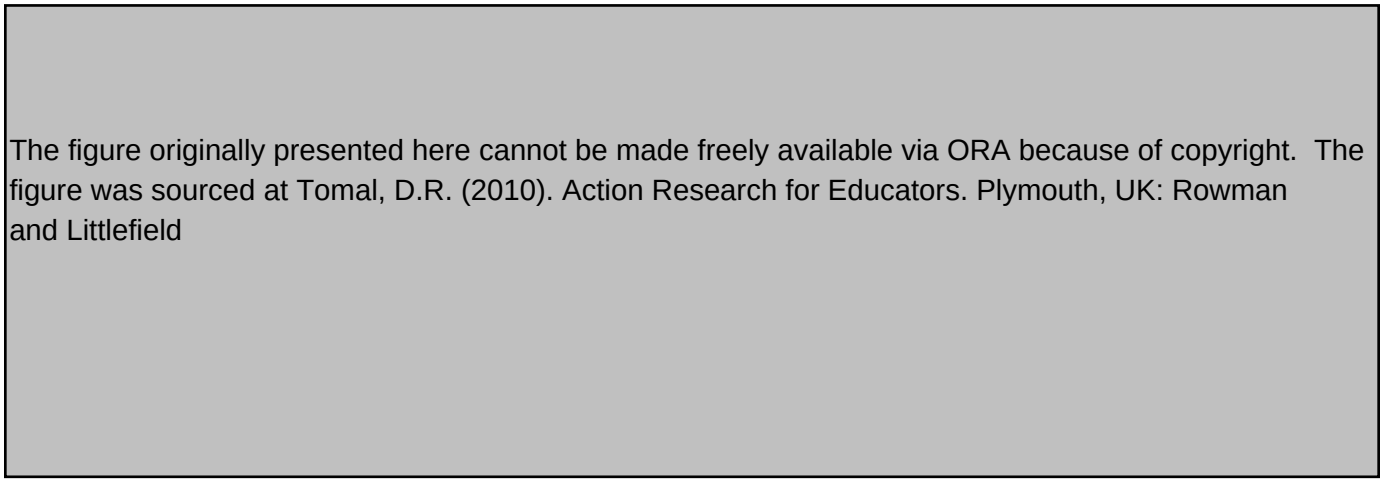

Fig 1. Shows the Action Research process which was adopted for this study (Tomal, 2010).

The identification of a problematic area and fact-finding took place during a previous scoping study, where it was highlighted that children's risk-taking was

heavily influenced by teachers and the school environment, as well as the home environment and parental attitudes towards success and failure (Manaton, 2017). The desire of the research was to assess whether it was possible to link the attitudes held by parents and teachers of risk-taking, failure and success, so that it would encourage children to take risks. Therefore, I was able to plan a suitable intervention which encouraged this collaboration, particularly concerning the language used about, and attitudes towards, success and failure on an academic task.

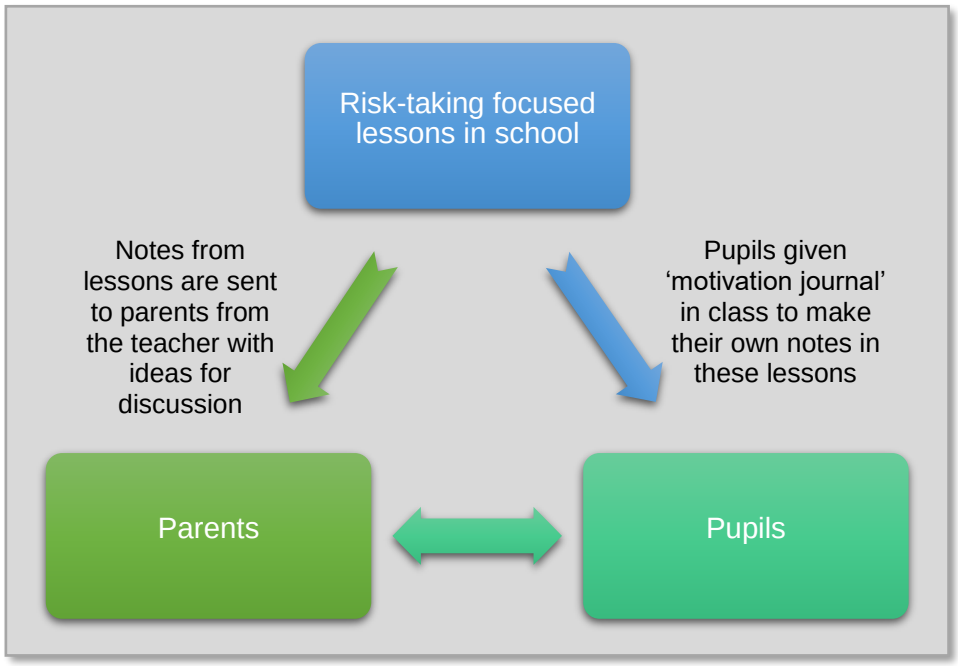

Fig 2. Shows the intervention process and how the three agencies of teachers, parents, and pupils interacted with each other.

The above shows the design of this study. Pupils in the class were given frequent lessons dedicated to risk-taking, which were delivered by their class teacher. An example of the first of these lessons is found in Appendix 3 (page 86). These included explaining and defining risk-taking, highlighting times where mistake making is part of a learning process, and listening to pod casts focusing on girls' attitudes towards failure at school. In addition to this, all girls

were issued with a ‘motivation book’, where they were able to make personal notes during these lessons and to compile their own list of motivational quotations relating to school learning. All of these lessons were carried out by me as the class teacher.

The parents of the students taking part in the study were given regular e-mail updates with details of the content of these lessons. In addition, they were given suggestions for conversations that they could have with their daughters about the concepts covered in class.

Four girls and their parents were selected to take part in the trial. The four students were selected from a class of nineteen, so that analysis of data was manageable, considering the fact that two parents took part for every one child. Due to the nature of the school, these students were not chosen randomly, but selected by me based on their current learning attitudes and their parents’ desires to take part in the trial. Such attitudes included being hesitant in lessons, reacting poorly to apparent academic failures, alongside a desire to achieve. Being an established teacher at the school, I had good awareness of the pupils in my new class at the start of the year, allowing me to make such selection choices.

Methods of Data Collection:

Questionnaires:

Questionnaires are considered a useful data collection tool in terms of their ease of administration and data interpretation (Cohen, Manion & Morrison, 2011). Questionnaires were used with pupils and parents throughout the study to provide both qualitative and quantitative data on the views of the participants relating to their own risk-taking or the risk-taking of their daughter. The first half of the questionnaire used Likert scale questions, which allowed for views on the risk-taking attitudes of parents and students to be categorised sensitively, whilst also allowing for comparable numerical data on how they rated their current risk-taking ability to be developed (Cohen, Manion & Morrison, 2011). These easily obtainable quantitative data provided an opportunity for giving me generalisable data which were easily comparable (Steckler et al., 1992). They also helped to show how the views on risk-taking had changed over the course of the study for each individual, as well as how these changing attitudes correlated with observed risk-taking changes in the classroom.

The second half of the questionnaire offered open-ended questions, inviting participants to explain their views on their or their child's risk-taking habits in greater depth (Cohen, Manion & Morrison, 2011). These were designed to give some easily comparable data, alongside a qualitative understanding of the participant's views. Such qualitative

questionnaire data allowed me to gain a deeper understanding of the personal views of the participants, and their motives for their behaviours (Patton, 1990; Steckler et al., 1992). During the design phase, care was taken to avoid leading questions, which might not give a true response from the student or parent (Cohen, Manion & Morrison, 2011). There were two variations of the questionnaire developed for the study: for the parents and for pupils. These were administered at two key points: before the study, and at the end of the study (see Fig.3 on page 44). Due to time constraints and school events (such as the school play), a planned third data collection point in the summer term (July) was not possible.

One drawback when using questionnaires is that I had no opportunity for clarifying ideas or exploring avenues raised by the respondent, as I would with interviews (Brenner, 2006). However, due to the time parameters of the study, questionnaires were chosen to collect data, as they allowed for the parents who had busy work schedules to provide data for the study easily. It would have greatly inconvenienced working parents to arrange interviews, going against the wishes of school senior management. Having only questionnaire data reduces the reliability of the data and findings, and to further support the conclusions made here, follow up interviews would be needed. Amongst the four students, questionnaires could be carried out simultaneously during form-time which did not disrupt lesson time, as interviews would.

It must also be considered how close to the truth the responses are. There was the potential for the respondents to feel overpowered by myself, as the researcher, and therefore they may have provided the answers which they felt I was seeking. This is most likely among the student questionnaires, as the hierarchy of power is more apparent. All respondents were encouraged to answer truthfully and in as much detail as possible.

Observations:

Participant observations can be used in a wide range of educational contexts and can take a variety of forms, making them a valuable and convenient method of data collection (Marx et al., 2004; Caldwell & Atwal, 2013). Observations allowed me to observe the children's natural behaviours, such as interactions with teachers and peers, within their social context which added depth to the data (Caldwell & Atwal, 2013). Two lesson observations of pupils took place, at the beginning and end of the study. Each observation was of an hour-long maths lesson, which was recorded with a video camera from the back of the classroom, the ethical considerations of which are discussed below.

As the class teacher, I was fully immersed in the observation process and was therefore a participant in the process. Analysis of the video data

took place after the event. Data analysis took a varied form, where some numerical data were obtained from the number of risk-taking behaviours which were observed from the participants (such as putting their hand up in class, seeking assistance from the teacher, and their peer interactions) (Cohen, Manion & Morrison, 2011). This structured element of the observation was further supported by an unstructured look at the behaviours of the individuals – behaviours which were not originally anticipated. Each lesson was analysed four times, with a focus taken on each of the children participating in the study. The general risk-taking behaviour of the class as a whole was also noted, which added context when compared to those behaviours of the focus children. With the method of observations, there is the potential for bias as the researcher can often see what they want to see (Cohen, Manion & Morrison, 2011). However, the use of video recording should help to reduce the effects of bias as it offers greater time to analyse the dynamics in the classroom.

When using recorded observations, there is the potential for Observer Paradox, where the presence of a researcher (as teacher) and recording equipment could influence the actions and behaviours of those being observed (Shanmuganathan, 2005). This Observer Paradox also encompasses times where I favoured particular behaviours over others, as they fitted with my pre-existing ideals for the study, but I made a concerted effort to note all behaviours seen on the video footage.

Finally, choosing to observer formally a small number of the lessons that I taught the girls, meant that there were often risk-taking behaviours which were missed in formal observations, but that I still informally saw whilst teaching. Providing a way to assess accurately and continually these children across all the maths lessons that year would have built up a greater depth of understanding around their risk-taking attitudes.

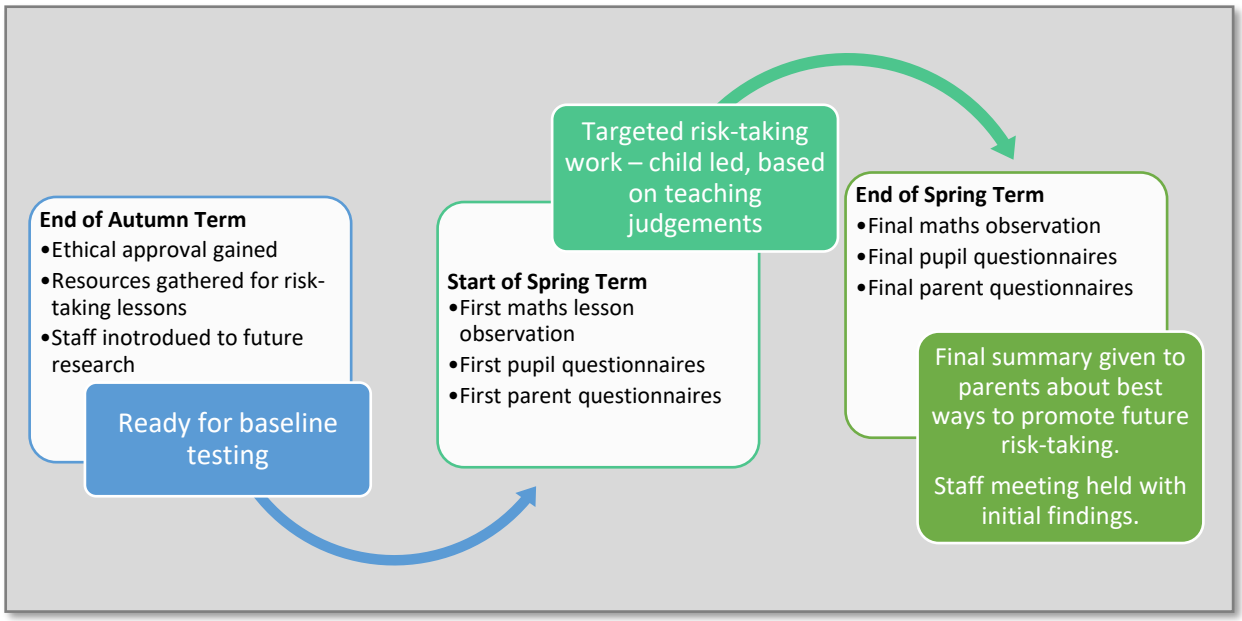

Fig 3. Shows the timescale over which data were collected and the forms the data collection took

Ethical Considerations:

The research design and all data collection were in keeping with the BERA guidelines, and the research had the full support of the Head Teacher (Hammersley, & Traianou, 2012). Parents of girls taking part in the study provided written consent to take part in the study. Parents were provided with written information on the nature of the study and the use of the data, as well as being reminded that they could remove themselves, and their daughters, from

the study at any time (see Appendix 4, page 87 and 88). This initial written information was followed up with individualised conversations about the study at the school's Parents' Evening.

Questionnaires were stored as electronic and hard copies. All questionnaire data information was stored securely on a password protected laptop and in a locked room. Questionnaire data were destroyed as soon as they were no longer of research use. Video footage was stored on the password protected school networked system and on a password protected laptop. Both copies were destroyed as soon as they were no longer of research use.

All pupils in the class were aware that filming was taking place during the observation lessons, which was in keeping with the *modus operandi* within the school to film teaching for professional development. Upon entering the school, all parents provide written consent for photo and video images to be taken of their children. Parents of the four focus children provided additional written consent for their daughter to participate in the study.

With hindsight, greater focus could be placed upon gaining permission from the school to interview parent participants, or to carry out student interviews in school. Without this supporting data, inferences drawn from questionnaires alone are less reliable. This would also be more possible given a longer

research period, as parents would have more opportunities to find free time to attend interviews.

Findings and Discussion

From the literature review, it has been shown that there are many different factors which amalgamate to create a child's risk-taking propensity and aspects of these factors were seen within the data. While it is necessary to consider each pupil within their own environmental context (e.g. family lifestyle, previous anxieties etc.), there are many wider themes that emerged for all four pupils. These will be discussed generally before each pupil is considered.

One such risk-taking factor that was seen within both observational and questionnaire data was the increase in pupils putting their hands up in lessons. When students put their hand up in a whole class discussion to answer a question, they are opening themselves up to the potential for failure, as they are not sure of the outcome, which could be negative (Gullone & Moore, 2000; Rosenbloom, 2003). There is also a strong correlation with children being reluctant to answer questions in class if they are wary of the response their peers will give and the potential for humiliation (Atkinson, 1957). Looking at all four tested pupils as a group, they put their hands up to answer 45% (18 out of 44) of questions in the first lesson, compared to 61% (46 out of 76) in the second lesson, showing a slight increase in general response. As the second lesson took place far later into the academic year (late May compared to early February), it could be suggested that the social bonds between the class were stronger and that this fear of humiliation had lessened, as the pupils had become accustomed to one another. That is to say, the pupils had a greater awareness of the social standing within the class and had come to realise that

any mistakes they make are met more warmly by their classmates than they might have previously assumed (Connell & Wellborn, 1990). Moreover, it could be suggested that over the course of the risk-taking intervention, all pupils were made acutely aware of the natural role of mistake making in the learning process and a supportive learning environment was created by the teacher to promote this and hence risk-taking (Brooks, 1994). Thus, it would seem that the initial impacts of the intervention had been beneficial to the overall tendency for these pupils within their cohort to take risks in asking questions in class.

However, it should be highlighted again that this research acts as a snapshot of the wider teaching within the classroom and it would add greater weight to the results to follow up the same group of students and observe them over a longer period of time. It is also necessary to look in greater depth at each individual pupil. I found that there was a disparity between the data from each child in terms of putting hands up. From the 4 focus children, only Pupil 1 and Pupil 2 had an increase in the number of times that they put their hands up in whole class discussions. Pupil 1 offered to answer 45% of questions in the first lesson which increased to 90% of questions in the second lesson. Not only did they increase the proportion of questions that they were wanting to answer, but there was a general increase in enthusiasm in answering and taking part in the discussion. In Lesson 2, Pupil 1 put their hand up to answer questions before they had been asked fully and generally seemed more confident in wanting to be selected, by sitting up straighter in their chair and looking more purposeful in taking part. It was clear that between these two lessons this pupil was wanting to offer and share their ideas with the class, even for the most challenging

extension questions. This pupil also made a mistake during one explanation but continued to put their hand up at future points in the lesson.

Similarly, Pupil 2 offered to answer 9% of questions in the first lesson but 42% of questions in the second lesson. Of note here, is that Pupil 2 had developed learning anxieties in the previous academic year, which worsened half way through the studied academic year. They were visiting a school counsellor and a private psychologist out of school. They remained within the study, as I felt it would further benefit them at school. This helps to explain the lower scores than Pupil 1, but also highlights the significance for that pupil of increasing their participation in lessons through question answering to 42%. In addition, Pupil 2 displayed the same behaviours as Pupil 1 as there were two instances where they put their hand up before the question had been asked, showing an engagement in the lesson and a desire to take part. Particularly considering the history of anxiety of Pupil 2, such a change in motivation to take part and participate within the lesson could indicate that they had positively changed their learner self-esteem. In Lesson 1, the overall behaviour of the child towards the lesson was negative, unfocused and showed a lack of commitment to learning. Kernis, Brown and Brody (2000) characterised this lack of learner self-esteem as being when a pupil is not wanting to complete a given task, the very behaviour that Pupil 2 was displaying. To expand on this, the desire not to complete their work was seen as being due to the pupil not thinking that they are able to complete it, or that their ability is not great enough for that given piece of work. By contrast, in Lesson 2 the learner was taking greater control of their learning through participation and focus in the lesson,

evidenced by the increased time that they looked at whole class explanations on the board, as opposed to looking around the room. This is more in line with the definition of Brooks (1994) of someone who has strong academic resilience and high self-esteem. While it is difficult to determine fully whether this mind-set change had been brought about directly from the risk-taking intervention, it is possible to suggest that it in part had a positive impact on this change.

Pupil 3 and Pupil 4 displayed different responses to putting their hands up in class. Pupil 3 showed little change, with 73% (8 out of 11) in Lesson 1 and 74% (14 out of 19) in Lesson 2. This could suggest that they already had a positive attitude towards answering questions in lessons but also that they have not been able to increase upon this aspect of their risk-taking yet. Pupil 4 put their hand up for 55% (6 out of 11) of questions in Lesson 1 and 37% (7 out of 19) of questions in Lesson 2. This decrease in answering, could suggest that other factors are preventing this pupil from putting their hand up in lessons which were not discretely taught in risk-taking lessons. This could include the different peer groups that the girl was working with (and how comfortable she felt around them) or even the pre-existing knowledge and confidence which they had with that topic in maths. This would need further investigation.

A second theme which emerged in the results was the language used in written questionnaire responses, which by the time of Lesson 2 had become far more detailed and cohesive with the messages given in school. For example,

two pupils started to use more specific behaviours in their definitions of risk-taking. When defining risk-taking, Pupil 1 stated:

> *"By **putting your hand up in class**. Taking risk, **go into the learning pit**. Trying your hardest. Not giving up just when you've looked at a question, even if it is extremely difficult". (emphasis added).*

There is a shift in language used in the definition which now includes specific features of academic risk-taking which were taught in lessons. This change in response has shown that the pupil, through exposure to specific lessons on risk-taking, has shifted their understanding of risk-taking to be more in line with the attitudes of the teacher in the classroom. On a deeper level, by exposing this child to an understanding of the emotions of the learning process (through 'The Learning Pit' Nottingham, 2017), the child is able to separate out their failures and successes as necessary stages of learning which will positively impact upon their self-worth (Ryan, Stiller and Lynch, 1994). Such an increase in understanding of how risk-taking appears in the classroom will enable the learner actively to seek taking risks.

Similarly, Pupil 3 also changed her written definition of risk-taking, with their second answer starting with:

> *"I think I take risks by **putting my hand up to answer a question I am unsure of**". (emphasis added).*

This child has taken their awareness of putting a hand up in class further, by developing the understanding that there is only risk involved when they are

unsure whether they will succeed or fail (Ciftci, 2006). As stated by Nota & Sonesi (2000), learners with a positive self-regulation, desire new knowledge in lessons, which comes about through risk-taking. This pupil is starting to show signs of that desire by building her awareness of how to deepen their understanding of mathematical concepts in lessons (Nota & Sonesi, 2000). More specifically for Pupil 3, there was also a shift in the definition of risk-taking given by the mother who, in their second answer, stated:

> *"Not being afraid of **making a mistake** or getting in wrong". (emphasis added).*

This valuable inclusion of mistake-making into their definition shows a change in this parent's outlook on their child's learning as a process. Grecas and Schwalbe (1986) highlighted the way that a child's self-worth and self-esteem as a learner can be heavily impacted upon by the attitudes that parents have towards the learning process. Thus, for Pupil 3, the increase in appreciation for making mistakes in the learning process will support that child to accept their own mistakes.

Other parent responses, such as from the mother of Pupil 4, included additional features of the taught lessons on risk-taking that had been sent home (such as The Learning Pit (Nottingham, 2017) and the natural emotional aspects of failures in lessons). As these parents are changing their own attitudes about success and failure in school, they will begin to place less value in these concepts, but rather in their child's whole journey at school (Rosen & D'Andvade, 1959). Therefore, the child will be more likely to develop a positive

learning attitude, which was starting to show through the pupils' questionnaire responses to questions about feeling upset due to mistakes (discussed below).

As well as this subtle shift in parental attitudes towards risk-taking and mistake-making, it was interesting to see that both parents of Pupil 1 noticed an emotional change in their child's responses to struggle and failure at home. When asked 'How do you support your child through successes and failures in maths', the Mother initially included the following in her response:

> *"If she doesn't understand, I will provide more details as to how to answer the question. However,* ***she gets frustrated with the amount of time it takes****". (emphasis added).*

By the time of the second questionnaire, there was no reference to this "frustration" that her daughter was feeling towards not understanding how to answer maths questions correctly. In further support of this, when asked the same question, Pupil 1's father provided this response the second time:

> *"This has changed from my previous response.* ***'Pupil 1' is now calmer in her maths****. As a consequence, she appears more confident to tackle problems on her own". (emphasis added).*

Both of these answers suggest that there has been a change in the emotional response of Pupil 1 towards failure. Initially, they reacted to failure in a highly emotive and frustrated manner, characterised by Meijers and Wardekker (2003) as characteristics of someone who is often failure avoiding, but they will use this emotion to re-establish their self-esteem and image as a learner. This

corresponds with the work of Zimmerman and Schunk (1989) who highlighted that being emotionally invested in your work can be the sign of good self-regulation and long-term learning motivations. This is the impression that the word ‘frustration’ gives, as it suggests a desire to succeed. Thus, it appears that Pupil 1 has a positive overall attitude towards their ability and learning, but that there are times where they previously responded to failure with frustration as they were so emotionally engaged with succeeding at the task (Meijers and Wardekker, 2003). However, by controlling this overall emotive response to failure, this pupil seems far more confident with taking risks, knowing that they can cope with the repercussions of failure, should it occur.

Generally, there was an overall increase in cohesion between the language used by pupils and parents in their responses at the time of the second questionnaire. This included the inclusion of key terms relating to the definition and processes involved in risk-taking, such as “resilience”, “mistake-making” and “hands-up”. Six parents were also more able to articulate clearly what risk-taking meant or appeared to have a greater depth of understanding of how they could support this at home. Such an increase in use of language is likely to have been brought about through the study, as the parents were given detailed lesson notes on the definition of risk-taking that their daughters were taught, as well as key factors relating to risk-taking in practice. Hechtman (1991) highlighted the impact upon a child’s resilience that home and social environments can have individually, suggesting that to develop the greatest resilience to issues which transfer between these environments, it is necessary for them to be aligned. Therefore, through the intervention study, educating the

parents through the same risk-taking lessons as the pupils may help them to have a greater mutual understanding of what risk-taking is, encouraging children to increase their resilience and therefore risk-taking. However, it should be stated that these findings are based only on questionnaire data which is less reliable than other forms of collection, such as interviews. Follow up interviews with participants would be needed to add further weight to these claims.

Not only was there an increase in this technical language used by parents in their responses, but two of the parents felt more confident in supporting their child's risk-taking at home. While this does not seem like a large proportion, Fig. 4 clearly shows that after the study, no parents disagreed that they felt able to support their daughter's risk-taking at home.

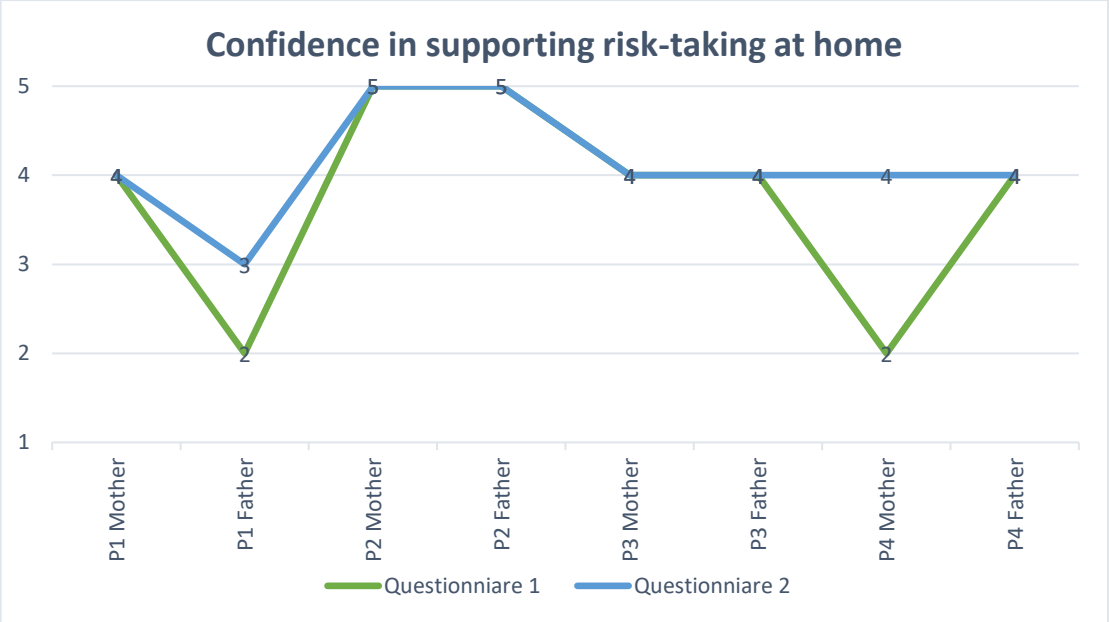

Fig 4. Shows parent response to 'I feel confident in supporting my daughter's risk taking'. Scale: 1=Strongly Disagree, 2=Disagree, 3=Neither Agree nor Disagree, 4=Agree, 5=Strongly Agree.

Therefore, after the study, all parents (but one) felt that they agreed with the statement that they were confident in supporting and promoting risk-taking at home. However, while it is a positive outcome that parents felt more able to support risk-taking, this data alone does not suggest the nature of home support. As discussed by Harter (1993), if children are met with negative responses from their parents to their academic mistakes, it can cause a reduction in that child's self-esteem to take place. Nevertheless, by focusing on risk-taking and the importance which was placed in lessons on mistake-making, one can assume that alongside this increase in confidence to support risk-taking, there has been a shift in the means through which this support takes place.

These changes to language use in parent questionnaires require further analysis to see the subtleties of the shifting risk-taking attitudes. The mother of Pupil 2 chose to change the nature of her support at home to become more emotion focused, rather than purely focused on the methods of the questions. From the first questionnaire, this parent's response to how you support your daughter through success and failure was:

> *"We go through questions she has found tricky or can't answer* ***and try to find other methods*** *to explain or work at the problem". (emphasis added).*

At the time of the second questionnaire, the response to the same question was:

> *"We reassure her that it's **okay to make mistakes**, that it is a **vital part of learning** and that she should have a go, even if she's not sure". (emphasis added).*

The distinction between these answers is that the parent has moved from a focus purely on the gaps of mathematical understanding that her daughter has, when she answers a question wrongly, towards an encouraging and supportive emotional response, which allows the pupil to view her mistakes on a much wider scale. Kernis, Brown and Brody (2000) noted that a child's self-esteem can be greatly influenced by the level of critical feedback they receive from their parents for their mistakes. Thus, for Pupil 2, as her mother is now far more attuned to the importance of mistakes in the longer process of learning, it is likely that they will respond less negatively which will help to boost the child's self-esteem. Furthermore, continuing to increase this self-esteem will lead to the child becoming more motivated towards succeeding on a long-term basis, which for a child with learning anxieties will be greatly beneficial (Waschull & Konis, 1996). This strongly corresponds with the work of Epstein (1991) who suggested that a child's level of academic attainment can be heavily influenced by the aspirations that their parents hold for their academic futures. Hence, developing positive, encouraging aspirations which incorporate mistake-making will help children to feel secure in their own self-worth to grow academically.

As well as these changes in the parent questionnaire data, Pupil 1 mentioned the support of their parents in her own questionnaire response. In her first questionnaire answer, she stated that she felt most encouraged to take

risks by her teachers in school, but in the second questionnaire highlighted the significance for her of family and friends as sources of encouragement. Again, this shows that there is a shift in the mindset of the attitudes of Pupil 1's parents as they are actively encouraging the same risk-taking practices as at school, giving Pupil 1 the continuity of environment. Brooks (1994) highlighted that this is the very cohesive message that pupils need to receive if they are to continue to develop their self-esteem in subjects at which they may view themselves as being less successful. For those pupils who didn't mention this parental influence on their support, it is likely that greater time is needed for these home life practices to embed and to transfer fully into their pupil's self-esteem. This is not to suggest that the parents have not changed their level or nature of support, but that further data collection would be necessary, over a longer time scale.

Another comment which was of interest, was from the mother of Pupil 4 at the start of the trial. When initially asked how she felt she would help improve her daughters' risk-taking, her mother responded with:

> *"Not sure, and I look forward to learning more from you [researcher] and your research of how to better support 'Pupil4'".*

Although subtle, it points to the positive response that parents gave to be a part of the study. Other forms of verbal, informal praise was given in addition to this captured data. This is an interesting notion which Gracas and Schwalbe (1986) drew upon, where they highlighted that in cases where parents are positively invested in their child's education and actively want to be embedded in

educational processes, then it helped to raise the sense of self-worth that their child had. Therefore, through their interaction with the study, parents have taken more of an active role in different aspects of their child's education, with a greater focus on the emotional side to learning and development. Hence, this should help their children to raise their self-worth and thus their propensity to take risks.

Observational data also showed changes to the girls' use of language in lessons. This was most evident for Pupil 1, who seemed to become more authoritative and confident in stating her answers and methods in Lesson 2. In Lesson 1, Pupil 1 had a tendency to answer questions with an upwards inflection, suggesting that she was unsure of the answer. Lakoff (2004) theorised that women have a tendency to speak with a rising inflection which sounds like they are looking for confirmation from others that their answer is correct. This would suggest that Pupil 1 was not confident with whether her answer was correct or not, so compensated for this by changing her tone of voice, as if to prepare for failure. However, by Lesson 2, she was asked to complete a challenging extension question on the board in front of the whole class and did so with an assertive voice, no longer raising the inflections in her words.

As well as these subtle voice changes, observational data also highlighted where the body language and facial expressions of pupils changed between both lessons. During Lesson 1, Pupil 2 seemed very disengaged with the

lesson, spending a large amount of her time looking at items on her desk when she should have been looking at the board and she seemed to refuse to listen to group support when the teacher was helping them out. However, during Lesson 2, she was far more engaged, writing working out on a board through the whole lesson, making greater amounts of eye contact with her peers and her teacher, and smiling throughout times of teacher support. This suggests that the pupil has increased their motivation for maths lessons and is far more willing to commit time and effort to lesson based tasks (Weiner et al., 1971).

Academic risk-taking is an emotive area, intertwined with the feelings that individuals have towards their success and failures (Atkinson, 1957). Hence, there is an interesting relationship which develops between how upset one feels about their failures and how afraid they are to take future risks. Both elements were tested through the study, with interesting outcomes. Generally, there was a tendency for the parents and pupils to hold opposing views, particularly where the parents ranked how afraid they thought their daughters were of taking risks, and how much the individual girls said they liked to take risks. Six out of the eight parents felt that they daughter was now less afraid of taking risks (shown in Fig.5) but by contrast, none of the girls felt that they liked to take risks any more, with one stating that she liked to take risks even less. Obviously, these questions are different, and it is possible that while someone may become less afraid of something, they might still not actively like doing it. The parent questionnaire data regarding pupils being less afraid to take risks helps support the notion that the girls are starting to take more risks in the classroom.

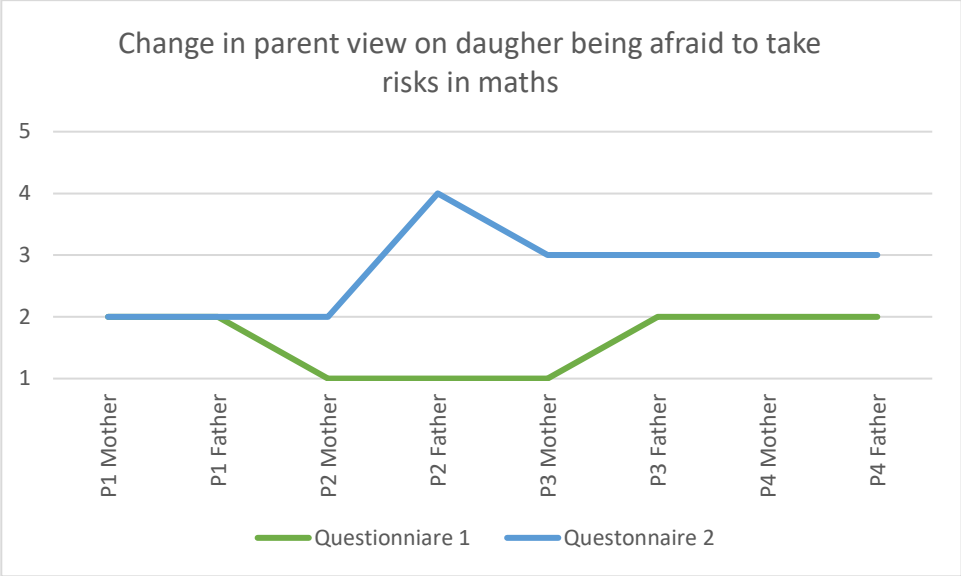

Fig 5. Shows parent response to 'My daughter is afraid of taking risks in maths'. Scale: 1=Strongly Disagree, 2=Disagree, 3=Neither Agree nor Disagree, 4=Agree, 5=Strongly Agree.

The variations here between parent and student data could, in part, be due to the period of transition that these pupils are going though. As they are beginning to feel more capable of dealing with the emotional and social effects of failure in the classroom, they are more inclined to take risks, even if they are not fully aware or openly desiring to do so. This links closely with the work of Brooks (1994) who stated that a child's self-esteem is centered around how resilient they are to failure and how they view themselves as being able to bring about future success. Through the increase in participation in lessons and the positive response from parents on their children being less afraid to make mistakes, it suggests that these students are beginning to raise their levels of self-esteem and that they are in a time of change (Covington, 1984). If this is the case, then these pupils are in the process of stabilising their self-esteem, as they are changing their self-worth and overall motivations in class (Kernis et al., 1998; Kernis, Brown and Brody, 2000). As data was collected over a short time

frame, it is possible to suggest that this establishing of the children's self-esteem in order to raise it is a key reason for the difference in opinion between parent and child. Again, it would be necessary to follow up this study with additional, long scale data collection to measure the full effects of the risk-taking intervention.

There were changes in responses to questions asked to both parents and pupils about being upset by failures. Of note, is that the pupil's feelings towards this did not change greatly at all, but also that they were so varied throughout, as seen in Fig 6.

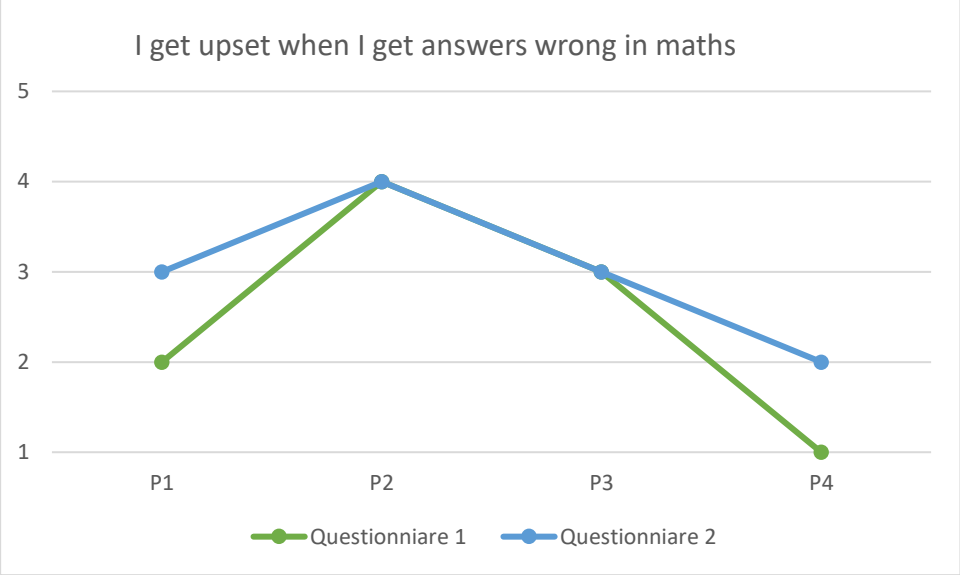

Fig 6. Shows pupil response to 'I get upset when I get answers wrong in maths'. Scale: 1=Strongly Disagree, 2=Disagree, 3=Neither Agree nor Disagree, 4=Agree, 5=Strongly Agree.

Here, it is interesting to see the range of feelings that students have about their own emotions regarding failure and mistakes. To fully understand this, and the effect that the study has had upon these changes, it would be necessary to further investigate the reasons behind this emotional response.

Improvements to the desire to avoid risk-taking and its potential failure also help to show confidence changes among the children. Briggs (1975) highlighted that showing signs of confidence with regard to risk-taking is an indicator of a positive self-esteem. When analysing the data, there were a few findings which help to indicate an improved confidence among the focus children for the study. One such change was with the reliance that the pupils had on teacher support during both lessons. During Lesson 1, all four focus pupils asked for teacher support in the lesson; the teacher was asked nineteen times by these girls collectively for help during the hour-long lesson. However, by Lesson 2, the teacher was only asked by these girls a total of fifteen times. While this does not seem like the largest of changes, it should also be noted that the nature of the support changed, with less time being used by the teacher to give support in Lesson 2 compared to Lesson 1 (a collective 26 minutes in Lesson 1, but 11 minutes in Lesson 2). This could suggest that the class purely found the lesson content more manageable, or that they had a greater core understanding of the concepts being covered, so needed less support. However, it could also subtly show that these children are beginning to trust in their own ability even more and to a greater degree (Kernis, Brown & Brody, 2000). Again, this indicates a changing self-esteem within these learners, which will inevitably lead to a shift in the school-based learning motivations (Urdan & Schoenfelder, 2006).

One pupil for whom this change was more particularly noticeable was Pupil 2. During Lesson 1, this pupil seemed rather unmotivated (head on desk,

looking around the room rather than the board, whistling), asked for teacher assistance before even trying a task, and needed lots of encouragement to start the task. This was certainly not the case for the whole lesson, but she did require a lot of assistance at the beginning of questions rather than trusting her own ability. In cases such as this, it can be likely that teachers assume that the child's lack of motivation is something that they cannot control (Urdan & Schoenfelder, 2006). However, in this situation, opportunities were given for success, as an accessible extension task was given, which re-motivated the student (Schunk & Miller, 2002). By re-engaging this student in the learning process through opportunities to succeed and through praise, teachers can cause motivational changes to take place (Atkinson, 1957). These are the very changes that are starting to be seen in Lesson 2, where this pupil showed greater success-oriented motivation, in that they were able to start tasks more promptly, needing teacher support far less. The times where a teacher was needed were for small questions to check multiplications or methods. While this shows that there is still an element of doubt over ability, it is positive to see that Pupil 2 is starting to develop a motivation in maths rooted in seeing their own successes (Ames, 1992).

As well as lessening their reliance on teacher support, the pupils seemed far more willing and happy to work with peers on tasks. When looking at risk-taking, the interactions that pupils have with their peers can be a good indication of not only their motivations, but also their awareness of their ability relative to these peers (Connell & Wellborn, 1990). Hence, it is interesting to see different changes that occurred across the two lessons relating to these

peer interactions. During Lesson 1, both Pupil 1 and 3 seemed confident in taking control of writing the working out to a pair-based question on their mini whiteboard, behaviours which they exhibited again in Lesson 2. This could indicate that these students, when working in small group scenarios, have come to realise that there is no risk of humiliation from their friends, and thus they are happier to share their ideas openly (Ames, 1992). As well as this, it was good to see that these children both took control, at times, of the discussions, standing up for the methods that they believed in. This shows that these pupils have developed a positive trust in their own ability relative to their peers, corresponding with the work of Deci, Nezlek & Sheinma (1981). As has already been highlighted, the fact that this peer interaction has not changed for these pupils, links to the notion that the ways in which a change in risk-taking manifests itself is different for each pupil. Each of these children will be at a different stage in their risk-taking transition, and hence it will change at different rates and through different means.

However, there were small changes that started to take place for Pupils 2 and 4. During Lesson 1, Pupil 2 displayed distraction behaviours and had to be heavy encouraged by the other students on her table to take part in solving the group question. When handed the board, she was obliging and did help to write some working out, but did not do so for long, before pushing it away from her desk in a dismissive way. This is a clear indication that Pupil 2 was selecting to answer only the questions that they were secure in knowing the answer to and once faced with a slight increase in difficulty, they refused to take part. This echoes the work of Covington (1948), who said that learners who are failure

avoidant will select tasks either far too easy or too difficult for them, so that the outcome is inevitable. Similarly, there is an element of Atkinson's (1957) theory, whereby students are afraid of experiencing failure in front of their peers, so avoid situations where that could come about. The result of this is that Pupil 2 is not challenging themselves in the lesson and is displaying failure avoidant behaviours. Conversely, by Lesson 2 there has been a shift in this behaviour. From the very start of the lesson, the child was already far more engaged and had taken part in whole class question discussions. At the time for collaboration with her table, she was more pro-active in engaging herself in the discussion and did not need encouragement from the rest of her table. This shift has shown that this pupil has not only started to change her in-class motivations but is also less fearful of making mistakes in front of her peers. This growth in confidence in peer scenarios starts to indicate a movement from failure-avoidant to risk-taking, albeit a slow movement.

In addition to this, there were some slight changes in behaviour patterns of Pupil 4 across the two observed lessons. Unlike Pupil 2, Pupil 4 seemed very willing to enter into the peer discussion on how to solve the group task and did not seem to feel unconfident in her own ability (Atkinson, 1957). However, it was interesting to see that, when Pupil 4 suggested a particular answer, she was told that her method was incorrect by the rest of the group, or they did not use her method to solve the problem. This resulted in Pupil 4 seemingly getting frustrated and agitated by not getting her way and she distanced herself from the group discussion temporarily. In this situation, while Pupil 4 felt secure in her own ability and understanding, being rejected by her peer group may have

led to her feeling inferior in her knowledge, shifting her evaluations of herself relative to her peers (Connell & Wellborn, 1990). As well as this in-the-moment feeling of rejection, it is possible that reactions such as this from a peer group can lead to lessening of a pupil's self-esteem, as their autonomy over solving a question has been removed by their classmates (Brooks, 1994). If this were to be the case, it would be expected to see Pupil 4 becoming demotivated in the classroom and avoiding future collaborative tasks (Dweck, 1986). However, such behaviours were not seen from Pupil 4 in Lesson 2. Instead, during the times where there was a debate amongst the group as to which method was correct, Pupil 4 did not seem to be upset by her method not being chosen and she continued to take part in the lesson. This shows an increased resilience to failure or non-success, as the pupil is not viewing her mistake negatively, but rather as a part of a wider learning process (Clifford, 1988). It is possible to suggest that through aspects of the risk-taking lessons which focused on identifying emotional responses to failure (i.e. The Learning Pit (Nottingham, 2017)), Pupil 4 was able to identify areas where they were not resilient before, which they have now started actively to change.

Finally, analysis of the observational data highlighted that the ability for some of the girls to support others in their class had increased. When specifically focused on Pupil 3, it was clear that her confidence in supporting others increased between Lesson 1 and 2. During Lesson 1, Pupil 3 requested to work on a challenging extension question with a high ability pupil from the class. When questioned on this by the teacher, she seemed insistent that they wanted to work together and that she could not solve the problem alone. Both children

worked well on this task, and as they were finally able to reach the correct answer it gave them a confidence boost. In addition, it is possible to think that this peer success could lead these pupils to assume that to replicate similar outcomes on challenging tasks, they need to rely on each other again (Brooks, 1994). In fact, during Lesson 2, Pupil 4 again asked if she could work with another high ability friend on an extension task. However, the teacher did not allow this and instead requested that Pupil 4 work with a middle ability child to support their understanding. Here, there was a role reversal for Pupil 4, who was now slightly more able than her partner. While she was hesitant at first, it was clear that Pupil 4 was able to take on the supportive role, leading both of them to answering the question, evidenced through the body language Pupil 4 exerted towards her partner, as well as the encouragement she was verbally giving her. Here, it was clear to see the confidence which Pupil 4 gained over the lesson as she was supporting her friend, allowing her to trust her own understanding and ability to help others (Brooks, 1994). Again, this growth in confidence will help Pupil 4 to continue to grow her self-esteem in maths, ultimately leading to greater risk-taking (Ames, 1992).

One factor of significance is the parents' attitudes and home environment (Hechtman, 1991). The parents' attitudes towards their daughters risk-taking at home changed, particularly with regard to how the parents can best support and promote risk-taking (Briggs, 1975). However, Bandura et al. (1996) highlighted that active parenting can encompass more than just the parents' response to failure or success at a school task, so it is necessary to look also at the long-term desires of success that these parents have for their children.

Such aspirations that parents have can often be rooted in their own educational experiences, making it important to look briefly at the current jobs of those parents involved in the trial (Sewell & Shah, 1969; Epstein, 1991). All eight of the parents were working at the time of the trial but did not specify whether this was full-time or part-time. The parents of Pupil 1 are both Company Directors of their own private Management Consultancy firm. Despite being in high power positions, showcasing their own personal successes to run their own business, they remained supportive of their daughter's mistakes throughout. Cleary in their business, there are day-to-day elements of risk-taking, none more so than developing your own company, which may have helped them to view failures as part of a wider process. Conversely, it could be argued that having two highly ranked parents means that Pupil 1 feels the pressure to reach a similar academic level. However, this is not reflected in the data, which has shown clear improvements to Pupil 1's risk-taking throughout the study.

The parents of Pupil 2 had slightly differing jobs. The mother works in the accounting department for part of the local University, while the father is a manager to a London based business. As such, the father is often not around and has not been able to attend school events, such as Parents' Evening. This could suggest, that having one parent more present at times of homework completion etc., will mean that Pupil 2 feels the influence more from her mother's views than she does of her father's. However, questionnaire data shows that the mother of Pupil 2 has changed her view of risk-taking over the course of the study, now feeling far more capable of supporting this aspect of her daughter's education. If the father travels for work frequently, it is possible

that they have not been able to take such an active role in the research process and this could have brought about even more noticeable changes in the risk-taking attitude of Pupil 2.

Pupil 3 also had parents with differing levels of power, but to a greater and more noticeable extent that Pupil 2. The mother of Pupil 3 worked as a Teacher Assistant at a local Primary School, while her father being a Company Director of his own company. Here, it is interesting to see how a range of attitudes could be presented to Pupil 3 about risk-taking. Having worked in a Primary School, it was clear to see that the mother of Pupil 3 had some existing knowledge of the importance of mistake-making and other ideas associated with the Growth Mindset work many schools are carrying out. This was predominantly reflected in the language that the mother used when discussing how she would support her daughter's risk-taking at home. On the contrary, in a similar vein to Pupil 1, having a parent in a successful, high-powered role such as Company Director could cause Pupil 3 to place unrealistic pressures on themselves to succeed. That being said, it is possible that having two parents who take an active role in their parenting could mean that they have a balanced view and attitude towards risk-taking and how it manifests in primary aged children, so do not overtly place as much pressure on their daughter.

Finally, the mother of Pupil 4 works in the finance department for a Rainforest Charity, while the father is the author of a non-fiction book. Both these varied jobs reflect careers and sectors which often face setbacks, where

resilience is required. Hence, it is possible to suggest that both parents have been able to reflect their attitudes towards failures as being temporary, yet necessary occurrences in the search for success, upon their child. In addition, it could be suggested that they have positive self-esteem now that they have seen the whole learning journey (and the associated emotions at each stage), which they can share and instil within their child. What is also of note here is that Pupil 4 is an only child, so has no other siblings to compare their educational outcomes against. This can come as both a positive and as a negative, as it allows the pupil to develop their own self-esteem, irrespective of the potential rivalry of siblings, but also does not necessarily highlight to them when they are failing or succeeding. However, in a similar way to all previous pupils, Pupil 4 has started to show signs of an improved risk-taking attitude.

One final observation to be made about the role of parents is that, like their daughters, some of the parents are also on a journey of redeveloping their understanding of academic risk-taking, as was mentioned during my first parents' evening with them. They will have approached this research with differing prior knowledge and it is possible to assume that through exposure to the notion of risk-taking, they have evaluated their own motivations and attitudes towards failure and success. Hence, the parents are also at different stages of understanding academic risk-taking and may not be fully able to reflect the necessary attitudes onto their children at all times. Again, this highlights the necessity to follow up the study with additional data collection, over a much longer time period.

Conclusion:

This study has looked at the academic risk-taking of primary aged girls in maths lessons. When focusing on risk-taking, it was apparent that two specific areas emerged as being significant to a child's propensity to take risks (Manaton, 2017). Hence, the focus of this study turned towards raising a child's levels of academic risk-taking by changing the practice of the parents and the teachers. While there were some positive impacts on risk-taking from this study, it became clear that further research and data collection, over a longer period of time, would be necessary to conclude fully whether the intervention would be of future benefit to students. Additionally, follow up interviews would need to take place with both parents and pupils to add reliability to the findings.

When considering the extent to which teachers' practice helped to raise the levels of girls' academic risk-taking, there are a number of conclusions which can be drawn from the study. Firstly, it must be reiterated that the main change to teacher practice that took place for the study was the implementation of a risk-taking intervention, where lessons were taught on risk-taking and the themes addressed in these lessons were embedded into teacher language and feedback in future lessons. A large focus for these lessons was on raising hands in lessons to offer answers to questions and this behaviour was encouraged by the teacher in respect of its benefits to risk-taking. Observational data showed that two of the research children increased the number of times they raised their hand, with these same two girls commenting on their questionnaire that they were happier to do so. Therefore, it can be

proposed that the teacher's practice has brought about this change in these pupils, suggesting that the intervention has benefited those students' risk-taking.

In addition, another main focus of the risk-taking lessons was the emotions surrounding learning, the necessity for mistakes at times, and the struggle that pupils will have to face. Again, this was heavily supported by the teacher and reflected in day-to-day lessons. Observational data showed that there was a decrease in the number of times that the focus children asked for teacher support (nineteen times to fifteen times), showing a greater independence in work and embracing the struggle of learning. Individual pupils, such as Pupil 2, experienced more of a change in this regard, with a decrease in asking for teacher support before even trying to answer the question independently. As this was a specific focus of the intervention, it is possible to suggest that this change was directly brought about from the intervention study and that the change in the teacher's practice allowed children to deepen their risk-taking.

Finally, there was a change in the confidence of the children, particularly in terms of their peer interactions, with a general increase in peer support and genuine collaboration, without pupils feeling as at risk from humiliation or frustration from not being correct. This was most prevalent for Pupil 4 and suggests that for her, the change in learning environment and the understanding of risk-taking for her peers and the acceptance of mistake-making (brought about from the risk-taking intervention) has allowed her to

increase her tendency to take risks in group discussions. Hence, this is another way that the teacher practice has supported the risk-taking of pupils within the class. These three findings have helped to support the notion that the study has brought about a change in teacher practice and hence has started to show positive changes to the pupil's propensity to take risks.

When considering the parent-school partnership, other findings of note have been discussed. One of the most noticeable changes to the parent responses was the language used when describing risk-taking and its support which, over the course of the study, became far more in line with the in-school language, for some parents. In particular, six out of eight parents included elements of the risk-taking lessons in their second questionnaire responses, such as key terms (reliance, The Learning Pit, mistake-making), improved definitions of risk-taking which echoed themes from the lessons, and more emotional, child-centered approaches to supporting their children at home. Hence, this marked change in parental understanding of risk-taking has been brought about through communication of the in-class lessons on risk-taking. By taking part in the study, a closer parent-school partnership has been developed, with closer alignment of attitudes, which allows for greater continuity of views regarding risk-taking and mistake-making. While it is difficult to say whether the changes in the risk-taking of the pupils has been brought about directly from this parental attitude shift, it is likely that some of the changes that occurred within the children (particularly the attitudes towards failure) have impacted positively on the parent-school partnership.

Adding greater weight to this notion was the questionnaire data which showed that parents were starting to feel more able to support their daughters at home (two of eight parents), as well as some pupils highlighting the importance of home and family for encouraging their risk-taking (two of four pupils). By feeling more able to support risk-taking at home, parents are continuing to foster the same attitudes and environment towards risk-taking that the pupils experience at school. Again, this helps to generate a continuity of views for the pupils, which could have been behind some of the observed changes to risk-taking amongst the students (such as more hands-up and improved peer-work). In addition to this, the fact that a small proportion of the parents, at the time of the second questionnaire, felt that they were more able to support risk-taking at home could signify that they needed longer to familiarise themselves with the materials and to embed these into their practice. This suggests the need for a longer time scale over which to collect data, as it is likely that this support will improve alongside further risk-taking changes in class. Despite this, it is clear that the study and its intervention has started to foster a positive home-school partnership, which has begun to develop the girls' academic risk-taking.

As well as the need for additional data collection over a prolonged period of time, there are a number of other limitations which need addressing for future research. For example, due to the nature of the data collection, it was difficult to pin-point the causation of observed changes in pupil risk-taking behaviours. With both the home and school environments being of such significance, determining which was the main factor in supporting and encouraging the

pupils' risk-taking proved difficult. To do so, it would be beneficial to interview pupils and parents to elicit more information about their motivations and attitudes towards risk-taking. Using interviews here would also add greater reliability to these initial findings.

Furthermore, it has already been mentioned that there were different changes observed for both parents and pupils across the study. Each pupil and parent displayed some change over the course of the study, but these were not uniform. This heavily supports the idea that the implementation of a risk-taking study such as this takes time and cannot bring about far reaching results straight away. Again, this highlights the need for a long term study of data collection.

However, despite these drawbacks and limitations due to the time constraints of the study and the difficulties in collecting interview data, it can be concluded that there were a number of changes which occurred which seemed to better the risk-taking tendencies of pupils within the class. Focusing on discreetly teaching risk-taking to pupils and parents allowed for greater consistency of views regarding risk-taking, resilience and mistake-making to be instilled within the pupils. While additional interview and observational data is necessary, the outcomes of the study so far suggest that involving parents in the risk-taking process is a valuable tool for school, alongside coaching children to a greater degree about their own motivations and risk-taking tendencies.

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Appendices:

Appendix 1: Student Questionnaires

Student Questionnaire:

For each of the statements below, circle the response that best characterises how you feel about the statement, where 1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree nor Disagree, 4 = Agree, and 5 = Strongly Agree.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
a) In maths lessons, I like putting my hand up to give answers	1	2	3	4	5
b) I like to take risks	1	2	3	4	5
c) I get upset when I get answers wrong in my maths work	1	2	3	4	5
d) I think that my parents encourage me to take risks	1	2	3	4	5

For the following questions, please provide a written response in the grey box. Add as much detail and explanation as possible.

e) How do you think you take risks in maths?

f) What is most likely to encourage you to take risks in maths? Why?

g) Do you think it is important to take risks at school? Why?

Appendix 2: Parent Questionnaires

Parent Questionnaire:

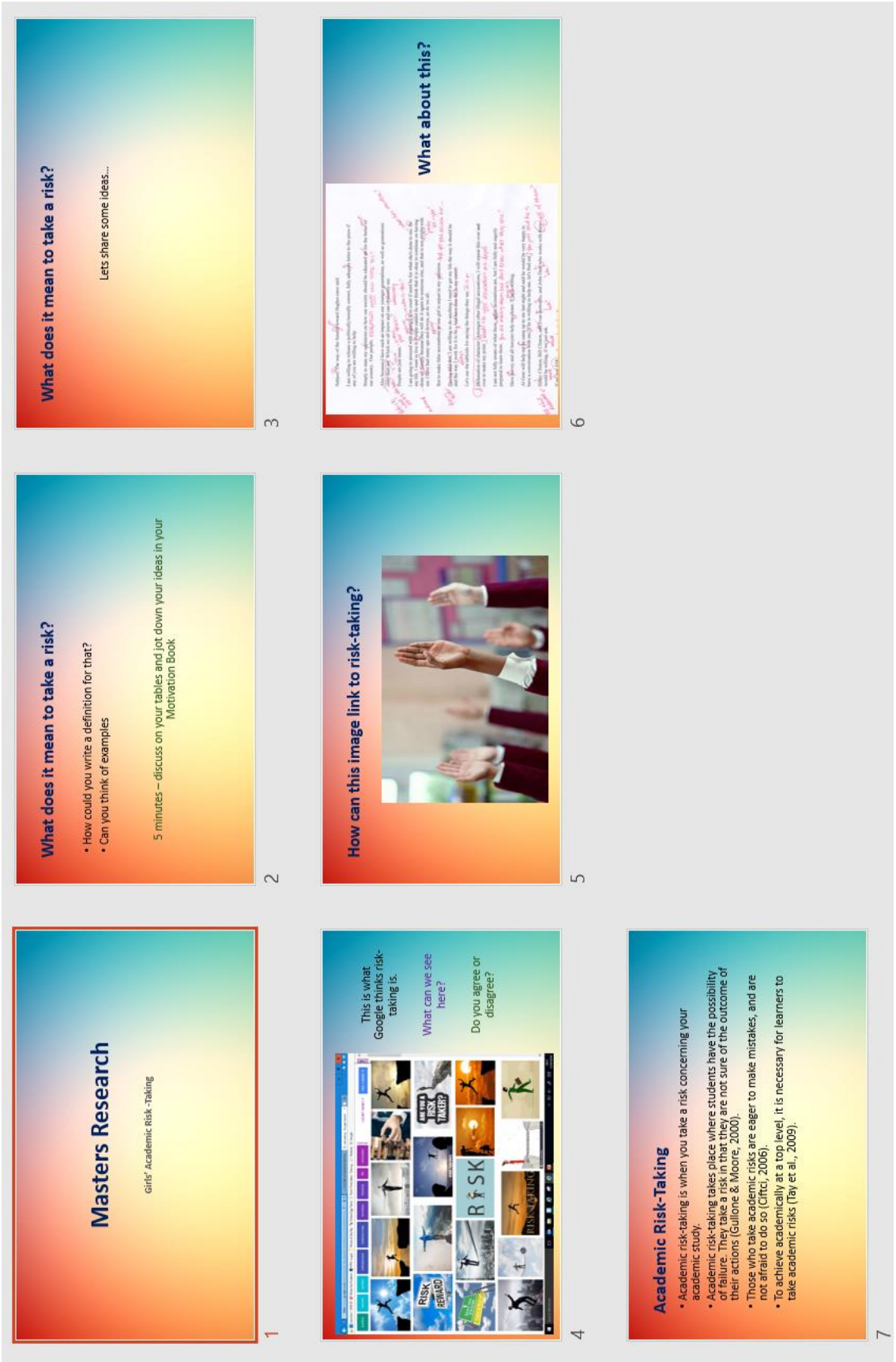
For each of the statements below, circle the response that best characterises how you feel about the statement, where 1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree nor Disagree, 4 = Agree, and 5 = Strongly Agree.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Disagree
a) My daughter is not afraid to take risks in maths	1	2	3	4	5
b) I place greater importance on my daughter's success than on her participation in maths	1	2	3	4	5
c) My daughter is easily upset by failures	1	2	3	4	5
d) I am confident with encouraging my daughter to take risks in maths	1	2	3	4	5

For the following questions, please provide a written response in the grey box. Add as much detail and explanation as possible.

e) How would you define academic risk-taking?
f) How do you support your daughter through her successes and failures in maths?
g) How do you think your daughter could improve her own risk-taking nature?

Appendix 3: Example of risk-taking PowerPoint used in school and sent home to parents.



Appendix 4a: E-mail sent to parents detailing the nature of the study.

Dear……..,

As you may be aware, I am currently completing a part time Masters in Learning and Teaching at Oxford University. For my final year assignment, I am carrying out research in school on academic risk-taking in maths. For this research, I am focussing on collecting data from a handful of girls and their parents. I am writing to you today to ask whether you would be happy for …….. to take part in the study, as one of the selected individuals. Her participation will mean that I would kindly ask that you participate in the study as well.

Attached is a consent form, outlining the project title and the nature of the data collection. If you are happy to participate, I would be grateful if this could be signed and returned. Of course, if you wish to discuss the nature of the research or have any queries I would be more than happy to talk to you further about this.

Many thanks,

xxxxxxxxxxx

Appendix 4b: Consent form sent to parents detailing the nature of data collection and terms for participation in the study.

Department: Education Department

Course: Masters in Learning and Teaching

Researcher: xxxxxxxxxxxxxxxxx

Project title: To what extent can girls' levels of academic risk-taking be raised in Year 6 maths lessons

The above study requires participation from students and their parents.

Your daughter has been selected to take part in the study. Data will be collected by means of observations from video recorded lessons and questionnaires. Should you allow her to take part, your participation will also be requested. For parents, data will be collected through questionnaires.

The following statements outline the rules surrounding yours and your daughter's participation within the research. Please read carefully and sign if you are willing to participation. Conversely, if you have any further queries regarding these statements, please do not hesitate in getting in contact to discuss these further.

- All data will be fully anonymised in the write up of this research.

- All data will be stored on password protector computer devices.

- As soon as the data is of no further research use, it will be destroyed.

- You/ your daughter have the right to withdraw your participation at any time.

- You/ your daughter have been given the chance to ask any questions over your participation or the use of your responses.

Signed: _____ Date: _____

Many thanks.