

*Journal of Trainee Teacher Education Research***JoTTER: Volume 3 (2012)****Barriers to learning: exploring the relationship between year 5/6 pupils' attitudes towards intelligence and how they cope with challenge****Rosanna Smith**

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email: rosanna.smith@cantab.net**Abstract**

Learning how to cope effectively with challenging situations and setbacks is an essential part of the educational process. We all face difficulties in life and learning yet some pupils respond to such circumstances by trying harder whilst others tend to give up. This research seeks to explore this difference by looking into the attitudes students hold concerning intelligence. Intelligence can be viewed as either a fixed trait, something you have a certain defined amount of, or as something malleable and capable of both growth and decline. In this study these two opposing views are explored, as is the relationship holding either view may have on how challenges are approached. The views of the participants in this study, pupils from year 5 and 6 classes, were initially ascertained using two questionnaires. A small focus group was then selected to undertake experimental tasks and interviews. Whilst marked differences in response to challenge did not arise, subtle differences were revealed that would benefit from further research conducted on a larger scale over a longer period of time

Barriers to learning: exploring the relationship between year 5/6 pupils' attitudes towards intelligence and how they cope with challenge

Introduction

“Whatever education is for, it is surely meant to be a preparation for life...” (Roach, 2010)

As well as equipping children with the knowledge and skills to pass formal examinations and enter employment, education has a role in developing and preparing pupils so they can thrive and adapt in an ever-changing world. This is explicitly recognized in the aims of the National Curriculum (online) which state “the school curriculum should...prepare all pupils for the opportunities, responsibilities and experiences of life.” Life and learning do not exist without challenges and setbacks, both within a school and personal context, and helping children to learn how to respond to and cope with such challenge is an important part of the teacher's role.

In this study I have investigated how children in year 5/6 think about intelligence, either as something fixed or as something changeable, and if this bears any relationship to whether they rise to a challenge or give up. In particular I have explored the research of Dweck (2000), who argues that the mindsets people hold about intelligence play a significant role in influencing how they think, feel and act. “Students who believe that intelligence is a potential that they can develop do fare better when faced with challenge.” Dweck (2010, online interview)

In this paper I start by examining existing literature and research on intelligence and motivation, before explaining my own investigation. I consider methodology and ethics, moving onto the presentation and analysis of my key findings, and finishing with an evaluation of my methodology. I also consider the implications this work will have on my future practice.

Literature review

Motivation

Understanding what, if anything, makes people act as they do is a fascinating and complex subject that many researchers have explored. Whilst Skinner (1968) explained action as a response to reinforcement or reward, Hull (1943) emphasised three factors: people's temporary states or drives; the value a goal holds for them; and their habits. Atkinson (1964) added pride and shame to the explanation, arguing that people will avoid or approach tasks depending on the level of the anticipated emotion they predict will follow.

Weiner (1992, p.17) defines motivation as “the determinants of thought and action...why behaviour is initiated, persists, and stops, as well as what choices are made.” He argues that people seek causes to explain their experiences, testing their predictions, and building theories to explain why, for example, they succeeded or failed on a task. This is attribution theory. Weiner identifies three key dimensions to the theory. The first is the perceived locus of control, whether the success or failure is attributable to personal or environmental factors. The second is the stability of the deemed control factor, whether it is something that is changeable over time. The third is whether or not the individual believes the factor to be controllable. Relating this to learning Chaplain (2000) explains that pupils who attribute their failures to internal, stable and uncontrollable factors and their successes to external, unstable factors will develop maladaptive learning styles. This is because they do not feel able to control situations so are not motivated to exert extra effort in the face of obstacles.

Such a theory is premised on the assumption that people's thoughts and actions are rationally related, yet this is open to challenge. Simon (1955) argued that although as humans we strive for rationality, the environment in which we operate is too complex, relative to our mental capacities, for this to be fully possible. He termed this “bounded rationality”. Despite these complexities, the search to understand behaviour continues, as researchers seek to identify factors that do regularly feature in our time-pressured and limited cognitions.

One such factor may be the mindsets people hold regarding intelligence. Placing this within the

three tenets of Weiner's attribution theory, whilst most people would agree that intelligence is a personal, internal factor, Dweck (2000) has found that there is much disagreement about how stable and controllable it is. She has identified two opposing mindsets, entity and incremental. Someone with an entity mindset regards intelligence as a fixed trait that we cannot change. An incremental theorist, on the other hand, takes the view that intelligence is something malleable, believing that “everyone, with effort and guidance, can increase their intellectual abilities.” (Dweck, 2000, p.3) Such differences in view, it follows, will result in different levels of motivation, depending on what outcomes are attributed to intelligence and whether that is seen as something stable and uncontrollable, or changeable and controllable.

Dweck (2000) explains that holding an entity theory of intelligence can lead people to become worried about how much intelligence they have, focusing their attention on either creating or preserving an image that they have enough of it. Extending effort to overcome difficulty is regarded as pointless as your intelligence is already determined. Additionally it is not desirable to be seen to be making effort as the fact you would need to exert effort implies you do not have enough natural intelligence. In contrast, holding an incremental mindset allows people to focus on learning and increasing their intelligence, relishing challenges as an opportunity to develop. Thus Dweck argues that the mindset held about intelligence is intimately related to motivation.

Research studies

In 1978 Diener and Dweck conducted research to explore why some children responded to failure by giving up whilst others carried on trying. In order to do this they gave 5th and 6th grade students increasingly difficult problems to solve, recording their responses as helpless or mastery-orientated. They found that over a third of the helpless group blamed their intelligence for why they were failing, showing deterioration in strategy use. Contrastingly, the mastery students did not blame themselves for their difficulties, or even seem to consider themselves to be failing. Instead many of them issued themselves instructions, remaining on task and generally maintaining or improving their strategies. They also observed that the division of children based on response type did not correlate to high and low academic ability but it did correlate with a division based on intelligence mindset.

Investigating this further, Zhao et al (1998) (reported in Dweck, 2000) gave stories of fictional characters facing obstacles and failing to people with an entity mindset, an incremental mindset, or suffering with depression. They found that people with an incremental mindset were more likely to lay out a plan of action for how to do better in the future, while those with an entity or depressed mindset were more likely to report feelings of lowered self worth and that they would want to change class or quit. They were also more likely to judge the character's entire intelligence based on one failure experience.

Testing this in a longitudinal and natural setting, so reducing experimental bias, Henderson and Dweck (1990) studied Caucasian children making the transition from primary to secondary school. They found that whilst children with helpless and mastery oriented responses tended to show equal academic performance in primary school, those with an incremental mindset fared better in coping with the transition into high school, maintaining and improving on their class standing in academic tests, and reporting less apprehension about school work. They explained this by referring to the increased level of challenge in high school, junior school being a fairly low key environment where failure is kept to a minimum. In order to test the reliability of these findings Dweck and Sorich (1999) repeated the study with ethnic minority students in inner city schools, finding similar results. Such studies highlight the importance of promoting the development of incremental mindsets in order to equip children to flourish when facing challenges.

It should be noted that whilst these studies seem to indicate that the mindset someone holds regarding intelligence is important, they do not, and indeed, cannot, prove that just because two factors are correlated one is a causal factor and the other a reactive one. Many different factors will be involved in a process as complex as determining why and how people act as they do, and whilst views on intelligence may be one such factor, views on other issues, such as how you feel about yourself, your confidence, how much you value the task at hand, how much you value the other people your actions may have implications for and the importance of the task relative to the other situations in your life at that precise moment, could all come into play.

Intelligence

Exploring why and how different mindsets regarding intelligence are developed and held, it quickly

becomes apparent why Holt (1969, p.5) wrote “intelligence is a mystery”. Intelligence is a broad term used by different people to cover different things, and there are “a number of legitimate alternative meanings of the word 'intelligence.’” Howe (1993, p.41) For example, intelligence can be considered in relation to scores obtained on psychometric intelligence tests, designed to discriminate between children based on ability and to predict their chances of success at school. Following this line of thought it is logical to conclude that intelligence measures a fixed level of capacity or ability, especially given findings that a child's scores on successive tests remain fairly constant. (Howe, 1993)

Such a view, however, can be disputed by different findings, such as Ceci (1990) who found that IQ scores for individual students were highest at the end of the school year and dropped over the summer holidays. Similarly, Howe reports that “measured intelligence is highly correlated with the number of years' schooling individuals have received.” (1993, p.43) Such findings suggest that, even if intelligence is measured as test scores, this is not fixed as environmental factors can impact on how well any given individual will do at any given time.

“What we are calling intelligence is a form of developing competencies that can lead to expertise.” (Sternberg, 2007, p.17) Indeed, Holt (1969) dismisses the idea that intelligence merely means being able to do well at school tests, noting that “these are at best only indicators of something larger, deeper and far more important.” (p165)

Given the range of possible ways of understanding intelligence it is not surprising that children develop and maintain different views. Yet for research into the implications of such views to be of practical application, it is necessary to explore how stable such mindsets are. There are mixed findings in relation to this. Whilst Robins and Pals (1998) (reported in Dweck 2000) found that the theories of intelligence held by university students remained relatively stable over three years, Bergen (1992) found that these mindsets could be influenced by giving students vivid case studies to read. This suggests that intelligence mindsets may be changeable.

Research design

In considering research design Bell (2010, p.117) emphasises “the initial question is not “Which

methodology?” but “What do I need to know and why?”” Thus my research design needed to enable me to ascertain the views that children have regarding intelligence and investigate their responses to challenging or difficult situations, in the most thorough, reliable, valid and ethical ways available given my time and sample restraints.

To do this I chose to use multiple methods, as they can be used “to corroborate each other so that you are using some form of methodological triangulation.” (Mason, 1996, p.25) Laws (2003) emphasises the power of such triangulation, enabling the cross checking of findings and providing the opportunity to look at the same thing from different angles. This allows the researcher to examine where the data sets intersect, looking at how different findings complement or contradict each other, and enhancing reliability.

Questionnaire

To identify the mindsets the children held concerning intelligence I used a questionnaire developed by Dweck, as it had already been tested and found to be valid (Dweck, 2000). This asks the children to decide whether they strongly agree, agree, mostly agree, mostly disagree, disagree or strongly disagree with three statements, such as “You have a certain amount of intelligence, and you really can't do much to change it.” (see appendix1) Each answer is correlated with a numerical value, ranging from 1(strongly agree) to 6 (strongly disagree) with a total score below 9 indicating a fixed mindset, and a total score above 12 indicating an incremental one. This enabled me to access the views of all of the 34 year 5/6 children at one time, producing a large amount of quantifiable data.

Initially I gave the 32 students present the shortened version of Dweck's questionnaire, requiring them to rate three fixed statements. I used the shortened version due to the young age of the children and concern that they might be confused by a mixture of fixed and incremental statements. I was careful not to bias the children by giving an explanation of intelligence myself, leaving it for them to adopt the meaning that came to them, simply assuring them that there were no right or wrong responses.

In order to ensure reliability of findings Bell (2010) recommends testing and re-testing so the results can then be compared and correlated. This is particularly important given that this questionnaire was about a subject the children might not have consciously thought about before. I

used a longer, six statement questionnaire (also designed by Dweck) for the second questionnaire as this incorporated three statements for each mindset (see appendix2). This was completed by all 34 students. I used the longer questionnaire because I wanted to eliminate the possibility that the children who had given fixed responses in the first questionnaire (predominantly year 5 and not year 6 pupils) did so because they were more fearful about disagreeing with the statements, opting to agree as this felt “safer” and less likely that they would have to justify their responses, rather than because it reflected their genuine opinions.

Challenging tasks

Thinking about how best to research the pupils' responses to challenge, I took heed of the advice of Silverman (2005, p.7) “if you can align your work with a previous, classic study, this makes sense.” I took inspiration from Diener and Dweck (1978/1980) who actually gave children challenges and used the questionnaires to select the three children with the strongest views each way to give increasingly difficult sudoku puzzles to. (see appendix3) I chose sudoku puzzles as they drew on skills the children use in school whilst being different from their ordinary work. Similarly such puzzles are made at a variety of difficulty levels, enabling me to give the children a selection of progressively more challenging puzzles. Diener and Dweck (1978/1980) recorded pupils' reactions by asking pupils to say out loud what they were thinking and feeling and comparing their strategies before, during and after difficulty. These were longitudinal studies where the children were given training and time to get used to speaking their thoughts. Adapting this for my study, I gave each child a self evaluation chart of faces, a format they were familiar with (see appendix4) and asked them to record how they were feeling at timed intervals as they progressed. I asked them to record the strategies they were using, and at the end to note which puzzle they enjoyed the most and why. I gave them a blank sheet to use as they wished, looking to see if they used it to aid their work, to doodle, or not at all. I also observed them working, noting what they said and how they reacted as the puzzles became harder.

Interview

I decided to use interviews to support and extend the practical tasks in order to give the six focus children the opportunity to think about the topic explicitly and communicate their thoughts in their

own words. This also enabled me to address the tensions between what people say they do/would do, and what they actually do, building up a fuller picture.

I interviewed each child individually to avoid the risk that they would be influenced or led by each other, agree without thinking, or conversely, speak in reaction to one another rather than expressing their own views. Individual interviews also avoided the potential that some of the children might have been intimidated by a group setting, especially across year groups, and so not dare to say their true thoughts. Additionally I did not want to interview them in two groups based on their mindsets as I did not want to create greater division between the two groups than there actually was.

To minimise the potential that working one to one, talking about themselves, would be intimidating for them, I started the interviews by discussing the story of a fictional character, (as did Zhao et al 1998) asking them questions such as “how do you think she feels?” and “what advice would you give her?” before asking them to discuss how they would feel (see appendix5). By using open questions I was able to maintain control of the general structure of the interviews, producing data I could compare, whilst also giving the children scope to individualise the process. All of the interviews were recorded, with the children's permission, and transcribed afterwards (see appendix6) so they could be analysed for interesting points.

Ethics

The 2004 Revised Guidelines from the British Educational Research Association (BERA) state that researchers must “operate within an ethic of respect for any persons involved.” (2004, online, p6). The guidelines layout the responsibilities of the researcher; to obtain consent, to recognise a participant's right to withdraw, to minimise discomfort and intrusion, and to protect participant privacy. Throughout my research I sought to comply with these guidelines.

I obtained the written consent of the school in advance, allowing me to undertake my data collection without seeking the consent of individual parents. Similarly I made sure I involved the class teachers, discussing each element in advance and taking on board their concerns about certain children.

In presenting the questionnaire I made it clear to the children that they did not have to take part if

they did not want to, that it was not a test, and that they could withdraw at any point. Likewise when working with my six focus children I made sure I obtained their consent to take part in both the activity and the interview, checking they were happy to be recorded and reminding them that they could still withdraw having started if they wanted to.

As my research was exploring how the different participants would respond to challenge, I was aware that some of the children could react negatively. Thus I sought to ensure that all of the children left the practical task with a feeling of accomplishment, giving each child an easier puzzle to finish with and explaining to them that I had given them really difficult puzzles that would normally be for older children but because they had done so well I wanted to see how they would find them. Likewise, I concluded the interviews by asking them about times they had felt intelligent, making sure I thanked them for their participation, and debriefing them on what the project had been about.

Finally, I have changed the names of all of the children and the school involved in order to protect their identities, informing participants that their information and details would be kept confidential “a promise that you will not be identified or presented in identifiable form.” (Sapsford and Abbot 1996, p.319) In relation to the data collected I only kept it on record for as long as necessary, deleting the recordings once they had been transcribed.

Results and critical evaluation of key findings

Using Dweck's questionnaire I found that whilst there was a range of views amongst the two groups regarding the fixed or incremental nature of intelligence, it was not clear whether these views correlated to coping techniques and reactions to challenge. Of the six focus children I worked with, they all persevered in the face of an actual challenge, with only one blaming his intelligence and using guessing as a strategy (Robert, fixed) and only one reporting feeling upset (Lucy, incremental). All of them advised a fictional character to keep going in the face of a setback, although, those with a fixed mindset were quicker to assess the intelligence of this character, something it would be worth investigating further in future research.

Views regarding intelligence

Questionnaires

Calculating the scores from the first questionnaire I found that 42.4%(1.d.p) of the 32 children gave answers corresponding to fixed mindsets, 39.4%(1.d.p) to incremental, with 18.2%(1.d.p) giving answers that fell in the middle ground between the two (see figure1). This is comparable to the distributions found by Diener and Dweck (1978) of about 15% of participants not falling within either mindset, and the remaining 85% being fairly evenly distributed between the two.

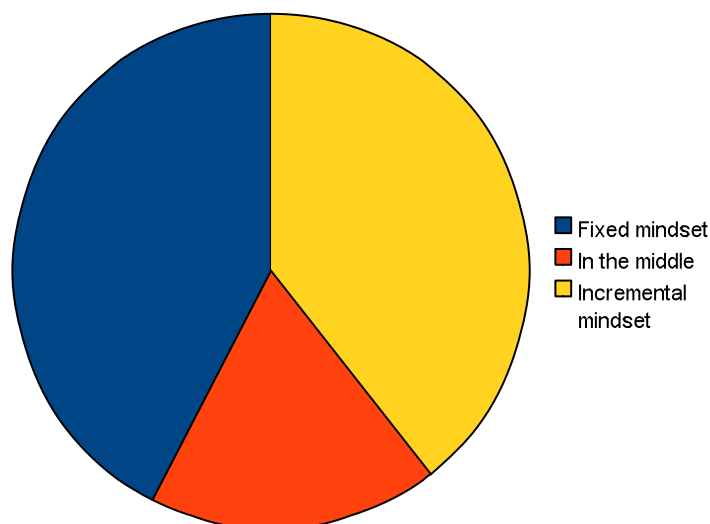


Figure 1: Distribution of opinions from first questionnaire

Looking at the distribution of the 34 responses from the second questionnaire it is interesting to note that whilst the number of children supporting an incremental mindset increased a little (moving from 39.4% to 47.1%) the number of children advocating a fixed view dropped significantly, moving from 42.4% to 25%(see figure 2). This could have been due to a number of factors, including the change of questionnaire to include both fixed and incremental statements, the fact that the issue was something they had thought about before, or due to the work they had been doing in PSHE on 'going for goals' in the interim. Whether their PSHE work-identifying goals, steps to achieve them and discussing overcoming obstacles-had had an impact on their views is a topic it

would be interesting to investigate further, but obviously, with any such study, there are so many variables at play it is hard to attribute any change to any one factor in particular.

Distribution of opinions from second questionnaire

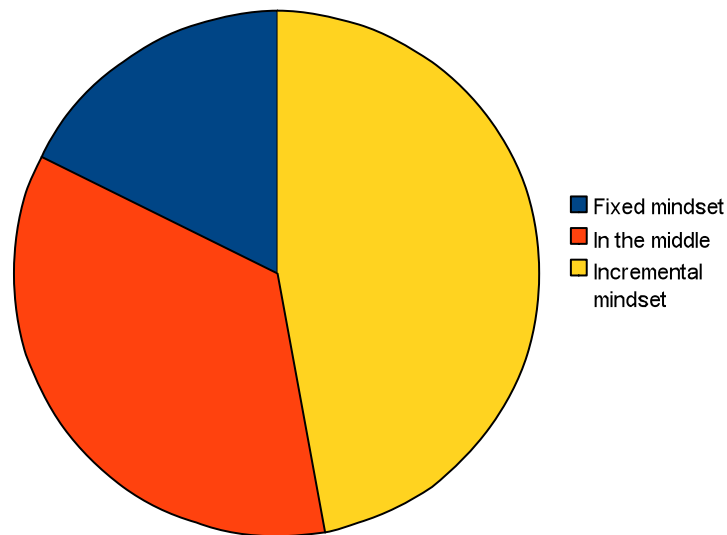


Figure 2: Distribution of opinions from second questionnaire

Considering how individual's scores changed between the questionnaires, (figure 3) it was interesting to note that some of the children recorded different mindsets, and some gave inconsistent responses. This may indicate a lack of understanding or a desire to please, for example always agreeing. It may also show a genuine change in their thinking. Yet the children who had advocated the strongest views either way on the first questionnaire, continued to advocate stronger views in the second, and it was with these children I conducted the rest of my research, combining the results from the two questionnaires to select them (figure 4).

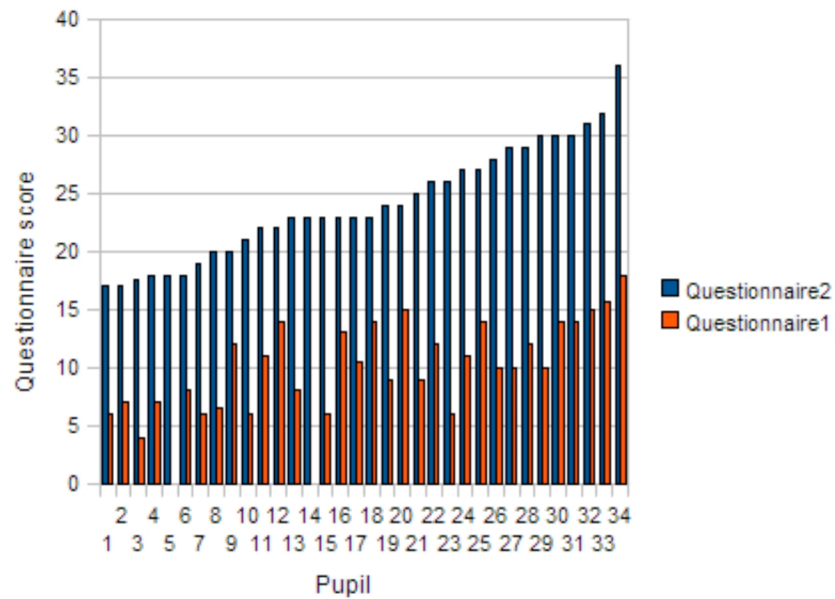


Figure 3: Individual scores on each questionnaire.

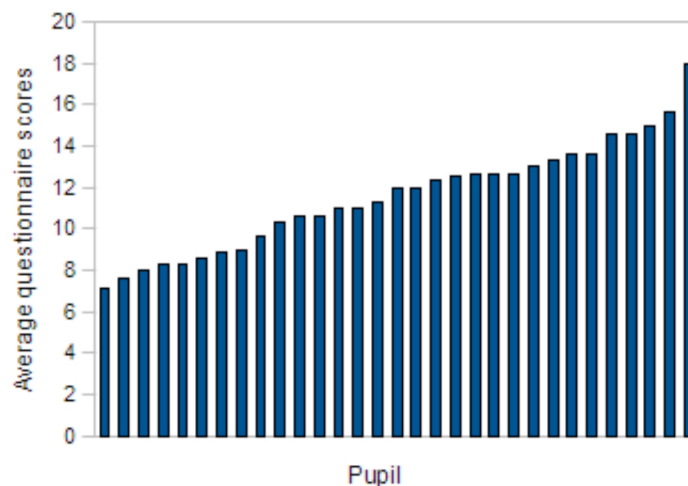


Figure 4: Combined results from the two questionnaires.

Interviews

In order to gain a more detailed impression of the views expressed in the questionnaires I asked the six focus children to elaborate upon their responses. This proved very illuminating, revealing that far from holding vastly different views, most of the children actually held similar views, and had just interpreted the questions differently.

Lucy “I didn't mean in like a year, but you can learn a lot from year 1 to year 6 and you're still the same person, it's not like you've had an identity swap.”

Casey “I think everyone can change their learning if they put their mind to it...maybe you have a bit more (intelligence) than other people, but it doesn't mean you should stop though, you should carry on.”

Robert “I can't really change my intelligence by loads, I can only change it a little bit at a time, sometimes, but not all in one go.”

Sophie “Even if you practise it's really hard to make a really huge difference.”

These reveal a large degree of agreement, all expressing the opinion that over time, with practise and perseverance intelligence can be improved. Where they differ is in whether they focus on the absence of making a big difference quickly (the latter two, expressed by children who supported fixed views) or they focus on the fact that a difference can be made (the first two, from children who expressed incremental views). This raises the question of what distinction the questionnaires were measuring and the degree that any fixed answer questionnaire can effectively identify differing mindsets, as any questions are open to individual interpretation. This illustrates the importance of further elaboration, where possible.

Only one of the children, Layla, identified as supporting a fixed view, expressed the view that intelligence is something you do not have the power to influence. “If you're already like it then you can't really change it.”

Responses to challenge

Task

Analysing how all six children reacted to the increasing levels of challenge in the Sudoku puzzles, I found that there was not an obvious distinction in correlation to the view of intelligence expressed.

Of the three children who had advocated fixed views, Sophie concentrated throughout, using a consistent strategy and continually rating her feelings as positive, reporting that she had most

enjoyed the hardest sudoku “because even though it takes longer it's more challenging.”

Layla fluctuated between bouts of concentration and periods of time staring at her pencil and doodling. She used a couple of strategies and largely reported feeling positive, sinking a little when first attempting the hardest puzzle, but reporting positive feelings again shortly afterwards. Her favourite puzzle was the mid range one, again because it “is a challenge.”(See appendix7)

It was only Robert who initially reported guessing, telling me that “I don't know how to solve this. I'm just going to try at random.” His concentration wavered throughout, yet he recorded positive emotions until attempting the more challenging puzzles, circling the half way faces until he moved back to the simpler ones. Of all the children he was the only one, when struggling, to condemn his abilities, telling me “I'm terrible at maths”, yet having finished the task he wrote he liked the initial puzzles because “the difficulty was at the right level for me” adopting a more objective view, telling me that he hadn't been able to work out the harder ones because “there were more numbers to fill in” rather than making any reflections about himself.

Considering the reactions of the other children, all three of them reported fluctuating moods between happy and unsure, generally becoming unsure each time they started a new puzzle or level of difficulty. Both Casey and Jack reported preferring the mid range puzzles, Jack because “it wasn't too hard but not too easy” and Casey “because it was hard but not really hard.” They both used strategies to help them and Jack muttered instructions to himself throughout, “now try that one, no, no, OK, now try four...”. Casey worked silently, focusing hard until right at the end when she switched focus completely, concentrating on drawing a horse. (see appendix8)

Of all the children it was Lucy who reacted the most to the challenge. Having spent a few moments contemplating a harder puzzle she stopped, looked at me, looked down, went red, hunched her shoulders, looked up and then down again before telling me “I'm stuck” in an embarrassed voice. When I asked her what might she do to help herself, she decided “I'll start this one (pointing to another one) as it looks easier, it should be quicker.” She then started a new puzzle, still using the same strategy of working box by box, even when it could no longer suffice on its own. She then sat in silence, staring at her paper and reporting feeling sad (see appendix9). I asked her how it was going and she told me very seriously that “Now it is hard. I feel a bit nervous as I might have to fill

in a wrong number I might have to guess.” Yet then she saw what a number should be and filled it in so opening up other possibilities, smiling, and telling me jubilantly “I feel better. I’ve got a strategy that works!” At the end she identified the hardest task as her favourite because “it made me think”.

Considering these findings it is interesting to note that five of the six children recorded feeling less positive when they started the new and more challenging tasks, indicating that facing something difficult for the first time is likely to provoke a change in emotion that children, and adults, must learn to deal effectively with. Relating my findings to those of Diener and Dweck (1978) I found some similarities, such as the fact that the one child who issued himself instructions, a strategy that Diener and Dweck found prevalent amongst their incremental groups, was Jack, who had expressed an incremental view, just as the one boy who blamed his lack of ability for struggling was a child who had expressed a fixed mindset, correlating to Diener and Dweck's findings that children with fixed mindsets were quicker to condemn themselves when things went wrong. Despite this, however, two of the children who supported a fixed mindset reported favouring the most challenging task, and all of the children persisted with the puzzles.

Interviews

Looking at the comments made at interview it is encouraging to note that all of the children, whilst recognising that Sandra (the girl in the passage they read) would feel upset, advised her to keep trying. They all took a similar coping strategy to receiving negative feedback, asking for input and giving it another go. Only one child, Robert, reported wanting to give up “I’d feel like I wouldn’t want to do it again ‘cos I’d put all my effort into it, just for it to fail.” Yet he followed this by saying he would “ask the teacher what I did wrong and try and learn from it.”

Interestingly, however, the interviews did reveal some distinctions. The first related to the responses given to the question of whether they thought it mattered how intelligence is viewed. Whilst Sophie and Lucy expressed similar views, with both of them saying that it might not matter, so long as you practised and stayed positive, amongst the other children there was a greater division, with the children who had expressed an incremental view seeing it as more important.

Jack "...'cos it (having a fixed mindset) would mean you'd feel you can't get any better at anything....so you wouldn't really bother doing anything cos you'd think you can't get better at anything."

Lucy "...if you think you can't change your intelligence it might not give you much confidence"

And in contrast, Layla "No. Because however you are that's how you are."

Robert "Well, it would probably change my answer on the questionnaire. Um, well, I can't think of anything that it would have impact on."

Secondly, there appeared to be a general distinction in whether the children felt able to deduce how intelligent Sandra was from reading the passage, with the children who had supported a fixed view of intelligence more readily making an assessment. This supports the findings of Zhao et al (1998) who found that those with fixed mindsets were more likely to judge a character's entire intelligence based on one passage than those with an incremental mindset. Thus whilst Casey replied "um, I don't think it shows, I think everyone can improve their learning, if they'd like to", Sophie was comfortable to make an assessment, stating "I think she's sort of half and half because she's quite intelligent 'cos she worked really hard on it, but not as much because the teacher and people didn't like it." Similarly Robert reported "I just think that she sounds intelligent," and Layla replied " she works really hard, so she's clever."

Interestingly, the fact that Sandra put in effort was used as evidence to suggest she is intelligent. This contrasts the findings by Maehr and Midgely (1996) that entity theorists have a strong desire to minimize the effort they put into work, saying that exerting a lot of effort made them feel dumb. Dweck (2000) explained such findings as a form of self protection, correlating to the belief that, as intelligence is fixed, exerting effort won't change this, and to be seen to be trying would somehow suggest you did not have the natural ability or intelligence that someone who tried less hard did. Thus it is interesting to note that the children in my study did not express this view about effort. Instead their views correlated more closely to that of Holt (1969, p.165) "the intelligent person...meeting a new situation or problem, opens himself up to it...he grapples with it boldly, imaginatively, resourcefully...he looks without shame or fear at his mistakes and learns what he can from them."

Analysis of methodology

Working with just six focus children over a relative short period of time meant that my research was not able to establish generalizable or concrete findings. In order to build up a more thorough picture it would be necessary to work with a larger sample of children in more depth, so gaining a clearer sense of whether any correlations arise. Similarly, with such a small sample, I am unable to conclude whether my results are anomalous or representative, within those classes, that school or that age range, let alone a wider sample. Thus my findings do not offer concrete support to Dweck's conclusions that a fixed mindset to intelligence can handicap children when facing challenge. Instead further research, both with these children, and with a larger sample would be necessary before any conclusions or claims could be made.

The breadth and triangulation of methodology was both a strength and weakness of my research model. By combining different methods of data collection I was able to explore how the children would respond to challenge more thoroughly, enhancing the validity of my conclusions, by having two different sets of data to consider together to build up a picture. As Johnson and Onwuegbuzie (2004, p.23) argue “by utilizing quantitative and qualitative techniques within the same framework, mixed methods research can incorporate the strengths of both methodologies.”

Silverman (2005) warns, however, that it can be naïve to expect any research method or combination of methods to reveal the whole picture, expressing concern that using a multitude of methods can create scrappy research with under analysed or indigestible data. By collecting data via a combination of methods I reduced the amount of time I could give to develop or refine any individual method further. For example I became aware, whilst observing the children completing the sudoku puzzles, that either an initial test to gauge their level, or a longer session, would have been beneficial, enabling me to make sure I was starting all of them off at appropriate levels and progressing to a puzzle for each of them that they would find challenging. As it was, Robert found the initial puzzle significantly harder than the other children, and Sophie could have been challenged further. Similarly, giving them blank paper to record thoughts or notes on if they wished seemed to confuse them, and I felt that Casey in particular drew on hers as she felt that it was part of the task to use the paper. Such problems of artificiality could have been eliminated by using naturalistic observations, and given further time it would be interesting to observe how the children

respond to challenges as they arise in the classroom.

Implications for my professional development

I have found the process of undertaking research into this field and learning about the findings of others, to be thought provoking and illuminating, providing me with insights and sensitivities to take into the classroom with me.

Having studied the considerable body of research conducted by Dweck, I have been made aware of the benefits of encouraging and creating an incremental atmosphere in my classroom where children believe they can always improve and expand and so seek out, rather than fear, opportunities to challenge and develop themselves. As a result I will focus on praising children for putting in a good effort, rather than for being clever, letting them see me working hard and persisting on difficult tasks, knowing that we will all work together and individually within the class to learn continually and stretch our intelligences.

I intend to support my classes in developing strategies to manage effectively the feelings of disappointment and negativity that result when facing difficult and unknown challenges, modelling strategies for them. For example, offering formative, forward looking feedback that encourages and models the process of sustained effort, highlighting the areas that need improvements and the steps to achieve this, so clearly modelling for the pupil how to respond. In this way the children can develop that pattern of response, building a strong foundation to take with them into secondary education and adult life, where they are likely to be exposed to less support and more challenge. Similarly, I will ensure I have explicit discussions with my classes about how we might react when facing an obstacle, thinking about possible options and developing positive strategies.

Looking beyond the benefits to the individual children, developing adaptive and incremental views to challenge can benefit society as a whole, as more individuals seek to challenge themselves, enjoying it as part of learning, rather than fearing it as a potential for failure, giving up or dropping out altogether. In a school context, such dropping out can lead to playing truant, which Varma (1993, foreword) suggests is a result of rejection and failure, noting that “children and adolescents who are happy and successful at school do not play truant.” In order to mitigate the negative impact

of such failure Varma advocates a school system where children are not subject to undeserved failure, focusing more on personal progress than on formalised group testing where there will inevitably be those who fall short of the supposed norms or averages. Taking this on board within my own classroom I will ensure that I focus the children on achieving their personal best, rather than on their position in relation to another or within the class as a whole.

Yet formalised testing and competition is a reality in both education and life, and children have many situations of competition and challenge ahead of them. In order to assist them in this, rather than trying to eliminate competition completely, I will work with my classes to re-classify failure, seeing setbacks as challenges to learn from, identifying ourselves as learners participating in the ongoing, lifelong process of learning and stretching our capacities. By helping children recognise that they will face challenges and they will get things wrong but that this is not a problem, I hope to assist my students in developing malleable and adaptive mindsets, enabling them to focus on enjoying the process of stretching their intellects, rather than worrying about how much or little of this mysterious intelligence they might have.

References

- Atkinson, J.W. (1964). *An introduction to motivation*. Princeton NJ: Van Nostrand.
- Bell, J. (2010) *Doing Your Research Project*. (5th Ed). Maidenhead: Oxford University Press.
- BERA. (2004) *Revised Ethical Guidelines for Educational Research*. (2004). Published online by British Educational Research Association.
- Bergen, R. (1992) Beliefs about intelligence and achievement-related behaviours. Unpublished doctoral dissertation, University of Illinois at Urbana Champaign.
- Ceci, S.J. (1990). *On intelligence...more or less: a bio-ecological theory of intellectual development*. Englewood Cliffs, New Jersey: Prentice Hall.

- Chaplain, R. (2000) Helping Children to persevere and be well motivated. In Whitebread, D. (Ed) *The Psychology of Teaching and Learning in the Primary School*. London: Routledge Falmer.
- Diener, C.I., Dweck, C.S. (1978) An analysis of learned helplessness: Continuous changes in performance, strategy, and achievement cognitions following failure. *Journal of Personality and Social Psychology*, 36(5), 451-462.
- Diener, C.I., Dweck, C.S.(1980). An analysis of learned helplessness: (II) The processing of success. *Journal of Personality and Social Psychology*, 39, 940-952.
- Dweck, C. S. & Sorich, L. A. (1999). Mastery-oriented thinking. In C. R. Snyder (Ed.), *Coping: The psychology of what works*. New York: Oxford University Press.
- Dweck, C.S. (2000). *Self Theories. Their Role in Motivation, Personality, and Development*. Philadelphia: Taylor and Francis.
- Education World interview (02/07/2000) with Carol Dweck. Retrieved on 26th February 2011.
http://www.educationworld.com/a_issues/chat/chat010.shtml
- Henderson, V., & Dweck, C.S. (1990). Achievement and motivation in adolescence: A new model and data. In S. Feldman and G. Elliott (Eds.), *At the threshold: The developing adolescent*. Cambridge MA: Harvard University Press.
- Holt, J. (1969). *How children fail*. London: Pitman Publishing Corporation.
- Howe, M.J.A. (1993). Limited Intelligence and School Failure. In Varma, V. (Ed.) (1993) *How and why children fail*. London: Jessica Kingsley Publishers.
- Hull, C.L. (1943). *Principles of Behaviour*. New York: Appleton.
- Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. *Educational researcher*, 33(7), 14–26.
- Laws, S., with Harper, C. and Marcus, R. (2003). *Research for Development: A Practical Guide*. London: Sage Publications.
- Maehr, M.L., & Midgely, C. (1996). *Transforming school cultures*. Boulder, CO: Westview Press.
- Mason, J. (1996). *Qualitative Researching*. London: Sage.

- Roach, P. (2010, December). The Global Classroom. Reported speech by NASUWT Deputy General Secretary from NASUWT Global Classroom Conference, 2010. *Teachingtoday*, Issue 75, 28-29.
- Robins, R.W., & Pals, J. (1998). Implicit self theories of ability in the academic domain: A test of Dweck's model. Unpublished manuscript. Reported in Dweck, C.S. (2000). *Self Theories. Their Role in Motivation, Personality, and Development*. Philadelphia: Taylor and Francis.
- Sapsford, R.J. & Abbott, P. (1996). Ethics, Politics and Research. In R. Sapsford & V. Jupp. *Data Collection and Analysis*. London: Sage Publications.
- Silverman, D. (2005). *Doing Qualitative Research*. London: Sage.
- Simon, H. A. (1955). A Behavioural Model of Rational Choice. *The Quarterly Journal of Economics*. 69(1). 99-118
- Skinner, B.F. (1968). *The Technology of Teaching*. New York: Appleton.
- Sternberg, R.J. (2007). Intelligence, Competence, and Expertise. In Elliot, A.J., and Dweck, C.S. (Eds.) *Handbook of Competence and Motivation*. New York: The Guilford Press.
- The National Curriculum Online. Retrieved 24th February 2011.
<http://curriculum.qcda.gov.uk/key-stages-1-and-2/aims-values-and-purposes/aims/index.aspx>
- Varma, V. (1993). *How and why children fail*. London: Jessica Kingsley Publishers.
- Weiner, B. (1992). *Human Motivation. Metaphors, Theories, and Research*. California: Sage Publications.
- Zhao, W., Dweck, C.S., & Mueller, C. (1998) Implicit theories and depression-like responses to failure. Unpublished. Reported in Dweck, C.S. (2000). *Self Theories. Their Role in Motivation, Personality, and Development*. Philadelphia: Taylor and Francis.

Appendix 1:

Short questionnaire (questions redrawn from Dweck, 2000, p. 177)

Dear Year 5 and 6,

Thank you for helping me with this questionnaire.

There are no right or wrong responses and it is not a test, I just want to find out what you think.

Please can you take a few minutes to think about these statements and tick in one box for each statement to show how much you agree with it.

Name..... Year Group.....

	1 strongly agree	2 agree	3 mostly agree	4 mostly disagree	5 disagree	6 strongly disagree
1. You have a certain amount of intelligence, and you really can't do much to change it.						
2. Your intelligence is something about you that you can't change very much.						
3. You can learn new things, but you can't really change your basic intelligence.						

Appendix 2:

Long questionnaire (questions redrawn from Dweck, 2000, p. 177)

Read each sentence below and then circle the one number that shows how much you agree with it. There are no right or wrong answers.

1. You have a certain amount of intelligence, and you really can't do much to change it.

1strongly agree 2agree 3mostly agree 4mostly disagree 5disagree 6strongly disagree

2. Your intelligence is something about you that you can't change very much.

1strongly agree 2agree 3mostly agree 4mostly disagree 5disagree 6strongly disagree

3. You can learn new things, but you can't really change your basic intelligence.

1strongly agree 2agree 3mostly agree 4mostly disagree 5disagree 6strongly disagree

4. No matter who you are, you can change your intelligence a lot.

1strongly agree 2agree 3mostly agree 4mostly disagree 5disagree 6strongly disagree

5. You can always greatly change how intelligent you are.

1strongly agree 2agree 3mostly agree 4mostly disagree 5disagree 6strongly disagree

6. No matter how much intelligence you have, you can always change it quite a bit.

1strongly agree 2agree 3mostly agree 4mostly disagree 5disagree 6strongly disagree

Appendix 3:

Sudoku puzzles

		2	
	4		
		3	
	1		

		2	4		
4					2
	2			3	
	4			6	
1					6
		3	5		

1								4
		3	6	1	8	9		
	2	7				6	1	
		8	1	6	9	4		
		1	2		7	3		
		6	8	5	3	1		
	1	5				7	3	
		2	3	7	6	5		
7								9

Appendix 4:

Evaluation sheet

Name:

Appendix 5:

Short story to discuss in interviews

In her final year at school Sandra joins an after school science club. Her teacher tells them all that they will have to make a presentation to the rest of the group during the term. Over the first few weeks of term some of the students make their presentations and all get good evaluations from the teacher and the rest of the class. Then it is Sandra's turn. She works really hard on her presentation, but when she finishes she finds out that her teacher and classmates did like it very much at all.

Appendix 6:

Full interviews

Lucy interview

What advice would you give to Sandra?

Don't worry you've tried your best...and you're not competing against anyone else, you're just trying to get the best you can do.

How do you think she'd feel?

She'd feel sad.

How do you think you'd feel if it was you?

I'd feel a bit upset cos if I work really really hard and then it doesn't work, no one likes it...

What might you do?

I'd probably say like, I've tried my best, it doesn't really matter if no one likes it, cos I've done the best I can do

So going forward, would you do anything differently?

She might not have followed the instructions very well, so she might listen to the instructions better, she might find out what she was doing the wrong kind of thing.

Does this tell us anything about how intelligent she is?

Not really sure, um, cos if she hadn't been following the instructions then you wouldn't, she might be really clever, she just didn't know what she was doing. So, you cant tell.

You said in your questionnaire that you strongly agreed that no matter who you are you can change your intelligence a lot. Can you explain that for me?

Well, you might start off learning not much, but then you can work out that you can start learning and try your best and you're going to learn. I didn't mean in like a year, but you can learn a lot from year 1 to year 6 and you're still the same person, it's not like you've had an identity swap.

Does it matter how you view intelligence?

Um, well, kind of and kind of not, if you think you can't change your intelligence it might not give you much confidence, but it might not matter, because you might, um, just think it but you've still got to have a positive attitude and still you still learn.

When do you feel intelligent?

When I find something I didn't really think I'd find myself, that I wouldn't really think I could find, but I did, like, um, if I work something out, like in maths, like a pattern I did a few days ago, I felt proud of that because I wouldn't really notice it if I wasn't looking very hard, but I looked, and, um if I wasn't following instructions, I wouldn't have found it, I might have looked in the 4 times table and there might not have been the same connections as in the 3.

Casey interview

What advice would you give to Sandra?

Maybe look it over, and, um, maybe it might have been something about her punctuation, so she might look at that, but if she decides that she likes it and that she thinks it's good, I wouldn't think about what other people think of you.

Including the teacher?

Well, um, yeh, if the teacher is giving her advice on how to do it, but if she is just like 'I don't like it, just go start again' that doesn't give her much help, so I'd just tell her she maybe needs to look it over and ask the teacher what needs to be improved and things.

How do you think you'd feel if it was you?

I'd probably feel kinda sad but then I'd go and ask the teacher and she'd probably give me some

advice and id go home and do it again and show her another day and hope that its good enough.

So you'd want to give it another go?

Yeh.

Do you think the story tells us anything about how intelligent Sandra is?

No, cos that subject might not be her strongest subject, that subject might be her weakest subject which means that she might not do as well as other people do. But I don't really think like that, um, I don't think it shows, I think everyone can improve their learning, if they'd like to.

And how would they do that?

Um, listen, learn, listen, and then co operate in class, or wherever they're trying to learn, um, maybe ask other people.

Looking at this questionnaire, you say that you strongly disagree with the statement that you have a certain amount of intelligence and you really can't do much to change it, can you explain that?

Yeh, sure. I think everyone can change their learning if they put their mind to it. Like, say you weren't very good at horse riding, I'm sure if you got on a horse and you tried and tried again that you would eventually get it.

So you think if you try and try again you will get it, so therefore to say you have a certain amount of intelligence isn't true, as you can get more?

Yeh, well, maybe you have a bit more than other people, but it doesn't mean you should stop though, you should carry on.

And how do you think you can change intelligence?

Well, you should listen, co-operate and ask other people what they think.

So do you think it matters how you view intelligence?

It depends on what sort of person you are, if you believe that, well, it wouldn't really help you that much having that sort of, um, way of life, sort of thing, thinking, oh I have a certain amount of learning in maths, I can't learn anything else. Maybe you have a bit more (intelligence) than other people, but it doesn't mean you should stop though, you can carry on.

So we have talked about how you can always keep learning, but are there ever times you feel particularly intelligent?

Sometimes when you've put your hand up, and everyone has tried and they can't get the answer right and then you get the answer right, it makes you feel a little bit more confident about yourself. Or like if you get full marks in a test, or something. But I don't really have a subject I'm amazingly intelligent at, I'm year 6 standard at most of it, maybe PE. I can run fast, sometimes I can beat other people, sometimes I can't, and I can get better at my times.

Jack interview

What advice would you give to Sandra?

Hmm, what didn't you do properly?

You'd ask her what she didn't do properly? Could you give her any more advice, imagining she is your friend, what would you say to her?

It doesn't matter, cos, it's only a presentation.

OK, so if it was you, how do you think you would feel?

A bit disappointed.

What might you think?

I'd think that everyone was mean, cos, they didn't like the project at all and you'd worked really hard on it.

So what would you do?

Try and ask the teacher what you did wrong, so you can try and fix it, write it again.

And do you think you can tell how intelligent Sandra is?

No, cos she might not be good at science, but she might be good at lots of other things.

OK, so she might be good at something else. Do you think it matters how you view intelligence?

Nope. Well, it does a bit. Um, not sure.

OK, well lets have a look at this questionnaire, you said you strongly agreed that no matter who you are you can change your intelligence a lot, can you explain to me why?

Because you can learn lots of things and then you could improve your intelligence, by listening and practising. So say someone was good at science and bad at literacy, then they wouldn't stay like that forever they could learn more literacy and get better.

And when do you feel intelligent?

When I am doing the lessons I am good at.

What makes you good at some lessons?

That, um, I know lots of stuff about it.

So could you get more intelligent at those lessons?

Yeh.

Could you get less intelligent?

Yeh, well, not really, you could, well, you can't, but then you could because you could forget, but then you can't because you never actually forget it, you just can't remember it. So it's in your brain somewhere, you just can't remember it.

Do you think it matters if you had a different view point?

Um, no. Well, yeh, maybe, cos it would mean you'd feel you cant get any better at anything....so you wouldn't really bother doing anything cos you'd think you cant get better at anything.

Sophie interview

What advice would you give Sandra?

Don't necessarily think that just cos they didn't like it, its bad. Cos it might just mean its something that interests you, and, um, don't feel really bad about it and next time you might be a lot better ,and if you try a bit harder you might do something that they'd like.

And how do you think you'd feel?

I'd feel a bit upset, cos Id worked hard on it and they hadn't liked it, but I'd try and just think that next time I will try and do it a little bit better.

So what would you do?

I'd try and ask some people what it was they didn't like, and try to put some more of that into my next one.

Do you think we can tell anything about how intelligent Sandra is from that?

I think she's sort of half and half because she's quite intelligent cos she worked really hard on it, but not as much because the teacher and people didn't like it.

Looking at your questionnaire, you say you can learn things, but you can't really change your basic intelligence. Can you explain that for me?

Yeh, cos when I think about intelligence I think about all your basic things, like times tables, punctuation, all the basics, and, um, cleverness as more the sorts of things that you learn.

OK, so when you say you can't really change your basic intelligence, you mean you cant really change how well you do your times tables and your punctuation?

Well, you can, like, if you keep practising them you can do them, but if you just like, aren't

very good at spellings and you get them wrong quite a lot, you won't exactly finish off being amazing at them even if you practise a lot.

But could you get better?

Yes.

Would that be making you more intelligent?

Maybe a little bit. But even if you practise it's really hard to make a really huge difference.

Do you think it matters how you think intelligence?

Not really, because if you think that you can't change it, then lots of people try and stay the way they are, but they learn by accident. And then when people say they can do it, then they practise, and they get better as well.

And so when do you feel intelligent?

Um, sometimes when I, um, get like a report, and I get a really good comment in it, like, once in my maths I got 'she concentrates very hard and gets on with her work'. So I liked that.

Layla interview

So what advice would you give Sandra?

Um, not sure.

Imagine she is your friend, what might you say?

(Long pause) Not sure.

If it were you, how might you feel?

Um, not happy,

Why is that?

Cos the teacher and class mates didn't like it.

So how might Sandra feel?

Not happy.

And could you give her any advice to help her?

Um, (long pause) go and talk to someone else, like your friends.

What would you want to do next?

Re take it.

How would she do that?

She could ask the teacher if she could do it again, something on the same subject.

Does this tell us anything about how intelligent she is?

Kind of, that she works really hard, so she's clever.

When do you feel intelligent?

When I get a lot of work done.

Why' does that make you feel intelligent?.

Not sure.

OK, so looking at your questionnaire, you've put here that your intelligence is something about you that you can't change very much, that you agree with that, can you explain to me why?

Um, because if you're already like it then you cant really change it, cos you might be really smart and then you cant change it if you wanna...

What if you're really not smart, could you change that?

Um. Maybe. If you worked harder you might be able to, or listened. Not sure.

Does it matter how you view intelligence?

No.

Can you explain?

Because however you are that's how you are.

Robert interview

What advice would you give Sandra?

Um, maybe to work harder on her investigation, or whatever she's doing.

How do you think she's feeling?

Disappointed that she put all that work into it and no one really liked it.

OK, and how would you feel if it was you?

I'd feel like I wouldn't want to do it again cos I'd put all my effort into it, just for it to fail.

So what would you do next, if that had happened, and you were Sandra?

Um, I would go along with whatever I did and then afterwards I'd ask the teacher what I did wrong and try and learn from it.

Do you think you can tell anything about how intelligent Sandra is from reading that?

Um, she sounds quite intelligent, but maybe that's just one of those things that hasn't gone to plan.

Why does she sound quite intelligent?

I just think that she sounds intelligent, cos she's finished her investigation and it's all going well, and she's doing science club and everything. I mean, it doesn't exactly say that she's not intelligent.

So when do you feel intelligent?

When I'm doing something I like. Because if I am doing something I don't like then I am probably not doing it very well.

Why is that?

Like, for example, today in maths we were doing divisible numbers and I wasn't very good at that so I didn't get as much work done as I wanted to, as I just didn't really get the hang of it. And, um, the day before, I was really good at doubling and halving decimals and whole numbers and stuff.

And did you try harder at that?

Um, no, I tried both ways.

OK, so looking back at these questionnaires, you say that you strongly disagree that no matter who you are you can change you intelligence a lot. Can you explain that to me?

Because, um, number one, it depends what is it. And number two, I cant really change my intelligence by loads, I can only change it a little bit at a time, sometimes, but not all in one go.

Like sometimes I get better at stuff by going over it a couple of times. So like, I can change it a bit at a time, but not all in one go.

Do you think it matters how you think about intelligence?

It depends what it is, like, if it's like a test or something, then yeh. And, um same with normal work, but not as much, not that it's not important, but.

So how you view intelligence, if you think you can change it or not, does it matter, does it make any difference?

Um, well, it would probably change my answer on the questionnaire. Um, well, I cant think of anything that it would have impact on.

Appendix 7:

Layla's responses

Name [REDACTED]

Please use this sheet to record your thoughts and feelings honestly. There are no right or wrong responses. Whilst working on tasks like this children think about many different kinds of things, for example what they ate for lunch, what they will do after school, what they did at the weekend or how to solve the problem. I am interested in what you think about whilst working on these tasks and how you feel.



Which sudoku did you enjoy most? The six by six one because it
Why? is a challenge.

Appendix 8:

Casey's responses

Name [REDACTED]

Please use this sheet to record your thoughts and feelings honestly. There are no right or wrong responses. Whilst working on tasks like this children think about many different kinds of things, for example what they ate for lunch, what they will do after school, what they did at the weekend or how to solve the problem. I am interested in what you think about whilst working on these tasks and how you feel.



Which sadoku did you enjoy most?

Why?

The Gone because it was hard but not
really hard!

Appendix 9:

Lucy's responses

