A REVERSAL THEORY PERSPECTIVE ON DISAFFECTION USING TWO EXAMPLES

Gareth Lewis
School of Education, University of Leicester

In this paper arguments are presented for a qualitative approach to researching affect in order to illuminate a richer, more complex and more dynamic motivational and emotional landscape in relation to children’s experience of school mathematics. Reversal Theory is introduced as an approach to motivation and emotion which can provide a richer description of the phenomena than has been done hitherto. Data from the literature is re-analysed using Reversal Theory as a lens to provide insights. Conclusions are drawn about the implications for future research.

INTRODUCTION

Disaffection

Disaffection with school mathematics education is a major problem. It is not just an educational problem, but an individual tragedy as well as having social and economic consequences. In the last 30 years there has been a great deal of research on attitudes to mathematics, much of it documenting and quantifying the worryingly high level of negative attitudes to mathematics amongst young people (Underwood, 2009).

A recent report into mathematics education by the Royal Society notes the widespread nature of current concern, ‘no decade since the 1970’s.......has seen so much being written about the disaffection young people appear to have for science and mathematics’ (The Royal Society, 2008). The report points out that there has not been enough quality research into this area, and cites only three studies in relation to mathematics.

Affect and Attitude

In order to understand disaffect, it is important to understand affect. However, this is not easy to accomplish as the field is fragmented and confusing (Hannula, 2006; Zan & Di Martino, 2007). Theorisation of affect has been strongly influenced by the framework suggested by (McLeod, 1987), and this has informed the CERME working model of affect (Hannula, et al, 2010). However, research to date on affect has been dominated by attention to attitude.

Although the study of attitude has helped to identify and document disaffection with school mathematics, and has provided useful comparative data across countries, gender and social class, it has not provided explanatory evidence for achievement (Furnham, 2009; Ma & Kishor, 1997). Thus there is strong evidence of a consensus that real insight and explanation will only come with a widening of the study of affect.

Schorr & Goldin (2008) argue for:
‘We share with other researchers the need to study affect more deeply than the study of attitude permits….But it is increasingly clear that the functioning of affect is far more complex than is suggested by considerations of positive versus negative emotions and attitudes.’ (Schorr & Goldin, 2008)

**WIDENING THE STUDY OF AFFECT : MOTIVATION AND EMOTION**

To investigate disaffection more fully, I propose that a focus on motivation and emotion, and a widening of the methodologies used will provide a deeper, richer and more dynamic picture of the landscape, and thus create new insights. More recently, there have been studies giving a more fine-grained picture of motivation and affect in educational settings (Op't Eynde, De Corte, & Verschaffel, 2006; Zan & Di Martino, 2007).

It has been argued that classroom contexts, pedagogy and teacher attitude and behaviour are critical to engaging the motivation of students (Boaler, 2010; Pintrich, 2003; Zembylas, 2005). But there is a need to understand more fully the motivational factors that influence how students engage or disengage in mathematics. One such study was conducted by (Nardi & Steward, 2003). They used the acronym TIRED to describe the factors identified.¹ Yet underneath these broad factors there are motivational mechanisms and needs involved that need further investigation.

Much of the literature on motivation has focused on achievement goals, but it has been argued that a broader research focus is required to capture the richness of motivational impact (Weiner, 1990). To do this, it is necessary to delve more deeply into aspects of motivation and emotion to find exactly what is going wrong for disaffected individuals. Vygotsky argued that cognition and affect are indivisible, and that emotion, motivation, attitude and beliefs all interrelate in a seamless web (Vygotsky, 1986). He advocates a more holistic approach, as does Zembylas (2005), arguing that we can understand the inter-relatedness of motivation, emotion, values, goals and beliefs (in addition to cognition) - what Vygotsky called the ‘fullness of life’ – via the use of ethnographic methodologies which he believes create space for the voices of those studied.

Aside from achievement goals, there are other formulations of motivational needs. One such influential formulation is that the basic needs are for competence, autonomy and relatedness (Deci & Ryan, 1985). However, as research has begun to develop a more detailed, qualitative picture of motivation and emotion, a good deal of complexity has been encountered. At the same time, a range of motivational factors and motivational and emotional phenomena that do not fit neatly into current theorisations have emerged, as the following makes clear.

**Evidence of Motivations**:

(Schorr & Goldin, 2008) point out that the complexity of affect in the social contexts of mathematics classrooms is exceptionally difficult to characterise for the purposes

¹ TIRED stands for : Tedium; Isolation; Rote learning; Elitist; Depersonalisation
of research. The variety of emotions they report was substantial, including: curiosity, anticipation, frustration, anger, fear, excitement, pride, pleasure, elation, satisfaction. They note a number of important aspects of the motivational climate that encourages students to engage with the mathematics. These include an emotionally safe environment; the central importance of social interactions; relationships based on dignity and respect. Important as these are, it is not clear how they relate to motivational needs.

Swain, (2005) studied the complex and multiple motivations of adult underachievers adopting mathematics education later in life, and found that ‘to help my children; to prove that I can do it; for understanding, engagement, enjoyment’ were more frequent and important motivators than utility. Swain also reports evidence of the excitement and pleasure of these adults in being able to do mathematics, ‘It’s exciting. I enjoy doing it.’... ‘It gives you a buzz....it’s exciting.’ Again we come across evidence that mathematics can be a source of pleasure and satisfaction for its own sake. Such evidence is also reported in (Buxton, 1981).

Theorising about emotions in the literature has been dominated by attention to anxiety or a limited set of negative emotions, and yet a whole range of other emotions has been reported, as referenced above. It has proved difficult to provide any theoretical or explanatory framework for many of these emotions, and they are rarely related to other aspects of motivation or affect. For instance, how does anger occur? How does excitement relate to motivation? These are important questions that need to be explored in a research setting. The CERME working group has set the agenda:

‘One apparent main focus for research and practice in this domain has been to develop richer theoretical frameworks using aspects and develop better concepts and instruments, preferably combining qualitative and quantitative methods. The frameworks should recognise the close relation between beliefs, motivation and competence.’ (Hannula, et al, 2010, p32)

One such framework that addresses these challenges is Reversal Theory. In the rest of this paper I set out some key aspects of the theory, and an analysis of data sources from the literature that evidence the application of the theory in the context of mathematics education.

**REVERSAL THEORY**

Reversal Theory was developed over 30 years ago as a way of trying to explain and illuminate problematic behaviour of young people. This led to a focus on the subjective experience and the meanings ascribed by children to their own behaviour. The foundation of the theory is the structure of the motivational landscape, and its constituent eight motivational states. Time and space will not allow a detailed exposition of the theory, but a full description can be found in the literature, and is perhaps summarised best in ‘Motivational Styles in Everyday Life: A Guide to Reversal Theory (Apter, 2001).’
A motivational state is defined as a distinctive orientation to the world based on a fundamental psychological value (Apter, 2001). Methodologically, Reversal Theory is a structural phenomenological approach, in that it begins with subjective experience, but seeks to find structure in the complexity of that experience. Our experience is ordered into four fundamental domains:

- means-ends, about directionality or purpose;
- rules, including expectations, conventions, norms, customs, and the constraints put on us by social contexts of various sorts;
- transactions, which is those people or things we interact with; and
- orientation, which is a focus on self or identification with external entities – ‘the other’.

One of the key insights of Reversal Theory is that we can experience each of these four domains in two, entirely opposite ways. So, for instance, with the means-ends domain, we can experience it as focusing on the goal or outcome, or we can experience it as focusing on the journey rather than the destination. The former is defined as the telic motivational state (or serious in everyday language). The latter is defined as the paratelic or playful state. In the case of the former, we are interested in goals or outcomes, and progress towards them. The latter involves doing things for their own sake – in effect, for the pleasure and excitement for its own sake.

This aspect of our motivational make-up has strong resonance in many aspects of human experience, but it is not well represented in current theorisations of motivation. Specifically in the educational context, there is significant evidence that fun and excitement (both associated with the paratelic state) are important. The evidence from (Buxton, 1981; Swain, 2005) and others, above confirms this. One of the advantages of Reversal Theory as a framework for studying motivation in an educational context is that it does account for phenomena that are evidenced in research, but which resist classification in terms of current theorising. Examples include:

- the notion that high arousal can be experienced in a pleasant way (as excitement or thrill). This runs counter to the notion, often adopted in mathematics education research, that high arousal is always experienced negatively (as fear or anxiety).
- That motivationally, goals do not always drive our experience and behaviour.
- Reversal Theory proposes motivational needs that are poorly explained or absent from current motivational research in education. These include: rebelliousness and anger; altruism – the need to help others. It will be instructive to see if there is evidence of these in mathematics education contexts, and to widen the theoretical base to include them.
The theory gives an account of primary emotions and their relationship to motivational states.

What Reversal Theory states is that one will always (at any one moment) experience the world as either serious (telic) or as playful (paratelic), but never both at the same time. What is very different about this treatment of motivational states (as opposed, for instance to trait descriptions), is that we frequently reverse between states.

The other domains and states describe aspects of our motivational experience. The domain of rules can be experienced as conformity or negativism. The domain of transactions can be experienced as mastery or sympathy, and relationships can be experienced as self-oriented (autic) or other-oriented (alloic). When we are in a state, it colours every aspect of our felt experience – from what we are paying attention to, to what we value, to how we view events, and the emotions we experience. More specifically, each motivational state has associated a value, a feeling, a way of experiencing, and associated emotions. People move between states (and combinations of states) frequently. And since these states are opposites, not only are we bi-stable, but we are multi-stable. That is, we can literally, be different people at different times. In this way, Reversal Theory captures the dynamic and changeable (and even contradictory) aspects of our personality, emotions and motivation.

In summary, we can see that our motivation shifts around (by reversals and by changes of focus) in a dynamic flow. There is strong evidence to show that motivational efficacy and psychological health requires that we have available and experience all eight states in the daily course of our lives, and psychological dysfunction caused by inability to do this is well documented (Apter, 2001). It is very interesting to speculate how, and to what degree these eight states are available to students (or not) in typical mathematics lessons.

REVERSAL THEORY IN MATHEMATICS EDUCATION: TWO EXAMPLES

Reversal Theory has been applied successfully as an explanatory framework in many areas of human experience, such as child guidance, psychotherapy, drug addiction, anti-social behaviour, smoking cessation, sporting performance (Apter, 2001). In educational terms it has been used much less. In the UK the Learning and Skills Council evaluated a psychometric instrument based on the theory very positively, and stated:

‘There is an impressive amount of empirical evidence which supports Reversal Theory ...which has major implications for how we think about learning styles.’
(Coffield, Moseley, Hall, & Ecclestone, 2004)

The first step in my own research has been to identify data and evidence for the constructs set out in Reversal Theory. Two examples will be briefly described here.

Reversal Theory perspective on the case of Frank
The case study of Frank (Op't Eynde & Hannula, 2006) was addressed by the contributors to the issue of Educational Studies in Mathematics, devoted to affect. An alternative analysis is presented here.

Perhaps the most interesting data about Frank is the map of his dynamically changing emotions. Using the ideas from Reversal Theory we can use the sequence of his emotions to infer the motivational states. Frank is reported as being a little nervous about the task, and this suggests that he is in the serious state. In fact, in subtask 1 we see that he is worried, which suggests serious/high arousal. This is likely to be caused by the problems he encountered in his progress. However, he then finds a solution, arousal decreases, and he becomes relieved. Reversal theory predicts that in the serious state the emotion will move from anxiety to relaxation/relief as arousal lowers (as the solution is found).

In subtask 2 he again encounters a problem and gets stuck. This time he panics. I interpret this to be a stronger form of anxiety, due presumably to his perception of the depth of his ‘stuckness’. That is, he can’t see a way to progress. The panic causes him to reach for the calculator, which is seen as a strategy to make progress. It is possible that the panic is amplified by the fact that using the calculator brings him into conflict with other aspects of his motivational system (e.g. possibly a mastery-based self belief that if you are clever, you don’t need it). Without the data, we can only speculate. However, he does invoke a sound learned strategy for dealing with problems (and unpleasant high arousal) in mathematics contexts – stop and think. This seems to work, as he says ‘I know again what I have to do’.

The emotions map shows that at some stage the panic changes to frustration/anger. This indicates that a reversal has taken place. His inability to make progress in the serious-conforming state has triggered a reversal from conformist to rebellious state, and the anxiety has now changed to anger. He now seeks to move outside of his own norms – to break the rules (whatever they are perceived to be). Is this where he impulsively reaches for the calculator?

When he finally reaches the end the emotion reported is pride. This suggests a shift of focus from the serious (which appears to have been the operative state so far) to that of self-mastery with the felt transactional outcome being experienced as winning.

This analysis enables us to evidence the dynamic flow through motivational states within the problem-solving process, and more specifically we are able to relate states to the associated emotions. We can see also evidence of reversals, and change of focus of motivational state.

**Quiet disaffection revisited**

The qualitative research by (Nardi & Steward, 2003) is one of the most influential analyses of disaffection with school mathematics. Below is a summary of the analysis of one of the interviews conducted with two 14- year old girls. Clearly, the interviews were not conducted with the intention of examining the complete motivational and
emotional landscape for each participating individual. Nonetheless, it is possible to
determine, even from this short extract, some key aspects of individual motivational
factors. I identified in the interview transcript any motivationally or emotionally
significant statements or segments. There were approximately thirty such statements.
For each one the implied motivational inferences were tabulated.

Examples include:

- I don’t like being shouted at  I need things explaining
- I like it when it’s fun   I remember it better when it’s fun
- I need to know why it’s important  I need to know the rules
- Not knowing the answer makes me..  I enjoy it more when I understand it
  ..feel stupid
- Maths makes me panic. (then). I need to do it my own way
  ..I don’t know what to do
- Talking to friends helps me to understand

If I use Reversal Theory as a framework or as a lens to refract the data through, I
encounter these points:

**(Self)Mastery.** The need to understand is a very strong focus for the interviewees. There are many statements here reflecting that. Having something explained to us is
an important component of being able to understand. When I understand it I can do it,
and when I can do it I enjoy it more. Not understanding can leave us feeling
powerless (‘oh my god I can’t do it’), or humiliated. There are a numerous comments
about feeling stupid. There is also evidence here of the issue of agency. For student J,
there is clearly a power tussle in which she obviously needs to assert her own way of
doing things.

**Seriousness.** Many of the comments here are about the lack of a sense of purpose. They demonstrate that both girls need to know why they are doing this. Comments
like ‘what’s the point in it?’ and ‘I don’t see what it would help us with’ can be
viewed as cries for a sense of purpose and direction.

**Playfulness.** Playfulness is not about play in the everyday sense of the word, but
about enjoyment in the moment. It is related to fun, but also to excitement, intrigue,
curiosity. It is arousal-seeking, and so is also often associated with risk-taking. However, when arousal is low, playfulness will be experienced as boredom or
sullenness, and there is good evidence of that here. It is interesting to note that ‘fun’
is mentioned a number of times by both girls. They make the association with being
more interested, paying more attention and remembering better. Activities that were
‘different’ (i.e. not following the book) sparked playfulness, as did practical activities
like looking through catalogues.

**Conformity and rebelliousness.** Conformity is about fitting in – complying with the
norms, expectations and rules of the socio-cultural environment. There are quite
specific and distinct rules and expectations that operate in mathematics classrooms
(even though they may not be explicitly codified), and students will want to know what they are. Comments like ‘I don’t get most of maths. It’s really weird.’ ‘I do everything differently to Mrs R because I don’t understand how most of the time’, give away the discomfort caused by the students not understanding the ‘rules of the game’. And even when they do, it is sometimes not sufficient to create mastery (‘you remember how to write it out but not how to do it.’) This is particularly interesting, because there is often a received notion that all pupils need to do in school mathematics is to follow the rules and the correct answer will follow. This evidence shows that even disaffected students (or maybe especially disaffected students) know that this is not the case. In contradiction to this, all healthy individuals will also spend time in the rebellious state, and will need to express this in some way. This is rarely legitimised in a school setting, and perhaps in mathematics classrooms least of all. Unfortunately, this is an opportunity lost, as constructive cognitive and behavioural rebelliousness can be extremely creative, and is a requirement for mathematicians at a higher level.

In these sequences, we do see evidence of rebelliousness operating. For student C, boredom or sullenness creates the need to raise arousal levels, and when associated with the rebellious state, involves doing something ‘naughty’ (‘winding up my little brother’) to raise arousal. Playfulness + rebelliousness + low arousal can cause problems when expressed in a classroom (as every teacher knows!). What is interesting is that C knowingly chooses to express this outside of the classroom, which demonstrates and element of mature self-regulatory behaviour. An element of rebelliousness is also expressed later by C in her rejection of the teacher’s way of doing things, and her assertion of her need to do it her own way.

**Sympathy and other.** There is some evidence here of the importance of relationships, and the need for affinity. Many comments refer to the need to have friends around. But friends also play a quite specific role in terms of being able to discuss, and the need to ask questions and receive explanations.

There is also evidence of interesting motivational sequences reported here. One is: ‘Maths makes me panic. When I panic I don’t know what to do. When I don’t know what to do I feel stupid.’ Motivation here shifts from serious to self-mastery (losing). Another sequence goes: ‘I need to understand. When I understand, I can do it. When I can do it, I enjoy it more.’ The sequence moves from self-mastery (winning) to paratelic enjoyment. It will be interesting to find evidence of other such sequences in further research.

So we can see from this interview evidence of all states being operative in the mathematical experience of these two girls. Of course, because we are in a state, does not mean we experience it positively or gain the satisfaction from the state, and that is often the case here.
CONCLUSION

Recognising the agenda of the CERME working group on affect, ideas have been presented from a wider point of view than the study of attitude and beliefs, and I have presented a theoretical framework that offers one answer to the call for a more holistic approach that relates motivation to emotion and other aspects of affect.

Reversal Theory has significant potential to provide an explanatory framework for mapping the motivational and emotional landscape of students in mathematics classrooms, and to provide a coherent basis for integrating theory about different aspects and constructs in the affective field.

The next stage of my research is to apply a multi-method approach to investigating how these phenomena manifest in the experience of young people in mathematics classrooms.

REFERENCES


