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► To cite this version:

Elizabeth Lake. 'Two things I like, maths and chocolate': Exploring ethical hedonism in secondary mathematics teaching. CERME 9 - Ninth Congress of the European Society for Research in Mathematics Education, Charles University in Prague, Faculty of Education; ERME, Feb 2015, Prague, Czech Republic. pp.1209-1215. hal-01287346

HAL Id: hal-01287346

<https://hal.science/hal-01287346>

Submitted on 12 Mar 2016

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'Two things I like, maths and chocolate': Exploring ethical hedonism in secondary mathematics teaching

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What motivates mathematics teachers to remain in the profession when disengagement from mathematics is common? I would suggest one of the reasons is deriving pleasure from engaging in teaching mathematics. As part of research into how teachers communicate their enjoyment of mathematics, eight experienced teachers were interviewed, observed during teaching and then engaged in discussion of lesson extracts. This paper takes interview samples to illustrate intellectual pleasures, with a thematic analysis of the narrative generated from the interviews. The analysis suggests that the deeper pleasures experienced by mathematics teachers derive from experiences of dependability, deviation or success, whilst underlying pleasures in teaching mathematics is a living of self, motivated by service to others.

Keywords: Affect, pleasure, ethical hedonism, teachers, mathematics.

INTRODUCTION

Any interaction inevitably has an affective dimension. In this paper, affect is defined from a social perspective as a stable trait as opposed to a more transitory emotional state (Hannula, 2012). In the teaching of secondary school mathematics, emotions play a central role in forming an affective orientation (Drodge & Reid, 2000). If an experienced mathematics teacher has a strong positive affective orientation towards mathematics, then this orientation guides their practice, satisfies desires, and gives pleasure. Frenzel and colleagues (2009) suggest that not only is affect important within the learning of mathematics but that enjoyment supports effective student engagement.

This paper is part of a larger study exploring affective responses to mathematics for experienced teachers

of mathematics and how these responses are communicated to students in the classroom. Currently there is little research on how experienced mathematics teachers communicate in mathematics teaching. This paper uses *ethical hedonism* (Onfray, 2007) as a frame to focus on what makes the teaching of mathematics pleasurable for a teacher. The assumption is that, to teach effectively, teachers must gain some affective reward from their teaching.

After defining pleasure in the mathematics classroom context, I review some relevant literature that provides insight into the pleasures of teaching mathematics. Acknowledging the inaccessibility of subjective experiences is important, so the data is teacher stories, and the analysis uses examples of teachers expressing pleasure. Conjectures are constructed from the literature and compared with selected data, enabling a presentation of espoused pleasures via themes with illustrative examples. I summarise, framing with the components of ethical hedonism, the elements that give teachers the greatest pleasure in their teaching of mathematics. The paper concludes with a brief discussion of implications of these interpretations of teacher pleasure.

PLEASURE AND ETHICAL HEDONISM

Pleasure is often defined as a feeling of satisfaction and enjoyment. Yet pleasure is also a subjective mental state experienced as enjoyable or worth seeking, a state that is satisfying more than basic needs or biological drives; on the contrary, experiencing pleasure is a psychological feedback mechanism that forms a potentially addictive feeling of positive anticipation. Pleasure generates a desire to recreate an experience found to be entertaining or aesthetically pleasing, which then impels seeking of similar sen-

sations (Damasio, 2006). This process may then, by repetition, lead to fixed beliefs since even apparently unemotional everyday logic is conditioned by underlying impressions left by formerly intense affects (Schlöglmann, 2006).

In this paper, and this research, the term pleasure is used in an aesthetic and ethical sense, unlike, say, the French term 'jouissance' that has stronger physical connotations. Damasio (2006) discusses the inter-linking of pain and pleasure, suggesting two parts: a bodily experience and the attached emotional experience. Both parts inform subsequent reaction and or action, subconsciously and consciously. Litman (2005) suggests pleasure links mathematics with an appetite for food or sex, where satiation or reward comes from positive feeding of social identity and community recognition. This social reward is associated with recognition and service.

Onfray (2007) defined ethical hedonism as an introspective attitude to life based on taking pleasure yourself and pleasing others, without harming yourself or anyone else. In other words, ethical hedonism is a joyful utilitarianism that gives moral pleasure. This perspective may be useful in exploring pleasure as it divides pleasure into self, others and an ethical yet purposeful context, where stronger, memorable pleasure is experienced when all three elements are addressed. Yet there is a temporal element to pleasure, unlike happiness which is more stable. Whilst one can again experience pleasure on recall, a person cannot always be in this state. Yet this very temporality may effectively aid the re-creation desire and compensate for any associated unpleasantness. Similarly to Utilitarianism, the 'greatest good' of ethical hedonism engages cognitively and viscerally whilst aligning one's own pleasure with that of others. The pleasure then has personal and social value as the greatest good, is relatively damage free and hence is ethically acceptable. This is this multi-levelled view that accords to pleasure the dimensions of self, others and ethical.

To summarise, pleasure is taken as having emotional, psychological, physiological and social dimensions. Exploring whether there is evidence for ethical hedonism within the teacher narratives, whilst identifying what the teachers suggest as giving them pleasure in their roles, is also necessary. The next section locates pleasures for teachers within relevant research, and seeks themes to support data analysis.

STRUCTURING PLEASURES FOR MATHEMATICS TEACHERS

Research into affect specifically for experienced secondary mathematics teachers is limited, although there has been more mathematics student orientated research (McLeod, 1992). Given the interactive nature of teaching, this research is relevant to teachers as well. Smith (2010) examines pleasure in the form of happiness in learning mathematics, including the role of success and the dependability of mathematics within social and mathematical identities for students. Research on the role of the teacher, power relationships in the classroom (Walkerline, 1988) and pleasures from deviation (Drodge & Reid, 2000) can also inform understanding of pleasure.

One of the more stable traits associated with pleasure is happiness. Smith (2010) found for mathematics students that happiness, especially subject pleasure, came from the dependability of mathematics. This pleasure from dependability may also prove to apply to teachers. Happiness as an affective trait requires constant high self-efficacy which combines confident knowing, doing and feeling. Smith (2010) suggests that, by choosing mathematics, people express something about themselves which is viewed as positive. By using and reproducing a mathematical identity they derive pleasure and hence happiness. Smith's research explores finding pleasure in your own work, pleasure which includes working for and with other people. Smith suggests that pleasure is often equated with success and that work and happiness can coexist in contemporary society where happiness is the sole purpose of life, and society promises to provide conditions for you to obtain this happiness. This balance of work and happiness can exist for teachers too, but with additional complexity from the role of a mathematics teacher in regards to vulnerability and risk.

Between freedom and compliance, within the autonomy of a mathematics classroom, lie experiences of deviations from 'norms' that can give pleasure. Vulnerability, in the context of teaching (Davies, 2006), derives from conflict of mastery and submission. In this model, the risk or vulnerability comes from, for example, exposure to judgement, whilst pleasure derives from a sense of connectedness. The degree of emotion a teacher is comfortable showing may come from balancing these two limits. This perspective is important, as it may be that the exercise of freedom,

self-regulated within constraints, is what gives pleasure. Yet simultaneously, social recognition from being seen as compliant can also give pleasure.

If a teacher's own learning was empowering, and pleasure derives from successful teacher and student interactions, then revisiting an environment, such as a classroom where success was experienced may trigger re-creation desires. If pleasure deriving from repeated experiences of success is significant, then it is reasonable to expect that teacher interviews would have frequent examples of positive educational experiences. We can also assume that teachers of mathematics would be good at mathematics and hence experienced more pleasure than pain in transition from learner to teacher. This positive imbalance may have led to investment because of feeling pleasure, with subsequent development of trust in the dependability mathematics.

Mathematicians also obtain a sense of pleasure from mathematical discovery which may also apply to a teaching context. Similarly, 'ah-ha' moments, for example when a method or solution becomes suddenly clear, are known to be pleasurable for learners and bring power along with the experience (Liljedahl, 2005). The same pleasure for teachers could be the revelation of a student misconception, or through being a witness to student pleasure from their 'ah-ha' moments. If pleasure is associated with deviations from the norm, either a discrepancy (Drodge & Reid, 2000) or 'ah-ha' moments, then deviations can elicit emotional reactions and hence are likely to be recalled in interview, but also may elicit strong identifying statements that are directed at the deviator, for example a student. Robert and Wilbanks (2012) suggest that "we experience pleasure if the sudden resolution involves an unexpected connection. Making that connection has been likened to cognitive 'play' and to the feeling associated with solving a puzzle" (p. 1073). An enticement to engage in more similarly rewarding activities. Deviation may appear come in many forms; difference from routine, deviation from 'normal' behaviour, as in the unexpected, or from the pleasure of making unexpected mathematical or social connections.

To summarise, the data will be considered through the lenses of the themes of pleasure in success, pleasure arising from deviations and from dependability of mathematics as described above. The social context is important, as is the role and experiences of the teacher, especially pleasures which help form positive emotional disposition or attitude (Di Martino, 2011) associated with a mathematics teacher.

DATA COLLECTION AND ANALYSIS METHOD

The data used in this paper is from two audio-recorded unstructured interviews with eight UK secondary teachers (A-H, Adam to Helen) who have been teaching in school from three to nearly thirty years. There are equal numbers of male and female teachers, all but two trained at the same university at different times. Six teach in rural schools and two are from a larger urban school. In the first interview the teacher relates their life history, talking about their mathematics and their teaching. The second interview, closely following observation of the teacher in action, is a stimulated recall of an extract from the lesson using video extracts from their teaching. The extract selection is guided by the use of a galvanic skin response (GSR) sensor worn by the teacher in observed lessons. The sensor measures visceral response to intense emotions such as excitement or anxiety. In the stimulated recall the teacher evaluates and explains their thinking and how they felt during the observed lesson. Both interviews are audio-recorded and the transcripts analysed for examples of pleasure. The research design has been approved by an ethics committee and the participants have consented for the data to be recorded and used for research.

This paper draws on the articulated pleasures for each teacher. Analysis of the interview data is influenced by the first two parts of ethical hedonism, a division of self and others (social interaction).

These divisions provide structure for examining teacher pleasures. These categories (Table 1), for the teacher comments that relate to pleasure, are then subdivided into two further categories. The teacher comments are themed by pleasure for self; as their re-

Pleasure for self	Relationship with mathematics	Self-identifying stories
Social interaction	Role of a teacher as professional	Significant others

Table 1: Analysis categories for examples of pleasure

relationship with mathematics, and secondly self-identifying stories. The 'others' category, (social interaction), is divided into the role of a teacher as the professional self and then significant others. These are selected as all the teachers speak about these four categories. Once classified, each category is illustrated and interpreted before being discussed in the final section. The intention in the next section is to reveal through examples any similarities or differences within the pleasures of these mathematics teachers and to further explore their sensory and intellectual pleasures.

EXAMPLES AND INTERPRETATION OF TEACHER PLEASURES

The analysis presented here explores what gives pleasure to teachers of high school mathematics structured by the categories in Table 1, but discussed in *deviation*, *success* and *dependability* terms, followed a discussion of other pleasure examples.

In all the interviews, teachers talk about their relationship with mathematics, for example, '...my relationship with the subject, it's stronger than ever' (Edward). The relationship is presented as positive, and comments relate to personal *success* in the subject, '...just absolute joy. Nobody ever told me maths was hard...maths was just like breathing... I thought maths wasn't important because it was easy' (Gus), but also the *dependability* and certainty that mathematics represents for them, 'I realised that I quite like maths, cos it's nice, you can have a... there's always a right answer, or most of the time...I really liked that...' (Debbie) or 'maths was something that was really important to me, and I enjoyed it' (Freddie).

From these examples, I would suggest teaching mathematics is perceived as safe and *dependable*, the participants experiencing personal *success* in mathematics as their identities were forming. The intensity and frequency of the comments, as illustrated above reflects the importance of subject within the teacher's identity. Re-living such an experience within a mathematics classroom allows constant recall of a positive experience. The pleasure in teaching a subject where they have experienced personal *success*, which effectively pleases the self, combined with actively sharing such pleasure with others in a morally good way, meets the criteria of ethical hedonism.

Similarly, all participants tell self-identifying stories of their self as student, 'I have just always excelled at maths I could always do everything in maths lessons and I found other lessons quite hard' (Adam). These comments show how important and pleasurable mathematics was to each teacher, 'Maths has always been my favourite subject when I was at school, and I enjoyed it, and was fairly good at it, and found it interesting and I kind of...I liked being able to solve problems and I don't know really, I enjoyed algebra' (Helen). But many stories report change during higher education, with examples showing critical points where their pleasure in the *dependability* of mathematics was shaken, '...by the end I kind of like lost the love a bit for maths...' (Adam). 'I enjoy my maths but I didn't enjoy my degree' (Carol). '...started and just, just hated it' [laughs] (Edward). Yet, all of these participants are now teachers and have a professionally *successful* outcome.

It is common for the teachers to speak about their positive and *successful* school experiences in terms of mathematics. They talk about themselves as individual students, or embed subject comments in the social of school experience. All mention transition, especially negatives associated with transition into university, mainly assigning the difficulty of mathematics as the reason. All but one, who took a combined teaching and mathematics university course, speak very positively about this experience. One difference is illustrated by Debbie. She was ill during school and talks of mathematics as reliably accessible during her illness, unlike other subjects; her 'horrid' transition occurred earlier than university. However, all comments suggest that these teachers experienced positive emotions through *success* in school mathematics. Carol used mixed tenses in the interview, often bringing the past comments into links to her present role, suggesting reflection, but also that her wider identity aligns with her current role. The comment on mathematics and chocolate in the title comes from Carol whilst discussing a significant event in her school life, providing an example of aligning sensory and intellectual pleasures. The pleasure that social recognition can give is strong in the stories of this teacher, suggesting that for her, teaching offers a continuation of pleasure as socially recognised *success*.

Pleasure from the role of a teacher as professional, combined with the social dimension of teaching, is mentioned in association with *deviation*. Pleasure

seems to come from changes to daily practice, 'Maths can become incredibly boring... bore you to death by making you practice it forever, and that's not what I do. Cos maths has got to be exciting, it's got to have something in it other than sheer boredom' (Gus). Or pleasure from surprises, or being creative and making change or challenges, a motivator for several of the teachers. '...they couldn't do it... I sort of then showed them, and they clapped me...I didn't expect it... it was just sort of "Oh well done miss"...' (Carol). or, similarly to a famous line in the film *Forrest Gump's*, 'Life was like a box of chocolates, you never know what you are going to get,' Debbie comments that '...teaching is different every day, it's a challenge, different challenges every single day...never dull, its lots of things but it is never boring...'

But *deviation* through challenge seems to be important, as without it boredom emerges, and excitement is lost,

'...I was saying on Friday to my husband that I didn't really feel excited about maths, we were talking about the emotion of it... and perhaps I'm not conveying it because a lot of it is the day to day of it, I've done it 20 times, 50 times, 100 times...' (Carol).

However pleasure from deviation through challenge or creativity can be viewed as a lure into mathematics for students,

'... I go with the philosophy of fun. If I'm not having fun in the lesson, if I'm not enjoying myself, then the kids aren't either...there's no hook...so it's trying to make it fun, trying to let my personality come through a bit, have a bit of a laugh with them...' (Debbie).

In general, the teachers use many terms to describe their teaching, from interesting, pleasurable (including social pleasure), creative or transformative, through to labour, challenge, routine, or a part of life. The descriptions illustrate the complexity of pleasure within a teaching context, and that pleasure is individual and social. Yet their comments do not necessarily distinguish between sensory and intellectual pleasures. Often there is a strong experiential aspect to what gives the teachers pleasure. I would suggest that pleasure emerges from aligning a socially located

identity with their individual view on the purpose of being a mathematics teacher.

Yet simply identifying with the mathematics teaching role can give pleasure, '...other stuff that kind of takes you away from teaching...teaching's the fun bit...' (Adam), or personal pleasure in mathematics, '...and I sort of enjoy that freedom to explore my subject... and take students along with that...' (Edward), or in comparison with other life pleasures, '... I was playing teaching... I was teaching and it was more fun than playing rugby and therefore I didn't need the rugby anymore...' (Gus).

All the teachers mentioned one or more significant others, such as a teacher, 'My maths teacher for my GCSE, O level years was brilliant'(Bertha), 'I got on very well with him... someone I am still in contact with...' (Carol), 'I just really clicked with him and that style suited me and could just practice, practice' (Adam) '...and I had this wonderful nun who was my mentor and tutor, and she was magic' (Gus). A friend or a family member as a significant other, '...my dad... used maths a lot... I can remember him sitting down and helping me with maths...' (Carol). A stronger degree of pleasure from engagement with others as well as self is evident here. Especially as, in addition to all the teachers mentioning at least one significant other, all positively mention their mathematics teachers in high school.

Pleasure for others appears in interviews as indirect pleasure in the *success* of students, suggesting that pleasing others is perhaps a stronger driver for these teachers rather than balanced by pleasure for self. One of the strongest examples of pleasure combines sensual and intellectual pleasure, '...at the end of primary school there was a competition...we [dad and I] won a bar of chocolate [laughs], two things I like, maths and chocolate' [laughs] (Carol). Not only is eating chocolate a sensual pleasure, Carol uses chocolate to recall a story that illustrates the reward of early social recognition as someone who could do mathematics, an intellectual pleasure. Significantly, the story also relates *success* in relation to a significant other. I would suggest this pleasurable recalled experience supports establishment of her belief that mathematics gives pleasure; as does chocolate. The combination has all the characteristics of ethical hedonism, harmless pleasure for self, others, as well as social recognition and acceptance. The importance of

the social within pleasure is emphasised by several of the teachers, such as the pleasure of helping others,

'I remember somebody saying to me in the first lesson, where is the fraction key on the calculator. I think that was a bit of a "oh, maybe I do know a bit more than you, I can help you. That's good."' (Helen).

And Carol reports '[I was] more comfortable talking to that group...cos they are weaker, so I feel I can help them more. They engage better'. There are examples of social pleasure from a common love of mathematics, '...there's a little group and they're like, yeh, I really like maths [laughs]...students I teach get that enthusiasm from me, and they like the subject... they like me as well'(Adam). Or social pleasure from interaction with a class, 'But actually, that's how I teach. Complete, complete enjoyment. And that class is an absolute joy to teach' (Gus). Social pleasure by proxy appears in a number of interviews, including teachers articulating as if they were students. Such as '...I teach quite a lot of lower sets and somebody in the class might say, "oh right yeah I get that now", and actually properly get it, and that will change... change their lives...' (Bertha). Bertha is also describing her experiences of student 'ah-ha' moments by proxy as discussed above.

Overall, the stronger of the articulated pleasures appear when pleasure is experienced by teacher, students and further, is associated with satisfaction in fulfilling the role of a mathematics teacher. There is an individual, social and moral dimension to pleasure from fulfilling a role. For example,

'...you can get the kind of challenge from that as well. I like the way that you can sort of relate it to real life. I like the fact that kids value it' (Helen).
'That's me, the more you laugh the more you learn' (Gus).

To summarise the selected data examples and interpretation, examples from teachers illustrate how pleasure is located within *success*, *dependability* and *deviation*. The categories of self and others enable the importance of social as a thread to emerge in different forms, such as indirect *success*, and how *deviation* appears to change between the role of student and teacher.

DISCUSSION AND CONCLUSIONS

In this section the categories are briefly discussed in terms of the themes of dependability, success and deviation in context, before considering intensity of pleasures in relation to ethical hedonism. Teachers find pleasure within their roles, something evident when talking about their professional lives, sharing their emotional relationship with mathematics, invariably in an open, cheerful manner. This paper focusses on the pleasurable aspects of teaching, although there are few negative examples. Just talking about their professional lives appears to be a pleasurable experience, and I was honoured to hear and engage, albeit briefly, in their stories.

As Smith (2010) found for mathematics students, subject pleasure and happiness, often in the context of success, comes from the dependability of mathematics. The data here suggests the same for teachers, where mathematics is, for example, 'analogous to breathing' (Gus). But most of the teachers report that their trust in the dependability of mathematics was shaken in their transition through university mathematics and the evidence from these teachers infers that dependability is less important when discussing teaching roles. I would suggest that deviation is especially associated with pleasure through power, that a teacher can decide to deviate from norms of their classroom, to be creative, accept the associated risk and use deviation as a teaching strategy; one which draws and engages their students and hence gives reward, a form of pleasure in teaching through intellectual play, as suggested by Robert and Wilbanks (2012). This idea of play or fun is used by Adam, Edward and Gus when talking about gaining pleasure from their teaching role.

Experiences of joint completion of hard work or overcoming difficulties may conjoin success, deviation and dependability, all in a pleasurable memorable experience for the teacher. The interview excerpts highlight the importance of the social aspects of teaching mathematics, including pleasing significant others. The 'brilliant' or 'magic' person described by these teachers. Research suggests significant others is important in a professional career (Zeldin & Pajares, 2000). Pleasing others as well as self is important, but the intense, memorable pleasures align different forms of pleasure and combine self, others and some form of value as in ethical hedonism. Yet additionally, pleasure can be by proxy, recall or from social interaction in a purposeful

context. Pleasure in teaching derives through mastery shared (where learning occurs), and where mirroring or synchronisation of values occurs, and reciprocity of pleasure in the subject induces stronger pleasure. This reciprocity is particularly evident for Carol, telling her story of the pleasure of maths and chocolate.

Defined as pleasure at a deeper level, meta-satisfaction occurs at a personal, social and ethical level, a resolution through ethical practice (Hobbs, 2012), that shapes future action. This shaping develops the emotional orientation of a teacher, and the degree of investment, or risk they are able to take in a classroom, acting as a limit for positive emotional exchanges. Pleasure comes in many forms, especially from interaction that revisits an arena where the teachers themselves, as learners, were successful. Teachers would, from experience, anticipate and plan for such reward pleasure by proxy. Teachers seek and recognise revisiting as something that will give emotional reward. Gratification comes when repetition continues to give pleasure, strengthening their emotional relationship to mathematics in a teaching context.

Knowing more about contextual pleasures in mathematics, for teachers as well as students, may support countering any circumstances of displeasure within a mathematics classroom. Although this paper is focussed on what teachers say, the fuller research also explores observed classroom practices, especially how observed pleasure links to the pleasures identified in this paper. One intention is to explore how teachers share their emotional relationship with mathematics in a classroom and what limits positive emotional exchanges. This may have implications for teacher training.

ACKNOWLEDGEMENT

I would like to thank the teachers for their cooperation, and my supervisors, Professor Elena Nardi and Dr Paola Iannone, and UEA for PhD studentship funding.

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