

Project management artefacts and the emotions they evoke

Stephen Jonathan Whitty, Faculty of Business, University of Southern Queensland,
Springfield Campus, QLd 4300, Australia

Email: jon.whitty@usq.edu.au

Abstract

Purpose – This study investigates the variety of affective emotions that are evoked in extant project management practitioners by various project management artefacts.

Design/methodology/approach – A phenomenological methodology is used for eliciting, through self-reporting and observation of gesture, the affective responses and consequential emotions experienced by project management practitioners as they interact or recount previous interactions with various artefacts of project management.

Findings – This study suggest that project management is prevalent in the Western corporate environment because project managers obtain an emotional affect from aspects of the project management experience, and project managers utilise various project management artefacts to emotionally manipulate their environment to their own advantage.

Practical/implications – The paper argues for a project management environment which is founded on evidence based practices. It suggests that future research should explore the links between project management, social architecture, and flow theory.

Originality/value – This study advances the evolutionary framework for project management research.

Keywords – Project Management, Evolution, Memetics, Emotion, Gesture, Flow Theory,

Paper type – Research paper

Submitted 7th February 2009, Accepted April 18th 2009

Introduction

This paper attempts to advance an evolutionary framework that addresses the reasoning for the prevalence or fitness of project management (PM) in the Western corporate environment.

When evolutionary thinking is applied to PM one is drawn to conclude that there are survival advantages in practicing PM or even presenting and maintaining the image of practicing PM. There must be some. PM would have been phased out by cultural selection if there were none.

In the context of cultural selection, selection pressure is the intensity with which the cultural environment tends to eliminate cultural or behavioural practices, or challenge them to create adaptations that will give them a survival advantage. In the West, the corporate environment is rapidly changing (Dodgson, 2004; Jones, 2004; Sugden, 2001), fuelled in part by the rapid change in technology (Rothwell & Zegveld, 1985), a condition which adds to the selection pressure placed on organisations. One response to this pressure has been to reduce business response times (Perrino & Tipping, 1991), and utilising the construct of a projects along with the application of PM techniques has been a key enabler of this (PIPC, 2005). Within the evolutionary framework it has been argued that some survival advantages are given to those organisations, and therefore those individuals, that adapt to embrace PM ideals (Whitty & Schulz, 2006). What has not been addressed is how PM creates self-sustaining behaviours that enable project managers to establish and maintain their position in their professional community.

To attend to this situation this study attempts to examine the plausibility of two hypotheses which focus on emotional affect and the PM experience. The first hypothesis (H1) is an attempt to examine the claim that a project manager's behaviour is driven by the various aspects or memes of the PM experience (Whitty, 2005). The second hypothesis (H2) is an attempt to examine the claim that project managers emotionally manipulate their environment to increase their competitive advantage (Whitty & Schulz, 2006).

H1: Project managers obtain an emotional affect from aspects of the PM experience.

H2: Project managers use the emotional affects of PM artefacts to increase their competitive advantage.

Through self-reporting and the observation of physical gesture (via phenomenological methodology), this study elicits the various affective emotions that are evoked in extant project managers by a variety of PM artefacts.

The paper takes the form of a literature review, an outline of the study and research design, a rich narrative of the results, and a discussion that places the results in the context of the evolutionary framework. Conclusions and implications are drawn, and suggestions for further research are made.

Literature review

The literature review begins with a summary of the evolutionary literature relating to PM and highlights a gap concerning the physiological (emotional) mechanisms PM memes (ideas and artefacts) use to replicate.

A large body of literature that pertains to emotion and affect in the context of organisations is summarised and attention drawn to that which relates to PM.

Finally, the literature relating to artefacts is summarised with special consideration to that which pertains to artefacts in the organisational setting, and that which considers how both artefact and gesture are expressions of emotion.

Evolutionary approach to PM

An evolutionary framework for PM research considers that the behaviour we would commonly call PM is brought about by the replicating behaviour of particular memes in the form of ideologies, concepts, and artefacts, and these memes will necessarily surface and thrive in Western (Judeo-Christian) societies courtesy of selection pressures (Whitty, 2005; Whitty & Schulz, 2006, 2007).

From an evolutionary point of view, PM behaviour is a consequence of the natural selection process, and whilst not an adaptive trait itself that is essential for the survival of the human species, PM does indirectly support and enhance the existence of its practitioners (Whitty & Schulz, 2006). It has been argued that in order to socially survive in the organizational environment, individuals are driven to 'put on' the performance of project manager as an actor would perform a scene (Hodgson, 2005; Whitty & Schulz, 2006). These 'actors' are emotionally driven, and they are predisposed by their surroundings (Davis, 1984) to play PM scenes on particular sets; are obligated to wear a costume and recite a script, and use specific props (artefacts); and all this before an audience of senior management, stakeholders, and project workers (Whitty & Schulz, 2006). In this way those who profess PM increase their fitness to survive by gaining a competitive advantage, and reap benefits that take the form of cultural inclusion and acceptance through employment, promotion, and membership to a community. This enables project managers to survive and reproduce, increasing the likelihood that their behavioural characteristics, tendencies, values, and ideals will be passed on to further generations who will again undergo further selection.

Within the evolutionary approach to PM it is not clear what function PM artefacts have in creating survival advantages for project managers or what affect or emotions they evoke that cause them to be passed on.

Emotions and Affect

Our emotions and behaviours have a biological foundation. We are hardwired to instinctively satisfying our emotions (Denton, 2006). Instinctive behaviours are driven by the physiological changes that are triggered by a change of body chemistry sensed by the brain (e.g. air, minerals, warmth etc) or those triggered by second level sensory inputs from the environment such as vision or simulation (imagination). Behaviour is a response to these needs, and particular behaviours boost chances of survival. It is these behaviours or traits

that undergo selection pressures in the social environment. Those better predisposed to responding to these needs in a particular environment win the cultural selection race.

There is a distinction between full-blown conscious emotion and automatic affect (Baumeister, Vohs, DeWall, & Zhang, 2007). A full-blown conscious emotional experience operates to stimulate cognitive processing *after* some outcome or behaviour. Full-blown emotions act as a *primer* to the cognitive control of behaviour. Neurologically speaking, events that create a full-blown emotional experience leave a trace or neurological residue, and later this residue can become activated if similar situations to those previous are detected, leading to a change in subsequent behaviour such as that of avoidance.

Affect may be no more than a quick twinge of feeling that something is good or bad, of liking or disliking for something (Baumeister et al., 2007). It does not entail the intense conscious experience that emotion does, though some conscious awareness of liking, disliking, suspense or tension may be felt. It is this conscious awareness or recounting of this previous awareness of affect that this study is particularly interested in capturing.

Popular business writer Tom Peters (1999) declares that PM *is* emotion management. It has also been argued that it is emotion that shapes, and is shaped by, organisational culture (De Dreu, West, Fischer, & MacCurtain, 2001). Furthermore, our ability to be able to manage and interpret emotions is placed at the root of productive relationships in the business environment in general (Ashkanasy, Zerbe, & Härtel, 2002), and PM in particular (Kadefors, 2004; Turner & Müller, 2004). A large volume of literature, summarised by (Liu & Walker, 1998), also considers emotion to be a significant part of the evaluating process of project outcomes.

Thought leaders across all aspects of PM are mindful of the need to investigate the nature of human interaction, particularly the role emotions play in the wider phenomenon of projects and PM (Winter, Smith, Morris, & Cicmil, 2006). However thus far, emotions have only been considered from the perspective of how a project manager manages their own positive or negative emotions as well as those of others to achieve project success. See (Cerny, 2007) for a summary of emotions in projects. None of this literature considers the emotions that are evoked by artefacts that pertain to PM in the context of PM.

Emotional expression: artefact and gesture

There is also a strong correlation between emotions, artefacts, and physical gestures (Denton, 2006). Simply put, both artefacts and gestures are expressions or by-products of emotions. It has been shown that spontaneous gestural expressions such as shame (e.g. chest narrowed and shoulders slumped) and pride (e.g. a winning athlete's arms raised and hands in a fist) are biologically innate expressions of emotion (Tracy & Matsumoto, 2008). Also art, in the moment of its creation, is connected to the emotions (physiology) of the artist. Moreover the observer is, in a neurological way, empathically connected to the creative emotions of the artist. Freedberg and Gallese (2007) have produced an extensive review of the literature that demonstrates that human empathic responses to works of art have a precise and definable material basis in the brain. Viewers of works of art report bodily empathy. Therefore art contains the mark, impressions, or some remnants of physical gestures that are expression of emotions.

Providing a clear ontology of artefacts is a non-trivial assignment. Suffice it to say that a project manager's technical artefacts such as their computer are different from their social

artefact such as a PM methodology they may follow in that the realization of their function crucially depends on their physical structure. Both however are used for *doing* things. It is under this criterion that this study considers the constructs commonly associated with PM such as deadlines, teams, PM methodologies, and Gantt charts, and so on, to be artefacts of the PM discipline. See (Kroes & Meijers, 2005) for an extensive perspective on this dual nature of artefacts.

The organisational environment is replete with artefacts. Whether they are passive or active, they can create and/or predispose us to particular feelings, emotions, and ideas. Both the interior design of offices (Davis, 1984), and exterior architecture of buildings, cities, and parks (De Botton, 2006) evokes emotional associations that influence our mood and further predispose us to particular values and ideals. Moreover, music (Blood & Zatorre, 2001; Scherer, 2004), works of art (Freedberg & Gallese, 2007), and more active structures on the body such as a forced smile (Strack, Martin, & Stepper, 1988), can further predispose us to emotions.

The study of the connections between emotions and physical artefacts in the context of the organisation is not new (see (Rafaeli & Vilnai-Yavetz, 2004)). However, a gap in the literature does exist which relates to what affective emotions are evoked by various PM artefacts.

Study

A phenomenological approach to this research is a potentially powerful methodology for eliciting, through self-reporting and observation of gesture, the affective responses and the consequential emotions experienced by PM practitioners as they interact or recount previous interactions with various artefacts of PM. A distinguishing feature of empirical phenomenology is the fact that it focuses on the meaning human beings make of their experience (Hillman, 1960; Schweitzer, 2002).

Research design

In an attempt to gain access to, and make sense of, the emotional experiences of project managers during their interaction with PM artefacts, a phenomenological method developed by the Duquesne School was used, which has been further articulated and demonstrated by Giorgi (1970, 1985, 1992b).

The chief characteristics of this approach are:

- To use loosely structured interviews;
- Participants are selected on the basis of experience of the phenomenon under investigation, and linguistic proficiency.
- The researcher adopts a position of “conceptual silence”, or naivety;
- The interview transcripts and observations are reduced to natural meaning units expressed in the words of the participant in an attempt to capture the lived-world experience of the participant; and
- Themes are extracted and compared with findings with other sources.

Validity of the data was addressed through careful selection of interviewees by use of a selection process, and reliability was addressed by using replication logic, i.e. eighteen interviewees were asked the same questions.

Sampling and data collection

The selection of participants occurred in two stages. A small cohort of 55 project managers from Queensland (Australia) Chapters of Project Management Institute (PMI) and Australian Institute of Project Managers (AIPM) were asked to participate, and a questionnaire was administered via email, containing the following questions:

1. What are some of the project management tools and processes you enjoy using?
2. How do they make you feel when you're using them?
3. How do you think you'd feel if you weren't allowed to use them to manage a project?
4. Try to imagine the ultimate project management tool or process – what do you think it would be like?

These questions are designed to encourage respondents to think deeply about the aspects of PM they enjoy the most and what initial responses and emotions they attach to them. The questionnaire serves two purposes: one, to act as a rough sieve for selecting a smaller group of respondents to act as participants for in-depth interviewing; two, to provide a framework for the interviews. 18 respondents were selected for face to face interviews on the strength of the richness of questionnaire responses, whilst not deliberately looking for racial, cultural and gender representation.

Face to face interviews were conducted in the participant's usual working environment which was, out of interest, on all occasions uncluttered and orderly. The questions were loosely formulated from their responses to the questionnaire, and typically asked for clarification and more detail on how they respond and emotionally relate to various artefacts and aspects of PM; what values and principles they attach to them; what narratives or metaphors they associate to them; and how would they feel if they were no longer allowed to use their preferred artefact or engage in their favourite PM activity.

Interviews were recorded (audio and video) and transcribed in full with comments on non-verbal communication. Ethical approval for this study was granted, anonymity assured, and video and audio recordings were destroyed following transcription.

Data from transcription was arranged into natural meaning units and explicated in an attempt to capturing the essence of what the phenomenon means to the participant, what responses and emotions they attach or associate with an artefact or aspect of PM. The emphasis at this stage is still on description, rather than interpretation (Giorgi, 1992a).

Data analysis

The first level of the data analysis codes each transcript, using a descriptive, open coding process to capture meaningful data units. This provides the foundation for a second level of analysis, meaning condensation (Kvale, 2005), in which the data (including the codes) are condensed into themes, explanations, stories, metaphors, relationship patterns, and their consequences. Meaning condensation is used to retain as much of the 'whole' of the data as possible and to capture the participants' interpretations of their responses, emotions, and experiences stimulated by PM artefacts.

Limitations

There are no claims in this paper of an absolute truth about the emotional influences of various aspects or artefacts of PM. Rather, it provides an insight into how certain individuals

(those reasonably well adapted to the PM environment) rationalise and make sense of their emotional engagement with various PM tools, methodologies, graphs, and processes. Self-reporting as a form of data collection is prevalent in the organisational behaviour and management literature (Dipboye & Flanagan, 1979; Gupta & Beehr, 1982; Mitchell, 1985; Sims, 1979), and there are issues when using this data to draw statistical conclusions (Podsakoff & Organ, 1986). However, this phenomenological study only extracts and interprets the psychological information that they contain. The findings are particular to the cohort, and any generalisations should be considered with caution.

Results

Eleven common artefacts associated with PM arose from the interviews. Those more intellectually discernable were the concepts of project, of team, of deadlines and that of the professional persona of a project manager. Those more tangible were the Gantt chart, work breakdown structure (WBS), iron triangle, S-Curve, PM post-nominals, PMBOK® Guide and PM methodologies, and professional PM institutions.

Table 1 summarises the findings and maps the artefacts to an emergent or overarching theme, affective emotion, and physical gesture. To follow is a richer description of the findings. **Participant comments are in quotes. Any words that they emphasized are in italics. Any comments on physical gestures etc. are placed in parenthesis.**

Project

Crude drawings can serve as a means of representing or abstracting the state of one's emotional psyche (Arnheim, 1969; Ramachandran & Hubbard, 2001). When asked to characterize the concept of a project in the form of a line drawing, participants drew a variety of shapes. Two participants drew an Octopus (Figure 1 is one example). One said "I see myself as the Octopus. The arms represent the different aspects of the project I need to be involved with". "It's organic; it gets born and dies; and it's slippery to get hold of". When commenting on the smile that one drew on their octopus the participant said "all projects test you, but it's what you take from it. I think it's *always* beneficial and satisfying in the end". Both Octopi were anatomically incorrect having nine arms not eight. Both participants stated that each of the arms represented one of the nine core areas of PM. The second described their Octopus differently say "the *project* is like an Octopus; difficult to properly grasp hold of and you might get stung by one of the tentacles". Another participant drew a snake and a ladder (Figure 2). "It's like playing the board game snakes 'n' ladders. On good days you land on a square and shoot up a ladder. On bad days you might get bitten and slide down a snake". Others drew various forms of wavy lines (Figure 3 shows one example). When pointing to a downward slope a participant said "there's an adrenaline rush when things are going right". When pointing to an upward slope "and then there's that sick feeling knowing there's a big fall coming". Figure 4 was described as "the project heads towards a climax, and then there's a huge weight (participant sat back and upright in chair) lifted off my shoulders". Another drew a rudimentary handgun saying "managing a project is like playing Russian roulette with work. Odds are it'll be fine but sometimes it just goes off in your face".

Projects appear to be emotionally perceived as though they are composed of two opposing forces or elements which were not as dichotomistic as good and bad. Rather, these forces are more complementary or completing aspects of the one phenomenon such as in the concept of Yin - Yang, though this term was only mentioned by one participants. All of the participants

described the most difficult parts of their roles as “challenges”, and felt they gained a sense of achievement and learning from their projects - “even the really bad ones. I get a buzz out of it, and I keep going back for more.”

Participants described the experience of managing a project in terms of a duality between thrill and excitement, even fear and personal satisfaction. “When I think about a new project we’re working on – I get butterflies in my stomach.” Furthermore, many believed in some sort of karmic effect where the benefits of a good work ethic today would be paid back in future project success. “I really feel that what I put in today – I’ll get back in spades tomorrow.”

All participants see project work as intrinsically rewarding. “People think I spend most of my time fiddling around with the Gantt chart. But most of what I do isn’t even on the Gantt chart.” Another said, “I heard one young fella say that what he did was put out fires. And I suppose people see him as a hero. He *did* get promoted over me. But I’ve been in this job 15 years and I can safely say that I spend most of my time in fire prevention - so to speak. I put systems in place to *stop* fires breaking out, and I pride myself on that.” Another said, “Preventing problems isn’t sexy. A few, if any, realise the work I do. But I know what needs to be done, and I know what I’ve done and what I’ve prevented from happening. And I suppose I get a lot of satisfaction, personal satisfaction out of that.”

Team

The concept of team appears to be a powerful PM artefact. “Even though the buck stops with me, we share everything. They rely on me, and I rely on them.” Another remarked “Projects and teams are two halves of the same things aren’t they? We’re all in it together”. Another “I’m the manager of the project so it’s my head on the chopping block, but it’s the team that gets the job done.”

Though a hint of Yin – Yang appears to emerge once again, there exists a more dominant theme of mutual commitment or common ownership, but not one of common responsibility. One said, “If they shine I shine, but if it all goes wrong I take the heat.”

Participants appeared to be appreciative toward their teams and felt pride in their accomplishment. Ekman (2003) called this pride “Naches”. One said, “let’s be honest – a lot of the good work *they* do sticks to me. I think it’s only fair to acknowledge and appreciate that.” Another, “I really benefit from having good people on my team. They take time to find and can be hard to keep. But the effort is worth it. I’m proud of them. But don’t tell them that”. Another said, “We all give it 110 percent. And I like to think that I play some part in them achieving their personal goals too.”

There appears to be a gesture associated with the concept of team. Many participants, whilst saying the word ‘team’ made the gesture of a circle. They did this by either drawing a circle if they had a pen in hand (Figure 5), by tracing a circle using their index finger on the desk or in free space in front of them, or by making a circle by touching their hands together using their thumb and middle fingers (Figure 6). As an expression of emotion the circle gesture has a limitless or boundless aspect with no beginning, no end, and no division. It symbolises wholeness and completeness, and it is possibly used by project managers to express their feelings of mutual commitment and fidelity to the team and the project.

Deadline

The concept of a deadline appears to be a PM artefact, and a mixture of anxiety and exhilaration can be associated with it. "My credibility in this business could be won or lost on whether I make deadlines or not." Another said, "It's a love / hate relationship with me and deadlines. I moan and grumble, but I think we're better for having them."

Participants appear to be optimists and positively reframe any anxiety or apprehension they have about the future in such a way that deadlines represent personal performance goals. This reframing ability presents itself as a self-administered pursuit that takes effort to maintain. Six participants on various occasions used variants of the phrase "to lose sleep" or "losing sleep at night". Others implied this phrase as one said, "I get paid so the client can sleep at night." "I hate deadlines. They keep me up at night. But (long pause) at the same time, as they get closer, they give me a buzz."

Deadline also appears to have its own physical gesture, which is that of a single hand chopping action. When questioned about the gesture, a participant said "its final", "I suppose it means that's *it* (chopping gesture), the end!" The term "chopping block" was mentioned by five participants. "(laughing) It probably is a bit like being under the guillotine (chopping gesture). My head would certainly be on the chopping block if I didn't get projects delivered on time on budget."

The term "deadline" takes its rise from the name of a light fence at an American Civil War Prison. Anyone crossing this line was shot (Styple, 1996). However, the deadline gesture observed in this study appears to have more medieval roots relating to the guillotine or the headsman's chopping block. Why the term is used and how it has been associated with the gesture in the context of PM is unclear. Perhaps today, as participants imply, it represents an easy to copy macabre mixed metaphor for an impending and possibly public disgrace.

It appears that the term deadline is reframed by many of the participants to implicitly refer to the death of their own track record rather than the completion of any aspect of the project. "My life is full of deadlines. I see it as a challenge to rise up and meet every one of them." Poggi, as cited in (Ekman, 2003), called this emotion of triumph over adversity "Fiero". Another said, "I need deadlines. I thrive on them. I set deadlines when there aren't deadlines (laughing). I use them to push me on and on and on." Figuratively speaking, it appears that it is the project managers themselves (self-administered) who put their own heads on chopping blocks.

Project manager persona

"Well you've got to at least *look* the part haven't you? You've got to at least *look* as if you can deliver." When asked (not all were asked) to describe what they imagined a successful project manager would look like, participants (including all females) used descriptors such as "male (females raised their eyebrows whilst say this)", "mid 20s to mid 40s", "businesslike", "must wear a business suit", "confident and assertive". Some commented on how they personally and actively used the persona. One said, "I think project managers should be like a Doctors in some ways. You have to ooze confidence in what you're saying, even if deep down you don't really believe it yourself."

The project manager persona could be conceptualised by the metaphor that beneath the external impression of the graceful swan are furiously paddling legs. "I have a knot in my stomach before I go into that meeting room. But soon I get right into it I'm in the zone

(clicking their fingers).” Another “At stakeholder briefings I’m conscious that I need to look composed and in control. And then that’s how they think the project is going. Of course that’s not how it’s *really* going.”

There appears to be a tension or anxiety when creating and maintaining the façade of control. “I suppose I’m always wondering whether or not I’m pulling it off.” Another, “I reckon if I can just distract them from the bad stuff with the good stuff, then I can sort out the problems later.”

When participants spoke about their professional persona their seating position became more composed. This could be an example of a primitive gesture that implies bigness as a sign of threat or intimidation (Armstrong, Stokoe, & Wilcox, 1995).

Gantt chart

It seems that project managers cannot talk about PM without mentioning the Gantt chart. Project managers appear to be compelled to make them to create and maintain their professional persona. “I couldn’t imagine talking to a client without having a Gantt chart to show them. I think I’d look *really* unprofessional.”

One participant expressed a liking for the process of building a Gantt chart along with the mixed emotions about the end result. “I really feel a sense of achievement when it’s done. I’m not stupid enough to think that the actual project will turn out like it, but it’s something to talk about, point at, and hope for.”

Though the Gantt chart is closely associated with PM, many participants regarded this association as a burden. Nevertheless, they appear manipulate this situation to their advantage. “Project managers have a lot in common with magicians I feel. Not that we do magic tricks, but when you see a magician you expect him to have a wand and a top hat. That way you know he’s a magician. Well, I feel a lot like that with Gantt charts. Everybody expects me to carry one. I’ve got to the stage where I draw one just to keep the peace. It keeps reporting mechanisms happy.” One said, “Most of the time I could draw the schedule we need on the back of an envelope. Even for some of our big internal projects. But if I did that I’d be out of a job tomorrow wouldn’t I? So I draw them a bloody Gantt chart.” Another said, “If I want to make everyone happy I just get out the Gantt chart and point at bits I know lots about. They all smile and nod, then I can get back to managing the project.” Another, “Company reporting mechanisms require me to produce a detailed Gantt chart. But a lot of the time I don’t actually use them to manage the project. I’m forced to use a hammer when all I need is a scalpel.” And another said when referring to the Gantt chart, “can you honestly imagine me turning up to a progress meeting without one?”

Even though project managers feel frustration that they are expected, even forced to use Gantt charts, they also manipulate this situation to their advantage and use Gantt charts to placate senior management and clients. As one participant clearly expressed, “It’s the Gantt charts that keeps *my* manager out of *my* office so I can get on with *my* work.”

When participants were asked to associate words or emotions with the Gantt chart they said; “Order, organised, control, methodical, systematic, frustration, structured, hope, efficient, instructive.”

As well as verbal and time related information, Gantt charts appear to contain emotion and affect. One participant said "the Gantt charts you're showing me don't mean anything to me I feel pretty neutral about *them*. But *my* Gantt charts can really stress me out." The Gantt chart also appears to be used as a tool to signal danger. "It really focuses my attention on the work. It heightens my awareness to issues. A bit like one of those Meerkats on the lookout for danger (laughing)."

Hopefulness also appears to be an emotion linked to Gantt charts. "When I look at it (the Gantt chart) all finished, (heavy sigh) I suppose I'm hoping that's how it will all turn out. I'm a shameless romantic aren't I (smiling)?"

The overall theme for the Gantt chart is attributed to the participant who said, "Mate, don't you know it's the project manager's Swiss Army Knife. It's useful in so many ways. Gets me out of all sorts of trouble."

All of the participants, but not all of the time, used a similar hand gesture when talking about Gantt charts or schedules. Figure 7 shows the starting position of this 'x-axis sweep' where the hands are extended forwards slightly left to the centre of the body with palms touching. The gesture is completed by drawing the right hand smartly away from the left hand in a sweeping action, stopping only when the right hand is somewhere right of the centre of the body (Figure 8). This gesture is clearly a function of brain architecture. See (Wood & Fischer, 2008) for expansive information on how the brain manages the relationship between numbers, space, and action. This gesture confirms that our 'mental time line' is tightly mapped onto a horizontal axis (Ishihara, Keller, Rossetti, & Prinz, 2008), and that the modern Gantt chart is an advanced abstracted form of the primitive 'x axis sweep' that is itself a consequence of a cognitive process.

WBS

Two thirds of the participants said they use a form of Work Breakdown Structure (WBS) in the conceptual phase of the project. Building them using post-it notes on a whiteboard appears to be a popular method.

There appears to be a 'commonsense' aspect to the WBS. "To me the work breakdown structure is a pretty obvious concept. Self explanatory. I can't imagine how people built things without it." Another said, "If you took my post-it notes and whiteboard away from me I'd find it very hard to do my job. *How* would you even start?"

All participants view work in packets or as bounded objects. As one put it, "I like to break the work down into nice crisp chunks, and then connect them all up together again." This behaviour supports Gestalt theories that in order to interpret what we receive through our senses we attempt to organize information into certain groups which include: similarity, proximity, continuity, and closure (Kohler, 1992). No wonder the WBS appears to be self-explanatory.

When asked to associate words or emotions with the WBS participants said, "Tasks, order, symmetry, methodical, components, boxes, authority, satisfaction, control, agreement." When referring to the post-it note version they said, "flexible, temporary, participate, all take part".

Many experience satisfaction, contentment, even a sense of control from the WBS process. One said, "I've got all my ducks in a line. All the parts eventually fall into place after a bit of hard work." Another said, "It's a tool that really helps me shake out most of the unknowns. I mean not the WBS itself but the process in getting to it." "It's really satisfying when I finally get it finished - up there on the board." "I'm relieved when it's done. It's a satisfying place to be. I know we can move on when we get to that stage."

Iron triangle

The traditional way of evaluating project performance using schedule, cost, and quality performances measures, also known as the 'iron triangle' (Atkinson, 1999), appears to continue to be a pervasive concept of PM. All of the participants mentioned the triangle. Many referred to it as the time, cost, quality triangle. All thought it was a valid method of evaluating project performance, but as one put it, "what do we mean by quality anyways? You can put anything into that category couldn't you?"

The iron triangle appears to be an easy to remember 'rule of thumb'. One said, "I've got a drawing of the triangle above my desk. It helps me to focus on what's important." Another participant said that they imagined each of the performance measures as analogue dials on a dashboard. "My quest is to keep all these needles in the green zone."

The iron triangle does create tension for the participants. "(heavy sigh) well project management, to me, is all about trying to keep these three things (dotting their finger three times on the desk in the shape of a triangle) under control. And it can be a constant battle to do that."

Some participants doodled a triangle shape on paper, and others traced an imaginary triangle either in the air or on the desk before them as they talked about it (Figure 9). None of the participants offered a reason for the triangle shape other than it was an easy way to remember the concept. Despite strong criticism (Atkinson, 1999), the iron triangle appears to survive because it increases anxiety by pushing fear buttons and because it is a easy to draw.

S-Curve

All participants recognised and understood the concept of the S-Curve though none applied it in practice in any real sense. "I sort of know that's how projects are supposed to unfold. I learnt it on a Uni course." Whilst pointing to the slowed growth part at the end of the S-curve one participant said, "I wish all my projects ended like that- all calm and well paced."

When asked to explain the S-Curve participants applied various metaphors that related the project experience to that of some natural biological cycle. The most common metaphor could be typified by "all trees start off as seeds, and then saplings, then a big growth spurt 'till they finally produce fruit. Trees need watering and feeding, and looking after. Projects are just the same." Pointing to the end of the S-curve one participant said "and the project never really dies. It just lives on in another form."

When asked to associate words with the S-curve, participants said, “natural, growth, growing, organic, paced, and rhythmic.” When asked to associate emotions, participants said, “Hopefulness, promising, confidence, expectation.” “I hope it will turn out that way. (light laughter) And I hope that every time.”

Post-nominals

With the exception of two, participants displayed post-nominals on their business cards. One said "They don't mean much really. I got them fairly easily. But they do impress the management (pointing upwards) – the uninitiated." Another said "Personally I feel they have little or no currency within the profession. But HR and senior management like them. Without these letters (pointing to business card) I wouldn't have got this job."

Participants generally expressed disappointment with the accreditation process of their post-nominals, but felt that the post-nominals were useful in the job application process. “(light laughter) it’s like a fake police badge. If I flash it (pulls business card from wallet) most people would be impressed wouldn’t they.”

PMBOK® Guide and PM methodologies

It is apparent that some PM methodologies are PM artefacts in themselves and are used as currency to gain a competitive advantage. "We use a maturity model. When I say we use it, I mean we use it on contract tenders."

Referring to the PMBOK® Guide "That was one of the books I use on my Uni course. Never really looked at it since though." All the participants were aware of the PMBOK® Guide, and all of them utilised a PM methodology of some sort, whether it were an off-the-shelf brand or a company-grown product. Participants appeared to be either for or against PM methodologies, some even crossed over the dividing line midsentence. "Frankly, I think these methodologies are a money spinning game for the institutions and governments that own and enforce them. But (long pause) on the other hand, I suppose we all need rules and guidelines - it would be chaos without them." "We use PRINCE2 and I like it. It really suits the way I like to work." Another said, “Everyone here has been on a PRINCE2 course. But it would be death by paperwork if we fully implemented it.” A little later the same participant said “I’ve just been for a job interview and all they wanted to know was how familiar was I with PRINCE2. So for 10 minutes I spoke like a PRINCE2 *guru*."

“(laughing) I was going to say that it’s (referring to a PM methodology) something for the whole company to get behind. But thinking about it, it’s something to *hide* behind more than *get* behind.” Participants appeared to take comfort from, and feel protected by, the methodologies they were using. When asked what they felt protected from one said, “Oh protected from *blame*. Not *all* of it obviously, but *some* of it at least.” Another said, “Look – in one way if I’ve done all the right things, ticked all the boxes and followed the process, I’ve covered my arse.”

The term “twofer” is used as the overarching theme of this artefact. It comes from one participant who said, “My PRINCE2 certificate is like a twofer voucher and I can redeem it in two ways. I can flaunt it at interview or on my resume, or I can use it to shift some of the blame off me and on to the way this organisation does business.”

Professional institutions

Only half of the participants were actively involved in a PM professional body, and those that were showed allegiance to their chosen one. "I've been a member of the PMI for years. As a professional I feel I should actively support my profession." Another said "The AIPM gives my career some credibility. I don't feel I'm part of a passing fad. (smiling) Well most of the time I don't."

With the exception of three, participants did not believe that PM was a proper profession. Nevertheless they appeared to go along with the idea as it appeared beneficial to them. "I class myself as a professional because of my engineering background not because I'm a Project Director. But I go along with the position the institute's trying to take. I can only benefit - I think."

Participants view their membership to their PM professional institutions positively, as they appear to offer a sense of collegiality and job networking. "I go to the talks, and I'm off to the conference this year. I find it intellectually stimulating meeting other professionals in likewise situations. (long pause) I got *this* job through the network of people I know through the institute, and I know that works for others too."

Participants feel that the institutes are playing a part in building a career path for project managers. "It's trying to set the standard for professional practice. It's certainly not, by far, rigorous enough yet. But it's making a good start. I think it's a good thing." Another, "In my experience, senior management will only take the role of project manager seriously if it's represented by a professional body. Look at HR these days."

The PM professional institutes appear give the individual project manager a sense that he/she is part of an influential group – as critical mass of project managers where there is safety in numbers. "United we stand, divided we fall – isn't that how it goes." Another said, "It (the institute) gives me confidence. I need the conferences and chapter meetings to reaffirm that what I'm going is right, and that I'm not alone in all this." From an evolutionary point of view the PM professional institutes appear to offer a 'safety in numbers' effect which is usually appropriated to flocking of birds and shoaling of fish. In these instances, by being part of a large group, each individual faces less risk of falling victim than they would if they travelled alone. The project managers in this study appeared to use their professional institutions and their respective PM methodologies to exploit the safety in numbers effect. The participants felt that being associated with a mass of project managers or a methodology sanctioned by such a group, that they were as an individual, proportionally less likely to be the victim of a project mishap or accident.

Discussion

The results of this study suggest that both hypotheses (H1 and H2) are highly plausible and that they explain the results of this study in a unifying way.

This section will discuss each hypothesis and draw comparisons with the findings of this study with those in the literature, and rationalise the findings within the evolutionary or memetic approach to PM.

Some (Cleland & Ireland, 2002; Evaristo & van Fenema, 1999; Maylor, Brady, Cooke-Davies, & Hodgson, 2006) have already mentioned that we should expect the concepts of projects and PM to evolve. However, underpinning these expectations is the idea that the process of evolution takes place for the benefit of the organisation. This view is conceptually different to that of the memetic approach which states that PM evolves for its own end (Whitty, 2005). The results of this study are considered with this latter view in mind.

H1: Project managers obtain an emotional affect from aspects of the PM experience.

This study has shown that project managers are drawn to project work. The participants in this study forage for projects because they can obtain or experience an emotional affect or more informally stated a favourable emotional fix from the challenge they present. A non metaphysical view of consciousness is that it is a melding of both primordial and secondary hardwired emotions (Denton, 2006). Emotions elicited from these behaviours and desires or thirsts for gratification culminated in the first conscious states. Memes that embody a 'thirst' for gratification will survive. We continue to perform Beethoven's scores and Shakespeare's texts while many scores and texts, more popular at the time than Beethoven and Shakespeare, are no longer performed (Benzon, 1996). We humans have a thirst for salt and we have a thirst for tasks (Denton, 2006). We spend time foraging for tasks that furnish us with an emotional fix (Denton, 2006). Foraging can take many forms of behaviour such as sex, competing in sport, foraging for information in a book or a movie or on the internet (Card & Pirolli, 1999), systematised ritual (Dennett, 2006), and as the results of this study shows - planning and managing a project.

Overall, the cohort had a natural disposition towards optimism and their ability to positively reframe anxiety or apprehension concurs with previous findings on how project managers cope with stress (Aitkin & Crawford, 2007). However, this study has shown that despite the amount of anxiety and tension caused by their work, people are emotionally drawn to project work. The cohort of this study appears to find aspects of PM intrinsically rewarding, even absorbing or addictive, and they are stimulated by the challenges the construct of a project has to offer. Furthermore, they appear to be fairly sure they can handle these challenges with their existing skill and abilities, and view the project environment in a goal directed utilitarian manner, which is not necessarily the case for the novice project manager.

Even though determinism is a major plank of PM ideology (Whitty & Schulz, 2007) and project managers like to think of work in "crisp chunks", they also appear to operate under the cognitive logic of yin-yang. They conceptualise the emotional experience of managing a project in terms of two possible states or statuses of events that ebb and flow; one state gradually transforming into the other state along a time dimension. What is also interesting is that these project managers find it necessary to conceal this behaviour for survival reasons.

The results of this study offer an interesting insight into PM when comparing them to the literature on psychological flow (Csikszentmihalyi, 2000) and more particularly flow in gaming (Sweetser & Wyeth, 2005). The term flow is a metaphor for an engaging or absorbing activity that is exhilarating, challenging, and creates an overall feeling of enjoyment. Projects can be immersive and engaging pursuits and an intrinsically rewarding activity, with artefacts such as the Gantt chart that act as an interface or proxy to the real world that are rewarding themselves to use. Further research might show that moments of

flow (see (Csikszentmihalyi, 2000) pgs 38-47 for characteristics of these) can be found in aspects of the PM experience.

H2: Project managers use the emotional affects of PM artefacts to increase their competitive advantage.

This study supports previous findings that show that senior management do perceive project managers in a particular way (Crawford, 2005), that they view the Gantt chart as representing PM (Maylor, 2001), and that project managers do put on a performance of professionalism (Hodgson, 2005). This study has highlighted how project managers manipulate the first two of these situations to their own advantage.

The Gantt chart appears to be a multi use symbol. It is used to signal to the organisation that a body of work is a project and it, and all associated with it, should be given the proper consideration. It condenses into one symbolic event the anxieties, memories of past glories and humiliations, and promises of future success. It also functions as a piece of modernist artwork, the creation of which is directed towards social purposes such as placating senior management rather than just a graphical plan of work.

At an emotional/neurological level the overall idea of PM and some artefacts of PM such as the Gantt chart, WBS, and iron triangle appear to quench the physiological thirst to control ones environment, for order and reassurance. Consequentially this leads to reduced levels of anxiety in the individuals who use them and those who perceive them to be used such as senior management. Real control is not required to reduce anxiety, the illusion of it will suffice (Langer, 1975).

Conclusion and Implications

This study set out to advance an evolutionary framework for project management research by demonstrating that PM is pervasive in Western corporate culture because humans, in this study the project managers, obtain an emotional affect from the PM experience. Furthermore, that project managers utilise various artefacts associated with PM in an emotional way to increase their competitive advantage in the organisational environment. In short, the findings of this study show that people who manage projects enjoy the experience; they forage for project work. Moreover, with the assistance of various PM artefacts they emotionally manipulate their environment to their own advantage.

Implications

With regard to H1 and H2, by the one we are victims, by the other we are victimisers. As project managers, we are largely ignorant to our lack of freedom, and ignorant of what it is that makes us behave the way we do. This research has been an attempt to examine some of our project management behaviours and obtain a glimpse of what underpins them. Both H1 and H2 have significant implications for the scholarly community, the educational sector and the PM professional institutions, as well as project orientated organisations and the PM practitioner.

In almost all instances, introductory courses to PM comprise a topic on how to draw a Gantt chart. This state of affairs, both implicitly and explicitly, makes a positive correlation between the creation of the Gantt chart and the performance of the project. However, the

findings of this research highlight the difficulties that exist in attributing value to various PM tools, practices, and behaviours. From the cohort in this study we know that some practitioners create Gantt charts because they enjoy the Gantt charting process, and some create them to placate others and/or to be viewed favourably by others. It is simply not clear how Gantt charts or the scheduling process in general contributes to the overall performance of a project. To address this situation a more scientific or rational justification for PM practices needs to be developed. The scholarly community will need to discern the various evidence based practices of PM, the educational sector will need to infuse PM programs with evidence based practice, and the PM professional institutions will need to promote and endorse them. This way we can bring a level of intellectual honesty to the discipline of PM.

This research has illustrated that the many work related behaviours of the project manager are in a sense determined by their physical environment (e.g. the tools and process they are required to use and adhere to), as well as the cultural environment (e.g. the norms of their organisation and professional PM body). No doubt many senior managers would agree that what a project manager does with his or her time should be, in some way, measurably connected to the successful management of the project. From the cohort in this study we know this is generally not the case as some were drawn into activities that gave them comfort and a sense of control, whilst others felt it necessary to present a particular professional image that enabled them to secure a favourable competitive advantage in their organisation.

Senior management could get more value out of their project managers if they understood how they are affected by the physical and cultural environment of their organisation. Project managers should be encouraged to pursue activities that demonstrably lead to increased project performance, and if new evidence based tools, practices, and cultural norms need to be adopted whilst others are abandoned then so be it.

As scholars and practitioners of PM we are bound together in a fellowship of project experiences. We can use the findings of this research to wisely develop our capacity for self reflection and critical reasoning so that we might pursue a course of activity towards project management which is established in evidence based practises.

Finally, I suggest future research on this topic should explore the links between project management, social architecture, and flow theory.

References

- Aitkin, A., & Crawford, L. 2007. Coping with stress: Dispositional coping strategies of project managers. *International Journal of Project Management*, 25(7): 666-673.
- Armstrong, D. F., Stokoe, W. C., & Wilcox, S. 1995. *Gesture and the Nature of Language*. Cambridge: Cambridge University Press.
- Arnheim, R. 1969. *Visual Thinking*. Berkeley: University of California Press.
- Ashkanasy, N. M., Zerbe, W. J., & Härtel, C. E. J. (Eds.). 2002. *Managing Emotions in the Workplace*. New York: M.E. Sharpe.
- Atkinson, R. 1999. Project management: cost, time and quality, two best guesses and a phenomenon, its time to accept other success criteria. *International Journal of Project Management*, 17(6): 337-342.
- Baumeister, R. F., Vohs, K. D., DeWall, C. N., & Zhang, L. 2007. How Emotion Shapes Behavior: Feedback, Anticipation, and Reflection, Rather Than Direct Causation. *Personality and Social Psychology Review*, 11(2): 167-203.
- Benzon, W. 1996. Culture as an Evolutionary Arena. *Journal of Social and Evolutionary Systems*, 19(4): 321-362.
- Blood, A. J., & Zatorre, R. J. 2001. Intensely pleasurable responses to music correlate with activity in brain regions implicated in reward and emotion. *Proceedings of the National Academy of Sciences*, 98(20): 11818-11823.
- Card, S., & Pirolli, P. 1999. Information Foraging. *Psychological Review*, 106(4): 643-675.
- Cerny, A. 2007. *Emotions in projects*. Paper presented at the 21st IPMA World Congress, Cracow, Poland.
- Cleland, D. I., & Ireland, L. R. 2002. *Project Management : Strategic Design and Implementation* (4th ed.): McGraw-Hill Professional.
- Crawford, L. 2005. Senior management perceptions of project management competence. *International Journal of Project Management*, 23(1): 7-16.
- Csikszentmihalyi, M. 2000. *Beyond boredom and anxiety*. San Francisco Jossey-Bass
- Davis, T. R. V. 1984. The Influence of the Physical Environment in Offices. *Academy of Management Review*, 9(2): 271-283.
- De Botton, A. 2006. *The Architecture of Happiness* Pantheon.
- De Dreu, C., West, M., Fischer, A., & MacCurtain, S. 2001. Origins and consequences of emotions in organisational teams. In R. Payne, & C. L. Cooper (Eds.), *Emotions at work*: 199-213. New York: Wiley.
- Dennett, D. 2006. *Breaking the spell : religion as a natural phenomenon*. London: Penguin Books.
- Denton, D. 2006. *The Primordial Emotions: The Dawning of Consciousness*: Oxford University Press.
- Dipboye, R. L., & Flanagan, M. F. 1979. Research settings an industrial and organizational psychology: Are findings in the field more generalizable than in the laboratory? *American Psychologist*, 34: 141-150.
- Dodgson, M. 2004. Innovate or die. *BRW*, 26(32): 54.
- Ekman, P. 2003. *Emotions Revealed: Recognizing Faces and Feelings to Improve Communication and Emotional Life*. New York: Times Books.
- Evaristo, R., & van Fenema, P. C. 1999. A typology of project management: emergence and evolution of new forms. *International Journal of Project Management*, 17(5): 275-281.
- Freedberg, D., & Gallese, V. 2007. Motion, emotion and empathy in esthetic experience. *Trends Cog Sci*, 11(5): 197-203.
- Giorgi, A. 1970. Toward phenomenologically based research in psychology. *Journal of Phenomenological Psychology*, 1: 75-98.
- Giorgi, A. 1985. *Phenomenology and Psychological Research*. Pittsburgh: Duquesne University Press.
- Giorgi, A. 1992a. Description versus interpretation: competing strategies for qualitative research. *Journal of Phenomenological Research*, 23: 119-135.

- Giorgi, A. 1992b. An exploratory phenomenological psychological approach to the experience of the moral sense. *Journal of Phenomenological Psychology*, 23: 50-86.
- Gupta, N., & Beehr, T. A. 1982. A test of the correspondence between self-reports and alternative data sources about work organizations. *Journal of Vocational Behavior*, 20: 1-13.
- Hillman, J. 1960. *Emotion; a comprehensive phenomenology of theories*: Routledge.
- Hodgson, D. 2005. 'Putting on a Professional Performance': Performativity, Subversion and Project Management. *Organization*, 12(1): 51-68.
- Ishihara, M., Keller, P. E., Rossetti, Y., & Prinz, W. 2008. Horizontal spatial representations of time: Evidence for the STEARC effect. *Cortex*, 44(4): 454-461.
- Jones, G. R. 2004. *Organizational Theory Design and Change* (4th International ed.). Upper Saddle River: Prentice Hall.
- Kadefors, A. 2004. Trust in project relationships—inside the black box *International Journal of Project Management*, 22(3): 175-182.
- Kohler, W. 1992. *Gestalt Psychology: An Introduction to New Concepts in Modern Psychology*: Liveright.
- Kroes, P., & Meijers, A. 2005. The dual nature of technical artefacts. *Studies in History and Philosophy of Science Part A*, 37(1): 1-4.
- Kvale, S. 2005. *Inter views : an introduction to qualitative research interviewing*: Corwin Press.
- Langer, E. J. 1975. The illusion of control. *Journal of Personality and Social Psychology*, 32: 311-328.
- Liu, A. M. M., & Walker, A. 1998. Evaluation of project outcomes. *Construction Management & Economics*, 16(2): 209-219.
- Maylor, H. 2001. Beyond the Gantt chart: Project management moving on. *International Journal of Project Management*, 19(1): 92-100.
- Maylor, H., Brady, T., Cooke-Davies, T., & Hodgson, D. 2006. From projectification to programmification. *International Journal of Project Management*, 24(8): 663-674.
- Mitchell, T. R. 1985. An evaluation of the validity of correlational research conducted in organizations. *Academy of Management Review*, 10: 192-205.
- Perrino, A. C., & Tipping, J. W. 1991. Global Management of Technology: a Study of 16 Multinationals in the USA, Europe and Japan. *Technology Analysis & Strategic Management*, 3(1): 87.
- Peters, T. 1999. The WOW Project, *Fast Company*: 116-136.
- PIPC. 2005. Global Project Management Survey, Vol. 2006.
- Podsakoff, P. M., & Organ, D. W. 1986. Self-reports in organizational research: Problems and prospects. *Journal of Management*, 12(4): 531-544.
- Rafaeli, A., & Vilnai-Yavetz, I. 2004. Emotion as a Connection of Physical Artifacts and Organization. *Organization Science*, 15(6): 671-686.
- Ramachandran, V. S., & Hubbard, E. M. 2001. Synaesthesia - A Window into Perception, Thought and Language. *Journal of Consciousness Studies*, 8(12): 3-34.
- Rothwell, R., & Zegveld, W. 1985. *Reindustrialisation and Technology*. London: Longman.
- Scherer, K. R. 2004. Which Emotions Can be Induced by Music? What Are the Underlying Mechanisms? And How Can We Measure Them? *Journal of New Music Research*, 33(3): 239-251.
- Schweitzer, R. 2002. Editorial. *Indo-Pacific Journal of Phenomenology*, 2(2): 1-2.
- Sims, H. P. 1979. Limitations and extensions to questionnaires in leadership research. In J. G. Hunt, & L. L. Larson (Eds.), *Crosscurrents in leadership*: 202-221. Carbondale, IL: Southern Illinois University Press.
- Strack, F., Martin, L., & Stepper, S. 1988. Inhibiting and facilitating conditions of the human smile: A nonobtrusive test of the facial feedback hypothesis. *Journal of Personality and Social Psychology*, 54(5): 768-777.
- Styple, W. 1996. *Andersonville, Giving Up the Ghost: Diaries & Recollections of the Prisoners*: Belle Grove.
- Sugden, L. 2001. Building For Tomorrow. *CMA Management*, 75(8): 40.

- Sweetser, P., & Wyeth, P. 2005. GameFlow: A Model for Evaluating Player Enjoyment in Games. *Computers in Entertainment*, 3(3): 3.
- Tracy, J. L., & Matsumoto, D. 2008. The spontaneous expression of pride and shame: Evidence for biologically innate nonverbal displays. *Proceedings of the National Academy of Sciences* 105(33): 11655–11660.
- Turner, J. R., & Müller, R. 2004. Communication and Co-operation on Projects Between the Project Owner As Principal and the Project Manager as Agent. *European Management Journal*, 22(3): 327-336.
- Whitty, S. J. 2005. A Memetic Paradigm of Project Management. *International Journal of Project Management*, 23(8): 575-583.
- Whitty, S. J., & Schulz, M. F. 2006. _THE_PM_BOK Code. *Proceedings of 20th IPMA World Congress on Project Management*, 1: 466-472.
- Whitty, S. J., & Schulz, M. F. 2007. The impact of Puritan ideology on aspects of project management. *International Journal of Project Management*, 25(1): 10-20.
- Winter, M., Smith, C., Morris, P. W. G., & Cicmil, S. 2006. Directions for future research in project management: The main findings of a UK government-funded research network. *International Journal of Project Management*, 24(8): 638-649.
- Wood, G., & Fischer, M. H. 2008. Numbers, space, and action – From finger counting to the mental number line and beyond. *Cortex*, 44(4): 353-358.

Figures

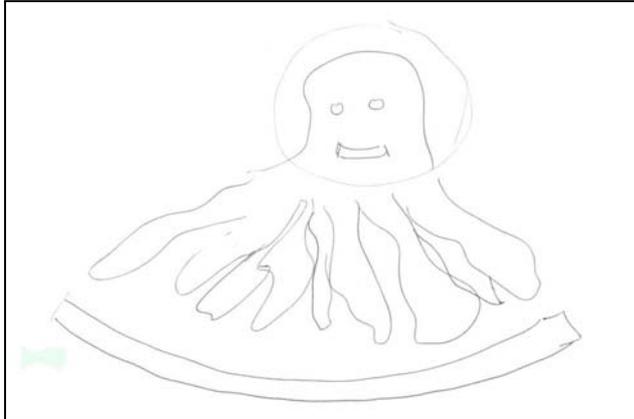


Figure 1 Octopus

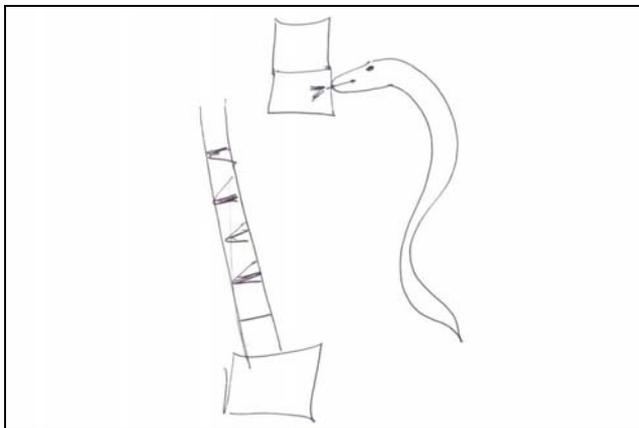


Figure 2 Snakes 'n' Ladders

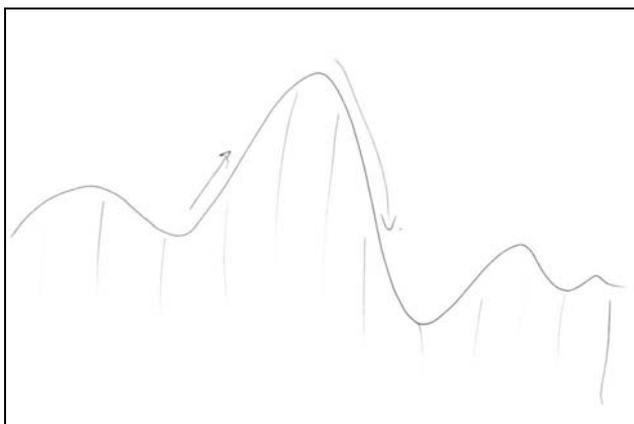


Figure 3 Rollercoaster

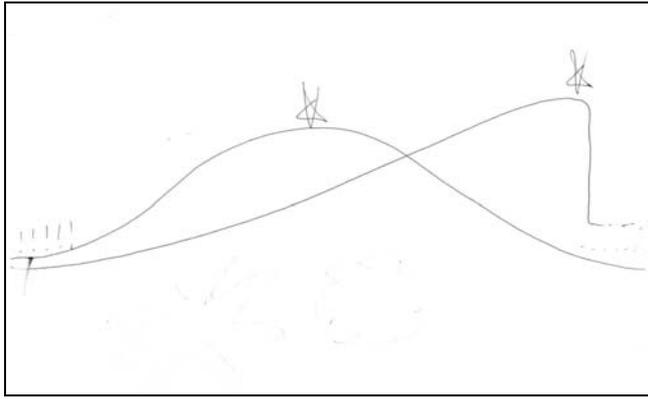


Figure 4 Climax

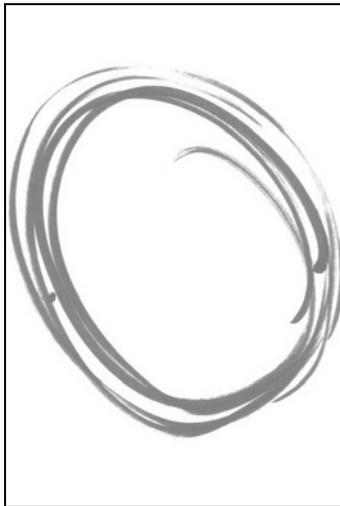


Figure 5 Team Circle



Figure 6 Team Hand Gesture



Figure 7 Gantt chart starting position



Figure 8 Gantt chart 'Sweep'



Figure 9 Iron Triangle

Table 1 – Project management artefacts and associated affect, emotion, and gesture.

Artefact	Theme	Affect and/or Emotion	Gesture
Project	Yin - Yang	Fear/Nervousness mixed with Thrill/Excitement – <i>towards the Challenge</i> Personal satisfaction - <i>intrinsically rewarding</i>	Various – with an opposing or completing quality. (Figures 1-4)
Team	Mutual commitment	Appreciation / Gratitude Naches - <i>pride in the accomplishment of one's team</i>	Circle (Figure 5)
Deadline	Self-administered positive reframing	Anxiety / Exhilaration Fiero - <i>Triumph over adversity</i>	Single hand chopping action
Project manager persona	Graceful Swan	Fear / Exhilaration Tension / Anxiety – <i>to appear businesslike</i>	Composed seating position
Gantt chart	Swiss Army Knife	Frustration – <i>expectant use</i> Tension / Concentration - <i>heighten awareness and focuses attention to issues</i> Sense of Control – <i>to vary style / strategy</i> Hope – <i>that the plan will be realised</i>	The x axis sweep
WBS	Crisp Chunks	Satisfaction / Contentment – <i>intrinsically rewarding</i> Sense of control	Building one on a white board with Post-it notes
Iron triangle	Warning Sign	Anxiety / Tension	Triangle
S-Curve	Natural biological cycle	Hope / Confidence – <i>in a good well paced outcome</i>	None
Post-nominals	Fake Badge	Disappointment	None
PMBOK® Guide and PM methodologies	Twofer	Comfort, Protection	None
Professional institutions	Critical Mass	Pride, Intellectually stimulating. Confidence.	None