Advances in Social Sciences Research Journal – Vol.3, No.11
Publication Date: Nov. 25, 2016
DoI:10.14738/assrj.311.2204.

Cookson, L.J. (2016). A Cladogram and Taxonimy for Emotions. *Advances in Social Sciences Research Journal,* 3*(11)* 21-37.

A Cladogram and Taxonomy for Emotions

Lawrence J. Cookson
LJ Cookson Consulting, Warrandyte, Victoria, Australia.

Abstract

A selection of character traits for emotions, desires and attitudes were used to construct a cladogram showing their potential relationships. A cladogram is possible if a theorised interaction desire is used as the original motivation behind these more complex neocortical developments. A distinction is made between desires, natural emotions, caged emotions and attitudes as responses to increasingly intransigent blocks that reduce the level of freedom needed to be wild, and obstruct the naive desire for positive interaction.

Keywords: Interaction; desire; emotion; attitude; parsimony; wildness; feelings

INTRODUCTION

There are a number of influences on the mind that determine behaviour. Most can be captured within the words emotion, desire, reason, cognition, mood and attitude. Are these separate competing influences or variations upon one underlying process? In the constructionist view of emotions, these states are thought to have a common stem. For example, Gross and Barrett (2011) consider that all mental states including emotion, cognition and perception arise from the one process, as they all involve subjective experience, expressive behaviour and physiological responses.

A candidate for the underlying process that sorts and distributes action states in the neocortex is a theorised interaction desire (Cookson, 2015). The mechanism for determining its own level of fulfilment may be based upon the measurement of parsimony (Cookson, 2013), where the performance of a given effort going into the neocortex can be judged according to the number of subcortical pleasure hotspots that were stimulated as feedback in the limbic system. The more subcortical hotspots stimulated from the one effort, then the more parsimonious, linked, skilful and aware must have been the arrangement of pathways available within the neocortex. Parsimony allows an organism to expend less effort for the same outcome (Gavalas, 2014). If the effort was blocked, inhibited or indirect then the number of subcortical hotspots stimulated would be fewer or less intense.

This desire for fulfilling interaction or parsimony has been suggested as the process that underpins our seemingly frivolous interests in art, poetry and religion. Parsimony, or information compression into simple rules, may also inspire our appreciation of music (Cookson, 1999; 2013; Hudson, 2011). While these pursuits can often be followed during periods of calm, an interaction desire must also deal with life-important impediments and difficulties. How a theorised interaction desire based on parsimony might produce and distribute emotions and attitudes during such strain is the subject of this article.

A desire for parsimony suggests that the neocortex is an interpreting organ that looks for a better understanding of the meaning behind events. It may be preoccupied with the immediate problems of how to meet important somatic desires (Cookson, 2015) such as hunger, thirst and

sex. It may also become a moralising organ looking for right and wrong, strongly influenced by ideas. Emotions are influenced by interpretation, and are known to be tightly bound with cognition. We can change the way we feel by changing the way we think (Ochsner et al., 2002). The role of interpretation before the appearance of emotions is also demonstrated by the need to learn context before the full range can establish. They are not present ready-made from birth (Spitz, 1949; Davidson & Irwin, 1999; Widen & Russell, 2003).

Emotions are also tightly bound to feelings. However, to progress an understanding of the role of emotions in the neocortex, it may be necessary to separate the functions of emotions from feelings. Emotions arise in the neocortex (Ochsner et al., 2002; Damasio et al., 2000; Phelps, 2006), while feelings occur in the limbic system (Joseph, 1992; Ploghaus et al., 1999; Burgdorf & Panksepp, 2006). The feelings generated for somatic desires such as hunger, sex and thirst are ancient and occurred in animals prior to the evolution of the neocortex. The feelings generated by outcomes in the neocortex are also thought to register in the limbic system (Cookson, 2013; 2015).

The separation of feeling from emotional interpretation and motivation is supported by the finding that in some people, all emotions produce only two feeling states, happy or sad (pleasure or displeasure, fulfilment or emptiness). Yet other people can experience a different feeling for each of many emotions. This emotional granularity suggests that while we can interpret events into a wide variety of emotions, the underlying differentiation of associated feelings acts on an original core of pleasure and displeasure located in the limbic system (Barrett, 1998; 2004; 2006). Emotions generated in the neocortex may actually be interpretations that then influence our view of happy and sad feelings, so that they instantly refine how we consciously experience those feelings. Knowledge of context is vital before, for example, a displeasured feeling can be further conceptualised into fear rather than anger (Clore & Ortony, 2013). For some, fear and anger simply produce the same empty feeling. The instant association of cause or blame with feeling may be so closely bound, and driven by a need for action, that it becomes difficult to sense that the large variety of emotions may simply be different interpretations that colour the underlying feelings of fulfilment and emptiness.

If feelings feel, then what is the role of emotions? They may be interpretations and motivations that carry an expectation or desire for improved interaction, whether that is through improved parsimony, justice and morality, or attendance to the important somatic survival needs. The emotion then becomes a motivational state that wants to act according to its interpretation, rather than being a feeling state. The intensity of the feeling state can of course dictate the urgency or level of desire behind emotions, but they are still different parts of the interactive equation (Cookson, 2015). Emotions are action readiness stances, called into service when circumstances are not going smoothly (Cole et al., 2004). They are energy intensive and agitated states whose purpose is to resolve block and return the animal to a place of freedom and wildness. 'The function of emotion is to restore the individual to a state of equilibrium' (Plutchik, 2001). Once the 'no more action needed' signal has sounded, there is no more need for emotion (Frijda, 1988).

In developing a cladogram with the interaction desire at its base, it is important to identify the trigger that might generate emotions. Such a trigger could be blocks or obstacles to the original desire for fulfilling interaction. It is easy to see how negative emotions might be stirred by block especially when one is clearly identified and disturbing, such as an enemy or someone's laziness. For positive emotions such as love, the block is often felt as ostracism, social rejection (Blackhart et al., 2009), or a generally unfulfilled state without any clear cause or disturbing

focus against which to act. 'A person is ready to fall in love because of one of a number of reasons, loneliness, sexual need, dissatisfaction, or a need of variety' (Frijda, 1988).

If emotions are triggered by our identification and interpretation of block, then the level of block being faced must also have a major impact on the kind of emotion being constructed. In nature, animals usually live a relatively wild and free state where they can do, or try to do, whatever they want according to their own internal honesty (Cookson, 2011). They can pursue a simple psychology of pain and pleasure. However, while it would be nice to maintain a state of wildness where you can do what you want, in nature wild animals often cannot get their way and if they survive the unpleasant encounter then they may ponder, ruminate or adjust (Kross et al., 2012). Children also start life with a free and natural approach, but then learn to become more circumspect as the reality of our adult restrictions takes hold. 'Between ages 4 and 7, children increasingly recognize that emotional satisfaction is shaped not only by a desire psychology but also by the rules and obligations that restrict people's ability to choose their own behaviours' (Lagattuta, 2005). In the face of block the interaction desire will try something different during its next interactive attempt. One option is to simply leave the difficult environment. Another is to tackle the block by producing emotions that can arouse and focus actions. There is often a chronological order to the appearance of emotions. Those first attempted could be called natural emotions, which have an expectation of being able to resolve block. A mixture of complete wildness (where only desires need be followed) and a proportion of natural emotions is probably the natural state for most vertebrates.

If natural emotions do not succeed then they must bow to the superior forces of those blocks and undergo further change. Such intransigence coupled with survival is probably rare for the wild animal, as it would suggest they are not in their correct niche. The next available option for natural emotions is to convert into those that become mesmerised by block as permanent components in their niche. The animal becomes surrounded by certain fixed blocks, trapping the mind and diluting its expectations and chances for freedom. The resulting emotions could be called caged emotions. They must give up the spirit of the desire for quality interaction and resign to a certain loss and incapability (Rawlins, 1998). The caged emotions would be more secretive, circumspect and manipulative, and probably lack the expressions often linked to 'basic emotions', some of which are called natural emotions in this article. Animal captivity also often produces a range of unusual mental states not found in the wild (Wiepkema & Koolhaas, 1993; Stein et al., 1994; Balcombe, 2006; Preti, 2007).

If the block cannot be resolved by emotions, then it is fruitless to continue using them especially when their implementation can be energy intensive and mentally draining (Turner et al., 2007). When they cannot relieve the stress created by unrelenting block, the next alternative is to convert caged emotion into attitude. Attitudes are relatively stable ideas about the block, whether something is good or bad (Cunningham & Zelazo, 2007). For example, anger at continued frustration on crime can convert emotion into a long-term attitude supportive of capital punishment (Ellsworth & Gross, 1994). Attitudes can present a similar approach to life as emotions but in a less energy intensive and damaging way. A grumpy person can warn people off without having to feel angry all the time. It can become a standard calm response. With attitudes, blocks and problems become accepted parts of the world, no longer being novelties requiring attention and emotion.

Cladograms traditionally use the rules of parsimony to show the evolutionary pathways and relationships taken to produce species (Sober, 1983; Goloboff et al., 2008). They have also been

used in studies on the development and migratory spread of language (Gray et al., 2009). In this article it is hypothesised that the neocortex is influenced by a desire for parsimony; therefore, it should be possible to produce a cladogram for its products including emotions. 'A useful goal in emotion research would be to find a parsimonious way to describe their variations while maintaining what is meaningfully different about them' (Barrett et al., 2007). A cladistic analysis may facilitate such a process. An important step in developing a cladogram is to find an appropriate outgroup (Nixon & Carpenter, 1993), which for emotions could be the desires (e.g. hunger, interaction desire). Desires are the plesiomorphic states, while emotions take block ever more seriously into apomorphic states. In the list of characters given below, the plesiomorphic states are assigned a 0 value, while apomorphic states are 1 or the even more derived 2 or 3 states.

The cladogram presented here attempts to map the emergence of a selection of desires, emotions and attitudes as examples. In theory, it should be possible to construct one tree for all emotions and attitudes. However, it is unlikely to be completed due to the changes wrought by each new personal experience and the involvement of cognition that could bring a new appraisal or interpretation at every step (Kemper, 1987).

METHODS

Characters of Systematic Utility

Physical Inherited Characteristics

Character 0. Inherited organs directly involved in their production, not relying on interpretation by the neocortex. This character separates desires from emotions and attitudes. State 0 = State arises directly from specific somatic organs such as the stomach, gonads, inner ear balance, skin (somatic desires). The interaction desire arises from the neocortex and its production does not rely on interpretation, although its level of fulfilment does. State 1 = All emotions and attitudes begin in the neocortex according to interpretation or appraisal, they are not inherited (basic emotion supporters will disagree here).

Character 1. Neocortex not involved in the direct production of the desire or state. Similar to above but can be used to separate the often older somatic desires from the interaction desire that is theorised to have evolved when the neocortex appeared. State 0 = The somatic desires such as hunger originate from various bodily organs. State 1 = The interaction desire arises directly from the neocortex. State 2 = Emotions and attitudes arise indirectly in the neocortex after neocortical pathways are blocked.

Character 2. Associated directly with a prime expression or action (body or face). Clear expressions or actions may associate with an emotion because they are inherited (basic emotions) or because the way to implement a constructed emotion is learnt consistently under natural conditions. The point is moot in this analysis as either will show which emotions are plesiomorphic. The more artificial the emotion or attitude the more indirect or hidden should be any associated expression used to aid its delivery. State 0 = The presence of an expression/action such as salivating and licking the lips, eating (hunger); an engaged or interested expression similar to that described by Sullivan and Lewis (2003) (interaction desire); crying, whimpering, begging, asking (hope); grunting, vocalisations, talking, gesturing (reason); crooning, glistening eyes, battering eyelids, gentle smile, play (love) (Shaver et al., 1996); stern look, furrowed eyebrows, bare teeth, growl, glare (anger); agitated, fidgety, brash, displacement activity (frustration); shaking, raised eyebrows, stunned wide eyed look (fear). State 1 = If present, the expressions are borrowings or blends. Borrowed expressions include those for violence (from anger), dread (from fear), passion (from love, or expression may be

hidden), opinion (from reason). Blended expressions are for hate (mixture of anger and frustration) and shame (mixture of fear and love, fear that bonded ones will disapprove). Hidden expressions are for hate/contempt and deception. No expression is for belief (praying actions learnt). The attitudes are calmer states, so can easily avoid the use expressions, or they may simply elaborate or blend those already available.

Character 3. Valence, or wanting versus avoiding, seems to be an inherited division that has often been used to help characterise emotions. The wild or natural state should be to want interaction, engage in life. State 0 = Appetitive valence include the desires. While desires may be considered not to have a valence (Ortony & Turner, 1990), they do present to the neocortex with want so are included here. Emotions and attitudes with positive valence include hope, love, reason, opinion, belief, religiosity, obsession. State 1 = The negative or avoiding valence can be assigned to the usual negative emotions such as anger, fear and hate. Shame, and being coy or lying are included here as even though the blocks or standards are not negative, we would like to avoid the sensations. Blushing (embarrassment, shame) is clearly negatively valenced (Leary et al., 1992).

Order of Appearance

There is a definite order of appearance for emotions (Lewis, 1995), and some may or may not occur in other animals (Panksepp, 2011). These orders do not necessarily imply inheritance, but may simply show that certain emotions will always be learnt in a certain order under natural conditions. Only one example is given here, although other ages and species comparisons could be listed.

Character 4. Occurring in infants to around six months of age. State 0 = Common in young infants, such as the desires (excluding sex), and all of the natural emotions considered here except reason. State 1 = Absent in young infants, as they are usually too young to have belief, opinion, passion, dread, hate, deception or attitude.

Approach to Block

Most of the characters used to separate the emotions and attitudes are placed under this category, as it is postulated that all emotions and attitudes arise in response to a blocked interaction desire. Each approach to block could be considered the result of a different appraisal. 'Appraisal theorists assume that the type of emotion elicited by an event can be reliably predicted if one knows how the individual has appraised the event' (Ellsworth & Scherer, 2003).

Character 5. Degree of block intransigence, where block may or may not be at fault. This character summarises the broader divisions previously discussed in their response to block. State 0 = Desires. State 1 = Natural emotions. State 2 = Caged emotions. State 3 = Attitudes. Desires arise irrespective of block as they are bodily or neocortical needs. Natural emotions can resolve block fairly easily. Caged emotions cannot resolve the issues so are trapped. Attitudes accept blocks as part of life, which eases the stress of having to use emotions.

Character 6. Degree of blame that can be levelled at the block. State 0 = block to fulfilment occurred but is not necessarily the fault of the block, so it does not need to be harmed. We can remain bonded to the setting. Block is not disturbing applies to all desires (they simply want), positive emotions and attitudes. Unlike valence, this character focuses on how the block is perceived rather than whether we want more of the associated feeling. Therefore, while

shame, coyness and lying are not emotions/attitudes we want to experience, the block that caused those feelings is not bad or disturbing. Instead, we need to lift our game and become more natural or skilful. State 1 = Disturbing or negative block is managed by the negative emotions (such as anger, frustration, fear, hate) and associated attitudes.

The degree of blame, good or bad, divides quite early so that further refinements can be broadly grouped into positive and negative streams.

Emotional positive streams

Character 7. Act positively to ease block. State 0 = The plesiomorphic state used here is that we should not have to adjust ourselves to get a positive result, because block to wildness does not occur (desires), is easily fixed just ask (hope), or it is too disturbing to act positively so act negatively instead (negative emotions and their attitudes). State 1 = Need to try more positively or helpfully (e.g. love, reason, belief, bias, passion, shame, coy). This character separates hope from the other positive options as hope barely recognises a block as being so serious that it requires lifting effort or altering psyche beyond simply wishing.

Character 8. Act positively using understanding. State 0 = The block does not occur (desires) is easily fixed (hope) is disturbing (negative stream), or may not be moved sufficiently by understanding (love stream) (= e.g. of 'otherwise'). State 1 = Need to tackle the block more positively using understanding (reason, opinion, biased, conceited).

Character 9. Act positively and forcibly promote our understanding. State 0 = Otherwise. State 1 = We have focused positively on block and do understand it, so we should promote our understanding and overrule dissenting views (opinion, biased, conceited). Separates reason from this remaining intellectual stream, as reason is still willing to listen and consider.

Character 10. Act positively to ease block to fulfilment using belief. State 0 = Otherwise. State 1 = Need to focus more positively on block by filling in the blanks and inconsistencies with imagination (belief, fantasy or superstition, religiosity).

Character 11. Act positively to ease block using commitment. State 0 = Otherwise. State 1 = Need to focus more positively by increasing our bonded commitment (love, passion, obsess, hobby).

Character 12. Act positively but are unsure. State 0 = Otherwise. State 1 = Need to focus more positively on block by increasing commitment to others but we are inadequate or have to present a facade (shame, coy, liar).

Emotional negative streams

Character 13. A specific block needs to change, but in a way that will teach or discipline as block is good intentioned like ourselves, just mistaken. Still bonded or inclusive to block. State 0 = The block is within our grasp and not disturbing, we can ease the problem by being positive, or if block is specific and identified and does not want to change we can still engage positively through anger to try and bring the block back into the fold (positive stream, and anger). State 1 = The disturbing block persists and cannot be resolved or changed (fear, frustration, remaining negative streams). This character has the same listings as for character 6, except that it distinguishes anger from the other negative emotions. Anger is a helpful natural emotion distinguished from harmful aggression and the pursuit of violence, as discussed later.

Character 14. Act negatively to the block with aggression and disdain. State 0 = We do not seek to harm the block as we can still be positive or bonded with its setting (positive motivations, and anger), or we would be better off avoiding it (fear) or waiting to sort it out (frustration) rather than harming it. Note that the hunger desire causes death to prey, but this does not arise out of hate or anger. Many cultures treat their prey with respect. State 1 = We seek to harm the block due to its intransigence which makes us have intense dislike or disrespect for the block (hate, violence, grumpy, cruelty, misogyny, racism).

Character 15. Act negatively without any hope that the block could ever become a friend. State 0 = We do not seek to seriously harm the block as we can still be positive or bonded with the block (positive stream, anger and frustration). Frustration is included as while we cannot act now, there is the expectation that resolution can still occur positively at some time, simply be patient. State 1 = The block is disrelated or alien to us, attunement is not possible, we want nothing to do with the block (fear, hate, violence, dread, inaction, and negative attitudes).

Character 16. Act negatively by mentally disengaging. State 0 = We can actively resolve the block. Attunement is still possible where we can come to positive arrangement (positive stream and anger) or we can fix or harm or guard against the block (frustration, violent, grumpy, cruel, hate, misogynist, racist, neurotic, morbid) or we can leave it (fear) (= e.g. of 'otherwise'). State 1 = The block cannot be resolved but persists so we must live with it by withdrawing or turning off (inaction, escape mentally, apathetic).

Character 17. Act negatively but cannot overcome or leave/disengage. State 0 = Otherwise. State 1 = Cannot leave or withdraw from the block, it is ever present and looming (dread, morbid, neurotic).

Character 18. Act negatively but must try to hide your disdain. State 0 = Otherwise. State 1 = We are supposed to tolerate the disliked and frustrating block even though we would like to tackle it, so we must try to hide our dissent unless an opportunity presents (hate, racist, misogynist).

Character 19. Act negatively and harmfully when we can get away with it. State 0 = Otherwise. State 1 = We are supposed to tolerate the disliked and frustrating block but would still like to tackle it and cause harm (violent, grumpy, cruel).

Positive attitudes

Character 20. State 0 = The block does not occur (desires) or could still be fixed using emotions (natural and caged emotions) (= e.g. of 'otherwise'). State 1 = Need to accept the blocks and problems but still act positively by shifting arena of interaction into beliefs (religious, fantasy).

Character 21. State 0 = Otherwise. State 1 = Need to accept the blocks and problems but still act positively by expecting others to accept our superior opinions (conceited, biased).

Character 22. State 0 = Otherwise. State 1 = Need to accept the blocks and problems but still act positively by focussing on our bonded passionate outlets (obsess, hobby).

Character 23. State 0 = Otherwise. State 1 = Need to accept the blocks and problems but still would like to act positively but we are unworthy (coy, liar).

Negative attitudes

Character 24. State 0 = Otherwise. State 1 = Need to accept the blocks and problems but dislike them so act negatively by calmly taking opportunities to harm them (grumpy, cruel).

Character 25. State 0 = Otherwise. State 1 = Need to accept the blocks and problems but dislike them so act negatively by harbouring reasons to belittle them (misogynist, racist).

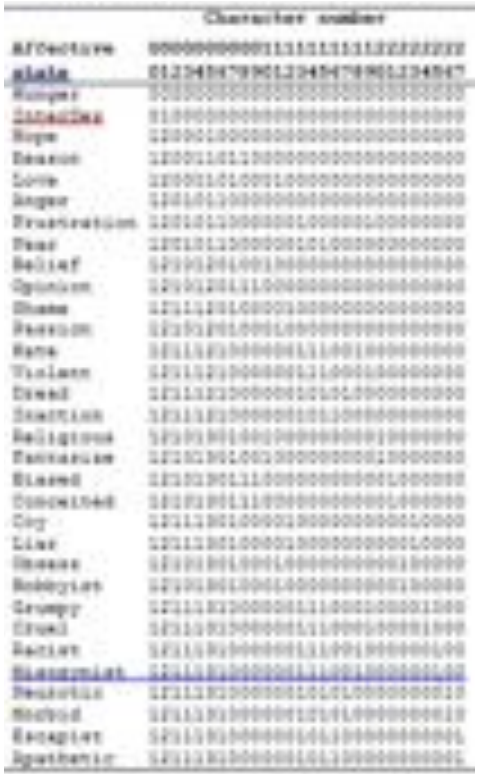
Character 26. State 0 = Otherwise. State 1 = Need to accept the blocks and problems but dislike them so act negatively and fatalistically as they are an ever looming danger (neurotic, morbid).

Character 27. State 0 = Otherwise. State 1 = Need to accept the blocks and problems but dislike them so act negatively by withdrawing or escaping from them mentally (escape, apathy).

Cladogram

A summary of the characters and their assignments are given in Table 1. This dataset was submitted to the TNT (Tree analysis using New Technology) phylogenetic software program based on parsimony, made freely available online through the sponsorship of the Willi Hennig Society (Goloboff et al., 2008). By following the steps for 'basic analysis' (Goloboff et al., 2008), the cladogram shown in Figure 1 was produced.

Table 1: Data matrix for TNT software program, showing assignments under each character number (00 to 27) for affective states.



A variety of emotions and attitudes can be distributed in a cladogram according to how a block is perceived and the level of persistence of that block. The cladogram is but one example arrangement, as different individual experience and therefore appraisal could easily reassemble the order of appearances presented here. A conceptual representation of the cladogram overlaid with varying degrees of block persistence is shown in Figure 2. The

following discussion will further illustrate the ideas behind natural emotions, caged emotions and attitudes, along with reasons for the inclusion of moods within the background of the tree (Figure 2).

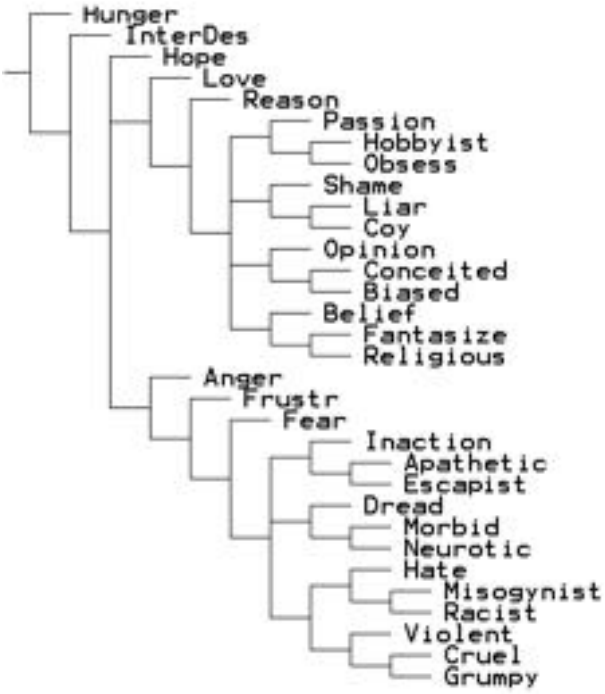


Figure 1: Cladogram for emotions

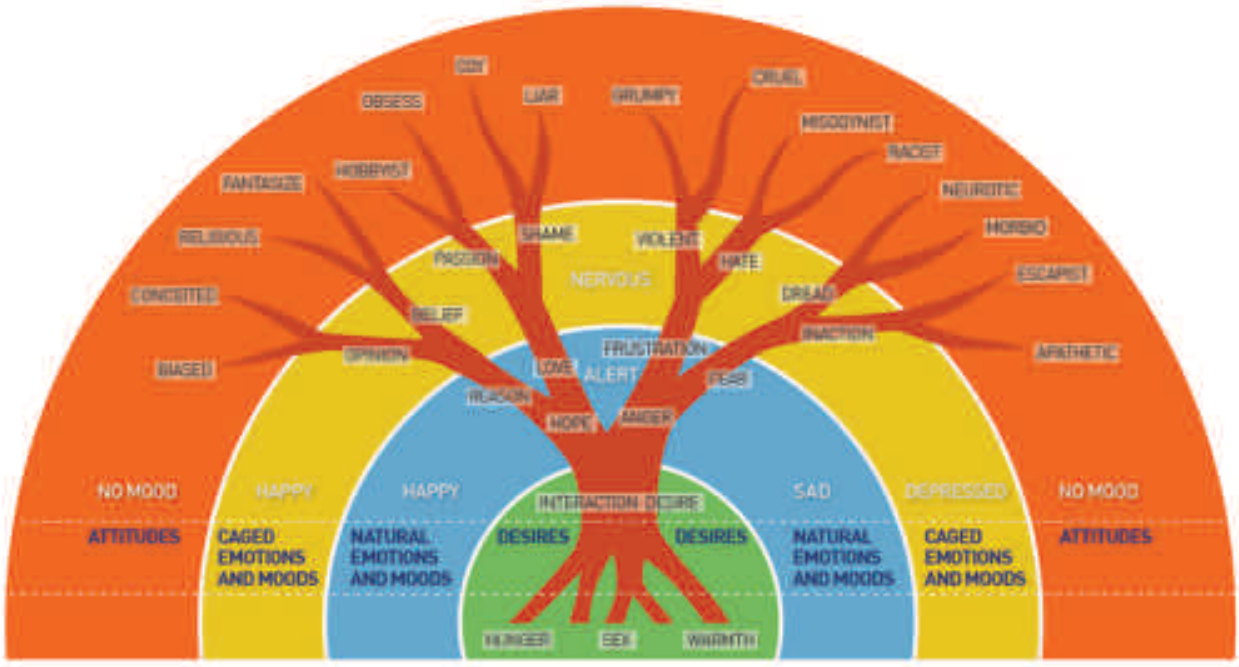


Figure 2: Concept diagram for the construction of emotions and attitudes.

RESULTS AND DISCUSSION

Natural Emotions, Resolvable Block

The interaction desire is placed as the starting point for neocortical processing, and whether it will be influenced by more ancient somatic desires such as hunger will depend on their degree of satiation (Cookson, 2015). When the desire for fulfilling interaction cannot be met, hope seems to be the first emotion into which the interaction desire will convert. It is the simplest and most inoffensive emotion, and carries most purely the original intention of the interaction desire. It is like a wish or plea to higher forces for better interaction (Lazarus & Hope, 1999; Scioli et al., 2011), and can be seen in other animals when they beg or whimper for help. This naive emotion is strong in children, and may be encouraged by providing institutions such as Father Christmas. All the child must do is hope, make a wish, and it might come true. In dogs it can be begging, where the dog just sits before someone who is eating, hoping that a scrap may be thrown its way. Due to its naivety, the reliance on hope usually subsides in the adult world.

When hope does not work and fulfilment remains difficult, a more targeted emotion will arise, most often love if a companion is available that will accept bonding. In this form, the emotion can seek and promise greater commitment to the companion and enlist their aid in meeting desires. Love here is meant as an emotional form of bonding, a recruiting emotion. Love can soon change to a close bonding where emotional intensity subsides. The clearest example of this distinction in adults is when surges of the heady and preoccupying emotion of love brings a couple together, but then subsides and is replaced by respect, intimacy and commitment (Shaver et al., 1996; Murray et al., 1996; Milivojević & Ivezić, 2004; Ahmetoglu et al., 2010). The former is the emotion and the latter attunement or bonding.

When hope and love does not work, then the block may be specific and dangerous rather than representing a lack of attention to needs. A concept that the block is being intentional, preventable or unjustified seems to require a theory of mind that another is deliberately obstructive (Javela et al., 2008). The next emotion to use may directly target this block as anger. If the block retaliates and cannot be beaten, then emotion may become fearful or worried. Frustration is also placed within the natural rather than caged emotional arena as while it arises for persistent block, there is still an expectation or agitation to resolve fully, it is just a matter of time. In the wild frustration occurs naturally and can be relieved through various displacement activities (Duncan & Wood-Gush, 1972; Kortmulder, 1998).

Reason has also been placed in the cladogram as a variation of emotion. Like other emotions, reason is an interpretation that appears in response to block, which it tries to resolve through improved understanding. It may approach the block from various directions, perhaps logically or laterally (De Bono, 1967). In a social and complex setting it is one of our most successful emotions so is exalted above all others and usually not considered an emotion. Reason as emotion is not obvious because unlike many others it can delay its association with feeling because it expects its own strength (of reason) will carry the day. If it fails and the person is mature, it may reassess and look for other reasons so remain harmless. However, reason can also quickly decide to use other emotions and take the most drastic of actions. Reason feels a sense of justice, and it can also feed strong feelings of injustice.

Others have noted that emotion is an aspect of cognition or that there are indistinct boundaries between them (Barrett et al., 2007; Parrott & Schulkin, 1993). Cognition may not be separable from emotion (Smaldino & Schank, 2012). In this taxonomy, reason is considered different to thinking even though both are forms of cognition. An unencumbered interaction desire (that has not converted into emotion) can still travel and meander through the pathways of its

neocortex, and then it is called thinking. Thinking explores and considers, is curious, and arises from the engaged or interested approach of the interaction desire, as it searches for things with which to interact. Indeed, any thought is a desiring attempt at interaction. 'Interest is no more an emotion than thinking' (Ortony & Turner, 1990), but it is a sign that there is desire in the neocortex. Thinking is exploratory arising from desire, while reason is an emotion targeting block. The psychological construction model considers that the ingredients causing emotions also cause cognitions (Gendron & Barrett, 2009).

Caged Emotions, Overwhelming Block

When caged by superior blocks, the range of positive actions available becomes limited. The blocks become fixed like the bars of a cage. Boldness and bravery could be attempted against all the odds, to try and remove the block, while holding true to the desire or spirit that tries to return the animal to freedom. Alternatively, the limitation felt may turn desire into a restricted stream of passion that accepts that there must be fewer outlets (Belk et al., 2003), to become an emotion that must be hidden or careful. But more often, weaker emotions with reduced spirit and respect must be used, such as hate, jealousy and contempt (Brewer, 1999; Rozin et al., 1999; Harmon-Jones et al., 2009). Fear may not be able to escape block so turn into a more pervasive dread (Berns et al., 2006). The caged emotion must be more devious and concealed (hate, deception), focused (passion), illusory (belief), change the environment of block using opinion, or submit to being overpowered (inaction, cowering). Inaction can hide from the overwhelming block, or become subservient. Caged emotions often fantasise and plot for opportunities in vengeance and cruelty, and are often risky, desperate and violent. Outlets that seek mental escape will be common (Sadava et al., 1978). Unlike desires and natural emotions, caged emotions are indirect. Therefore, they will often lack expressions or more obviously borrow from the range available in natural emotions.

Caged emotions should take longer to develop than natural emotions so occur more often in teens and adults than in children. The social emotions could also be placed within this category. A young child has no embarrassment or shame (Darwin, 1965), and self conscious emotions begin to emerge during age 2-3 (Lewis, 2000; Davidson, 2006). By learning social expectations certain constraints or cages become reference points that we agree should be upheld. Some natural desires must be suppressed to meet social expectations and consensus. An element of phoniness or pretence must be introduced, and then, discovery and scrutiny of inadequacy in upholding these standards may lead to embarrassment, shame, lying and guilt. Self-conscious emotions tend not to have universally recognized facial expressions (Davidson, 2006).

Caged emotions should also be relatively rare in wild animals, though they might be more common in social animals or during captivity. Hate is probably rare or brief in wild animals as they can use other emotions to resolve the issue quickly or simply leave the difficult environment. What we interpret as cruelty sometimes occurs in the wild, but more accurately they are examples of hunting skills being honed (thereby reducing clumsiness during future predations) (Kitowski, 2005; Thornton & Raihani, 2010), rather than acts of vengeance or punishment for persistent unfairness (De Quervain et al., 2004; Singer et al., 2006). Similarly, aggression and violence causing unnecessary harm (as opposed to 'violence' caused by hunger) is rarer in the wild than supposed, and there are many postures and displays designed to reduce harm between species members (Lorenz, 1966). Anger can be distinguished from aggression/violence, as the former seeks compliance while the latter has given up on the block. It seeks harm (aggression) or serious harm (violence) (Anderson & Huesmann, 2003; Parrott &

Giancola, 2007). The natural usage of anger in a bonded setting is to teach or adjust rather than commit violence, and is initially applied as a positive emotion. Anger has been associated with prosocial actions that seek to raise moral codes or reduce unfair situations (Javela et al., 2008). The block (usually a naughty offspring or group member) is not to be killed or seriously harmed, but simply needs to be bought back into line. Reconciliation is possible afterwards (De Waal, 2000). In comparison, aggression and violence are born out of longer term unresolved frustrations (Harrington, 2006; Walker & Bright, 2009) that stimulate elimination.

Belief is another emotion arising in the cage or under adverse conditions. Beliefs can help us to cope emotionally with difficult conditions and stress (Sharp, 2010; Harris et al., 2013), find greater meaning or belonging (Freeman et al., 2002; Gebauer & Maio, 2012), meet desired outcomes rather than reality (Mele, 1998; Bastardi et al., 2011), and for narcissists it helps maintain a sense of superiority while reducing empathy for others (Crocker & Park, 2004; Judge et al., 2006; De Zavala et al., 2009; Cooper & Pullig, 2013). Belief is made possible by our ability to fabricate and imagine new 'realities' in the neocortex and enforce their compliance in the environment due to our technological advances, a feat not open to the wild animal that must deal with reality directly. Through belief, a person can redraw their circle of interaction and involvement to select for favourable portions that suit their belief or delusion (Sharp, 2010; Chadwick & Lowe, 1990; Eisen et al., 1998). There is no direct evolved expression for belief, although it can borrow from the expressions of hope and contentment. Similar to belief is opinion, ideas that are emotionally protected from objective judgement.

Attitudes, Incorporated Block

As people experience complexities in our imperfect societies, certain realities about the intransigence and durability of a raft of blocks hit home. The continued use of natural and caged emotions can become mentally harmful and draining, which can be alleviated through the development of a range of attitudes. As used here, attitudes refer to settled methods for handling right or wrong, while personalities include attitudes but also other methods learnt since birth and womb when block was not necessarily being experienced. With attitudes, blocks and problems become accepted parts of the world. They become incorporated into our memories and neural pathways so that they no longer become novelties requiring attention and emotion. Williams (2007) provides a suitable example of the processes involved in response to continual ostracism, where the final response involves acceptance of social exclusion and learned alienation when an individual's resources for fighting the position become depleted. There are many other attitudes available so that one can become apathetic, conceited, prejudiced, jaundiced, or unhelpful.

Attitudes are different to emotions, being relatively enduring beliefs and predispositions (Scherer, 2005). However, attitudes may still be a derived form of emotion because they exist to handle block. The underlying problems have not gone away, and life does not feel as fulfilling as imagined possible.

MOODS

An arrangement for moods has also been provided in Figure 2. They are listed in the background medium of the figure rather than on the branches themselves. Moods influence the consistency and fluidity of the neural substrate in the neocortex through which the tree of emotions must grow. They vary according to the type, balance and quantity of the various neurotransmitters that control the excitability of cortical neurons (Gu, 2002; Ruhé et al., 2007).

A pleasant feeling can produce a happy even excited mood, with a range such as serene, happy, buoyant, cheerful, excited, bubbly and elated. A positive mood will encourage neocortical usage, allowing desire or emotion to travel quickly along its pathways as more pleasure can be expected. An unpleasant feeling may inhibit usage of the neocortex through moods of sadness (sad, despondent, gloomy) that reduce the supply of desire into the neocortex while also making its pathways slower to transverse. If the problems continue, the mood may sink further into depression, which is probably the most disengaged mood experienced. Similarly, a neocortex that is regularly overwhelmed, surprised or uncertain can produce an anxious or stressed mood, one that anticipates surprises but does not know in what form. This mood can make a person more alert, fidgety, nervous, anxious, or listless.

The default mood for a wild animal is probably to have no mood other than its positive expectation for interaction, as being in mood suggests an unsettled state. During unsettling or unfulfilling times, the success or failure of emotions should generate moods that enhance or restrict the continuing usage of those emotions. When attitudes develop, results are more likely to follow expectations so the presence of blocks no longer produces extreme moods or feelings of discomfort, blocks are accepted. By coming to terms with events, homeostasis or a state of 'no mood' is likely to return.

CONCLUSION

An interaction desire that judges the quality of the pathways organised in the neocortex according to parsimony is presented as a possible contender for the motivation behind emotions, attitudes, cognition and personalities. Unencumbered, the interaction desire can pursue calm curiosities and esoteric interests such as art, music and thinking. When restricted by block it can become emotional, with intensities and forms determined by perceptions and appraisals about the intransigence and properties of the blocks being faced. If overwhelmed the desire may convert into attitudes that accept or anticipate the restrictions. Resolving block should improve naturalness and freedom. If interactive quality can be sorted to the highest level, a constructive level of wildness should appear.

ACKNOWLEDGEMENT

I would like to thank my son Daniel for the artwork in Figure 2.

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