FEAR AND FITNESS REVISITED

Leif Edward Ottesen Kennair*

Department of Psychology, Norwegian University of Science and Technology,
Trondheim, Norway

Abstract. Fears of specific and real dangers are adaptations. Hypophobia, a lack of adaptive aversive emotions in dangerous situations, is often maladaptive. Anxiety disorders also appear maladaptive, and many ethological suggestions about adaptive function are unconvincing from a clinical perspective. Modern and effective treatment (Cognitive Behavioural Therapy) is based on changing disorder specific cognitive and metacognitive processes. Earlier thinking on the adaptive function of different types of anxiety and the downplaying of the specificity of different anxiety disorders is challenged. A combination of the cognitive sciences Evolutionary Psychology and Cognitive Behavioural Therapy might be fruitful. Evolutionary Psychology may provide Cognitive Behavioural Therapy with a better understanding of the function of the mental mechanisms involved, while Cognitive Behavioural Therapy may provide Evolutionary Psychology with a better understanding of the proximate mechanisms of specific mental disorders.

Keywords: anxiety disorders, cognitive behavioural therapy, evolutionary psychology, psychopathology, psychotherapy

In the meantime, more knowledge about the adaptive significance of anxiety and its subtypes, and the normal mechanisms that regulate them, will help us make even more rapid progress in understanding and treating anxiety disorders.

Marks and Nesse, 1994, p. 259

* Address for correspondence: Department of Psychology, Norwegian University of Science and Technology, N-7491 Trondheim, Norway: Phone: +47 73591956, E-mail: kennair@ntnu.no.

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INTRODUCTION

Ever since Darwin fear has been the prime example of an emotion that has an obvious adapted value. Fear of specific dangers makes us avoid them, or, through the general fight-or-flight system, helps us defend ourselves. Hypophobia (MARKS and NESSE 1994) is a fear disorder, causing a lack of adapted aversive emotions in dangerous situations. Hypophobia is therefore most often non-adaptive – but in some cases such as when saving loved ones, following HAMILTON’S (1964a, b) logic of kin selection, or engaging in warfare, following TOOBY and COSMIDES’ (1988) logic of the cognitive processes of war, a lowered fear of the real danger might be adaptive.

Contrary to the logic of fear, anxiety disorders are disorders in which fear-like emotions are elicited in the absence of an objective present danger. Most attempts at defending against no danger will be an excessive expenditure of energy, and therefore non-adaptive. Even the smoke detector principle (NESSE 2001) cannot account for the behaviours and cognitions involved in many anxiety disorders (e.g. panic disorder; there is no threat in any case and the behaviour initiated to protect oneself would not work even if there were a threat, so there is no “better-safe-than-sorry logic” to panic disorder).

Many evolutionary models of mental states and behaviours traditionally considered maladaptive have, none the less, sought to understand them as adaptations. Illustrative examples such as depression (e.g. HAGEN 2002; NESSE 2000; SLOMAN and GILBERT 2000; WATSON and ANDREWS 2002; see KENNAIR 2003b) or even suicide (e.g. ANDREWS 2006; BROWN et al. 1999; de CATANZARO 1995; KENNAIR 2003a) have been offered. And although there is a certain controversy about the status of these theories, it would seem that what we previously found non-adaptive (especially from an evolutionary perspective) has been suggested as adaptive in specific contexts. For example, NESSE (2005) claims that anxiety disorders might primarily be non-adaptive (see also MARKS and NESSE 1994; NESSE 1998; MYSTERUD 2003), however, the proximate mechanisms underlying anxiety could themselves be adaptations. Thus, the evolved proximate mechanisms delivering anxiety behaviour are simply ‘misbehaving’ in anxiety disorders. If this is the case, then it potentially opens anxiety disorders to Cognitive Behavioural Therapy interventions that are directed by an understanding of the evolved function of those underlying proximate mechanisms.

MARKS and NESSE (1994) provided in their article “Fear and Fitness” a classic introduction to the evolutionary approach to anxiety disorders, but also to psychopathology in general (see BARON-COHEN 1997). Isaac Marks is one of the pioneers of behaviour treatment (exposure and habituation) of anxiety disorders. But the behavioural approach has significant limitations. Today agoraphobia and simple phobias will probably be adequately treated with exposure therapy, but several of the anxiety disorders need more specific treatments, and these methods focus on disorder specific cognitive processing.
Ethological and behavioural approaches are limited when the maintaining processes are primarily cognitive. The cognitive approach to treat specific anxiety disorders through mapping and changing disorder specific cognition will to a larger degree be an answer to the call for future research in the opening quote.

Unfortunately, an evolutionary perspective does not generally inform current Cognitive Behavioural Therapy. There are obvious exceptions (Gilbert 2004), and it is worth noting that Beck, the founder of this approach, is explicitly positive to an evolutionary foundation for cognitive therapy (Alford and Beck 1997). But none of the major models, techniques or theories are explicit about how to implement an evolutionary analysis (although see Gilbert and Procter 2006).

This article will discuss whether Marks and Nesse (1994) were correct that many anxiety disorders arise from the malfunction of processes inherent in adaptive fear and apprehension, by considering recent developments in our understanding of anxiety. Are the specific subtypes of anxiety disorders best thought of as an expression of the modularity of evolved mental mechanisms or are they due to variations of the same general process? And may clinical approaches to the study of the treatment of anxiety disorders and specific proximate mechanisms benefit from a modular adaptive perspective?

Standing on the shoulders of Marks and Nesse (1994), but also from the vantage point of modern Cognitive Behavioural Therapy, one may reconsider several of the currently promoted ideas about anxiety – concerning both understanding and treatment.

**SPECIFIC DISORDERS, SPECIFIC TREATMENTS**

Marks and Nesse (1994) make two important points that, from a cognitive perspective on therapy, are contradictory. One is that specific, non-overlapping anxiety disorders are unlikely. Second, that many of our cognitive biases and processes are modular. If there are specific modules, and these cause specific processing of specific information in specific contexts, then one would expect specific disorders. Disorders could be a consequence of a possible mismatch between the Environment of Evolutionary Adaptedness and the current environment or due to a dysregulation or malfunction of specific evolved mechanisms (Kenna 2003b, 2004).

Anxiety disorders are the most treatable kind of mental disorders. This success can be attributed to the work of pioneers within the empirically supported treatment of mental disorders as well as to the use of exposure and behavioural principles of treatment. To a large degree Marks is part of this tradition in which one considers the learning processes to be general and the treatment of exposure to be the treatment of choice for all disorders. However, it is also the case that research on specific cognitions by researchers such as Clark, Salkovskis and Wells, has greatly improved our understanding and treatment of these disorders. Many believe this approach is successful due to its specification of the different attentional and cognitive processes involved in each specific disorder. Compared to behavioural therapy,
where exposure and relaxation is common across all treatments, modern Cognitive Behavioural Therapy provides specific models for specific disorders.

Cognitive Behavioural Therapy is today treatment of choice for anxiety disorders. For social phobia the most promising treatment is Clark and Wells’ (1995) cognitive therapy. For Generalised Anxiety Disorder Borkovec’s Cognitive Behavioural Therapy is the best documented therapy (Newman and Borkovec 1995), although the metacognitive approach by Wells (1997) has in an initial trial proven to have a much higher efficacy (Fisher 2006). For panic disorder Clark et al.’s (1999) cognitive therapy is the most efficient approach to treatment. These assertions are based on recent research development, but see Norton and Price (2007) for a meta-analysis, with somewhat different results – some of which may be due to the meta-analysis methodology.

Cognitive Behavioural Therapy is presumed to work by combining exposure and attentional processes and changing disorder specific cognitive processes. For each of the three disorders above there are specific information processing mechanisms that seem to be context dependent (Wells 1997). Today there is no single Cognitive Behavioural Therapy, but several different approaches to the treatment of anxiety disorders. To a large degree Cognitive Behavioural Therapy as a treatment approach has become more focused on designing treatments for the different diagnostic categories of the DSM system. The anxiety disorders chapters are among the best specified disorders, and the success of Cognitive Behavioural Therapy in treating these disorders (compared with e.g. depression and personality disorders) might in part be due to the specificity of the phenotypes of this category of disorder.

This is congruent with the modular cognitive architecture suggested by Evolutionary Psychology (Cosmides and Tooby 1995; Kennair 2002, 2004). There is reason to believe that an Evolutionary Psychology of anxiety disorders could benefit from the in-depth study of phenotypes and proximate mechanisms within evidence based approaches to clinical psychology and psychiatry. The improved efficacy with anxiety disorders that has been documented the last decades, is probably due to the more specific diagnoses described in the diagnostic manuals (American Psychiatric Association 1994). But also due to an improved specification of phenotypes; i.e. the proximate mental mechanisms involved in the attention and information processing specific to these different disorders (e.g. Wells 1997).

Simple Phobias are effectively treated with exposure therapy, although cognitive interventions may improve treatment, this is usually not necessary. It is worth noting, however, that a spider phobia and a blood phobia both treated with exposure, require two very specific approaches. With the spider phobia the patient merely needs to hold the spider in her hand until she notices the natural reduction of anxiety due to a lack of an actual threat or pain. Blood phobia induces, unlike all the other anxiety disorders, a sudden loss of blood pressure – causing the patients to faint (Marks 1988). In blood phobia the patient needs to attempt to raise blood pressure during exposure, to avoid fainting – and to then habituate to the blood stimuli. Blood phobia is therefore treated with additional anti-relaxation techniques.
as well as exposure. The fact that there are two different anxiety syndromes suggests that maybe there are other specific anxiety types. While in both kinds of treatment the patient has to discover that the situation may be mastered, there will be different evolved cognitive mechanisms involved in the perception and cognitive processing of different kinds of phobic stimuli. These will include specific, modular perceptual mechanisms that interpret ecological signals (blood or spiders; dark or heights; large animals or contaminators), which cause specific adaptive physiological responses to stimuli that were dangerous in the Environment of Evolutionary Adaptedness.

Panic Disorder presents different issues and there appears to be no adaptive function. Learning to fear places where you experience panic or other aversive emotions, as in agoraphobia, may not be functional – because of the misattribution of panic to location – but the learning process itself is probably a very useful adaptation: the ability to be conditioned to avoid aversive experiences. To this end, panic disorder is described within evolutionary psychopathology as a mechanism for escaping danger (NESSE 1987, 1998). From the classical Greek descriptions of warfare and panic that causes the soldier to flee the battlefield one may see how acute fear of a real danger might cause extreme aversive emotional states. But panic disorder is not a disorder that usually strikes people in real danger. These patients are usually caught in a positive feedback process involving harmless symptoms of anxiety; which increases the anxiety dramatically.

Within Cognitive Behavioural Therapy panic is treated by changing beliefs about symptoms as signs of somatic or mental catastrophe (CLARK et al. 1999; WELLS 1997). The harmless anxiety symptoms are believed to be signs of a) heart attack, b) fainting, c) choking or d) going mad. Lying down, so as to not have a heart attack when one does not have a heart condition, or to not faint when one cannot faint due to anxiety (except blood phobia), are not adaptive and do not help escape danger. The problem is that the patient misattributes the safety behaviour (lying down, getting medical attention, holding onto something, breathing consciously, opening ones tie, concentrating so as to not go mad), as the reason for the catastrophe does not occur. In reality there was no imminent catastrophe, thus the safety behaviour is merely a waste of energy. These misattributions maintain the problem.

When did we evolve the capacity to consider somatic symptoms to be signs of death, fainting or going mad? And is this really an evolved response, or is panic disorder caused by culturally transmitted beliefs that trigger fear symptoms in response to other fear symptoms thus causing a positive feedback? It would seem that the latter is the more likely explanation given current Cognitive Behavioural Therapy models and evidence of treatment effect. Redirection of what these symptoms mean seems to cause swift and clinically significant improvement.

HOFMANN et al. (2004) provide one of few attempts at integrating evolutionary psychology and a cognitive therapy approach to anxiety. Typically this contribution also ends up considering social phobia in detail, with little comment on the other disorders. Social phobia is suggested to be an intraspecific communicative behav-
Social Phobia is usually maintained by the patient’s exaggerated internal model of what anxiety/submission signals he or she displays in social contexts. This model is created from introspections of different anxiety symptoms (i.e. the perception of internal states – using the feeling of being flushed to assess degree of blushing or redness or the feeling of being warm to assess the amount of visible perspiration). These symptoms are usually not perceived by others as clearly or negatively as the patient fears. Neither does the patient perceive these symptoms as negatively when provided with feedback, as when merely depending on introspection. Anxiety is alleviated when beliefs based on these introspections are changed by viewing objective feedback – i.e. observing on video how red one really is rather than how red one feels (Clark and Wells 1995; Wells 1997).

The social anxiety does not seem to guard the patient against losing social status or being subject to ridicule, rather the patient believes he or she is the victim of such and acts as if it were already true. Social phobics do not achieve status to be lost, and this is due to their social phobia.

There is reason to believe that some amount of ability to regulate oneself in social situations is necessary. Alcohol and anxiolytic medication will often result in maladaptive social hypophobia. But the processes involved in normal social restraint are not usually a result of typical social phobic cognition.

Social phobics are not just shy of attracting extra attention to themselves – as most people are in social situations – they obsess about how they present to others in situations that would not trigger social shyness in non-social phobics. Also the processes they engage in to assess how they present socially is not something most people engage in – introspection, socially anxious rumination, and attempts to control involuntary submission displays.

Also, extraversion is behaviour that may increase and defend status; while introversion, as in social phobia, is a strategy for avoiding acquiring status. Social phobics receive less education and fewer promotions, they are less likely to marry and if they do they do so later than average. Their anxiety is usually elicited by social situations with acquaintances. Social phobia would have been a fitness reducing condition in the relevant evolutionary past, if the clan group was perceived as e.g. classmates are perceived by social phobics today. Social phobics react with anxiety to classmates, but not to immediate family or close friends.

This calls for an evolutionary analysis of the cognition involved. Is there something about society today that develops or elicits social phobic cognition (mismatch theory, see e.g. Nesse and Williams 1995)? Would social phobia develop in the ancestral environments? Are there anthropological reports of social phobia? One has the description of agoraphobia in Ancient Greece. Another aspect that has received little attention is the focus on unwanted blushing among Cauca-

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sian patients – something that probably is rather recent from an evolutionary perspective.

Social phobia is the anxiety disorder that has been given most attention from both a Cognitive Therapy and evolutionary perspective (Gilbert 2001; Gilbert et al. 1995; Gilbert and Trower 2001; Hofmann et al. 2004). This is probably due to social phobia’s obvious social hierarchical nature. Leary and Buckley (2000) suggest that social phobia involves worry cognition about social presentation, primarily when this may lead to social devaluation. It is important to note that the introceptive image socially anxious patients construct of themselves, and the social presentation that they thus wish to avoid making, is based on the physiological and psychological anxiety symptoms that they are experiencing.

Leary and Buckley (2000) conceptualise social anxiety as the “emotional output of an early warning system that is designed to detect potential relational devaluation well in advance of actual rejection so that the individual may take steps to protect relationships that may be in jeopardy”. But it is the anxiety itself that seems to suggest to the patient that there may be something negative about his or her social presentation. It is the introception of anxiety symptoms that is the patient’s evidence that there might be something strange and undesirable about one’s appearance (Clark and Wells; Wells 1997). Thus one has a situation where patients would be satisfied if their anxiety was not visible to others.

Also, one needs to explain why showing signs of anxiety should result in social devaluation. Normal social anxiety keeps us from making fools of ourselves and keeps us from jeopardising our relationships. Social phobia makes patients act strange in an attempt to cover up the fact that they are anxious (Wells 1997). Normal fear of acting in ways that might harm social relations might therefore provide us with early warning and regulate us functionally. On the other hand, social phobics seem to have exaggerated negative beliefs about the consequences of being perceived by others as anxious.

The idea that social anxiety in general involves a protective mechanism to avoid ostracism is parallel to Nesse’s (1998) suggestion that social anxiety processes may protect current status and reputation. Clinically it would seem that it is the fear of such ostracism that lies behind the patients social withdrawal; thus the defensive strategy becomes the real problem rather than the solution.

Blushing will usually be both a sign of anxiety that the patient would like not to show due to fear of social devaluation, as well as an involuntary submission (Gilbert et al. 2005; Sloman and Gilbert 2000) and shame response (Gilbert 2000; Gilbert and Miles 2000). Despite blushers not wanting to blush, people tend to be more forgiving of people who blush when embarrassing themselves in a social situation. Blushing thereby reduces social aggression. It may therefore be room for several analyses of social anxiety – both Gilbert’s involuntary submission perspective and Leary’s social devaluation approach may provide relevant pieces of the puzzle. Social aggression would include both violent attacks by dominants, loss of alliances, loss of status and ultimately ostracism. Several perspectives on differ-
ent aspects of social devaluation and submission and the evolved cognitive and emotional responses to socially threatening or worrisome situations do not appear exclusive, but may be combined to provide broader understanding of why so many people fear social attention. Not least since social attention is linked to status and ultimately increased fitness.

I concur with HOFMANN et al. (2004) that the evolutionary approach to both cognitive therapy and anxiety disorders provides new and interesting insights. Paul Gilbert’s work on social phobia might be one of the best examples. There are, however, still many unresolved questions within this field. Such as: why do social phobics rate themselves lower than their peers on e.g. “social attention holding power” (Gilbert 2001)? Social phobics do not usually have poorer social skills when they are not anxious.

Generalised Anxiety Disorder is a disorder defined by excessive worry that is perceived as uncontrollable. Rather than being a general anxiety – i.e. anxiety for several different situations – it is a rather specific worry disorder. The disorder does not consist merely of worry about different areas of life, but also worry about the worry itself. Metacognitive processes such as worry about worry and positive beliefs about worry are considered major parts of the disorder (DUGAS and KOERNER 2006; ROBICHAUD and DUGAS 2006; WELLS 1997, 2000).

Worry consists of negative expectations about future events or consequences of events, which creates emotional distress and anxiety. The cognitive processes are verbal-conceptual (BORKOVEC and INZ 1990; BORKOVEC et al. 1998) problem solving attempts (BORKOVEC et al. 1983) that also act as cognitive avoidance strategies and prevent emotional processing (BORKOVEC et al. 1998). Worry seems to be a typical human reaction to future events that we cannot control.

Some people use worry as a coping strategy. They believe that worry is a way to show that they care (WELLS 1997; ROBICHAUD and DUGAS 2006). Yet others believe that worry may change future events. This is similar to the metacognition thought–event fusion in Obsessive Compulsive Disorder (WELLS 1997).

Worry is, as the cheater detection mechanism (COSMIDES 1989), an anti-confirmation bias process. The patient generates images or plans for negative outcomes of variable likelihood – and most often very unlikely negative consequences and scenarios. They seem to believe that this makes them more responsible or prepared (DUGAS and KOERNER 2005; WELLS 1997) – and thus better able to tolerate uncertainty (ROBICHAUD and DUGAS 2006). But in truth this kind of planning behaviour is pointless, as few predicted scenarios actually come true and if the worst one could imagine, despite being extremely improbable, actually came true – it is questionable that one would really be better prepared. But in addition the perceived lack of control, as defined as part of the syndrome by the DSM-IV diagnostic system (American Psychiatric Association 1994), often causes meta-worry about going mad or becoming physically ill due to the worry (WELLS 1997).

The worry is often chronic if not treated (FISHER and DURHAM 1999). There might be normal adaptive “worry”, but pathological worry that reduces function
needs explaining. If the ability to consider different negative outcomes is adaptive, why would some people start worrying chronically? And why would people in general worry about worrying if it really was adaptive? Patients usually believe it is adaptive. This belief actually maintains the disorder (ROBICHAUD and DUGAS 2006; WELLS 1997).

UNANSWERED QUESTIONS ABOUT THE ANXIETY DISORDERS

There are several unanswered questions concerning most of the anxiety disorders. One is a question of nosology – the general literature on anxiety is continuously working on the categorisation of these disorders (e.g. NORTON and PRICE 2007; WATSON 2005). The different Cognitive Behavioural models would suggest that there are specific subtypes and different cognitive mechanisms involved in the specific disorders. Here research on the genetics of different anxiety disorders is important, too, but still not able to conclusively answer any of our most pressing questions (e.g. KENDLER 2004; OZAKI et al. 2003; COLLIER 2002).

Another question concerns aetiology – or the acquisition of anxiety disorders. RACHMAN’S (1977) model of acquisition and Mineka and ÖHMAN’S (2002) work on the aetiology of anxiety has been challenged by the longitudinal studies by POULTON and MENZIES (2002). Even the simple phobias – a class of disorders that were believed to be acquired through conditioning – no longer have a clear aetiology (KENDLER et al. 2002).

It is too early to differentiate between anxiety disorders based on their aetiology. It is neither currently possible to differentiate between those that are due to dysregulation of mental mechanisms (either due to physiology/brain chemistry or due to mental processing) or due to other pathways, including specific fear acquisition adaptations. Our general knowledge of anxiety disorders is limited. Maybe this in part is due to a lot of analyses being performed mainly at the general level rather than asking what is specific to the information processing in each specific disorder, or what mental modules might be involved in each specific disorder.

As I have suggested, this is exactly where an evolutionary approach may be most helpful. One may attempt to start mapping specific behaviours and cognitions from a modular and functional perspective. Taking the position that there may be specific rather than general routes to disposition, acquisition, maintenance, treatment, and prophylaxis, one might be able to sidestep some of the problems that the generalised or universal approaches have struggled with. It would seem that most fears are caused by evolutionary relevant stimuli and situations. Since these situations differ greatly from each other one would expect specific evolved mental mechanisms to be involved in all of these fears. Specific anxiety disorders may therefore be due to specific dysregulations or malfunction of specific mental mechanisms (see also BARON-COHEN 1997).
CONCLUSIONS

Many claims of adaptive function of anxiety disorders do not fit the clinical understanding of these disorders – or observations of the maintaining cognitive processes. This is in no way an objection to understanding anxiety disorders as caused and maintained by specific evolved mechanisms. The fact that many of the information processes involved to some extent appear disorder specific would suggest that there are specific evolved mental mechanisms involved. Whether these are functioning normally or are malfunctioning (either due to environment mismatch or due to genetic fault) is an important question to solve – and is the heart of evolutionary psychopathology (KENNAIR 2003b). It is also important to consider the normal function of the mechanisms involved, and consider whether there indeed are adaptive sides to these specific forms of information processing.

The opening Marks and Nesse quote suggests that there are normal mechanisms that regulate anxiety disorders. The specific cognition involved in specific subtypes seems to indicate the modular cognitive architecture MARKS and NESSE (1994) describe, which is typical of both Evolutionary Psychology and modern cognitive neuroscience (GAZZANIGA 2000). It would also seem that this is congruent with modern Cognitive Behavioural Therapy for anxiety disorders (WELLS 1997). Whether the mechanisms are normal or not, is another question. But as BARON-COHEN (1997) pointed out there is a reciprocal relationship between evolutionary normal psychology and evolutionary psychopathology where the two approaches will mutually inform each other (as the example of COSMIDES 1989 and STONE et al. 2002 also shows).

Both Evolutionary Psychology and Cognitive Behavioural Therapy are cognitive sciences, while the earlier ethological approach was primarily a behavioural science (KENNAIR 2002; WILLIAMS 1985). Combining Evolutionary Psychology and Cognitive Behavioural Therapy might be a fruitful merger of two cognitive approaches where Cognitive Behavioural Therapy might provide Evolutionary Psychology with an improved understanding of the proximate mechanisms involved in specific anxiety disorders. Improved functional knowledge might in turn provide more efficient therapy.

Note

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http://www.human-nature.com/nibbs/02/ep.html


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