

Emotion and attention: a necessary connection?*

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Consider a typical fear episode. You are strolling down a lonely forest lane when you suddenly see a huge dog running towards you, barking wildly, and baring its teeth aggressively. A number of different things will be involved. First, there is the visual and auditory perception of the dog as it runs towards you. There might also be an appraisal of the situation as dangerous. Then, there are a number of physiological changes, involving a variety of systems controlled by the autonomic nervous system. You freeze, your heart races, your breathing becomes strained, you start trembling. Some of these changes produce an expression of fear on your face: your mouth opens and your eyes widen while you stare at the dog. There is also a conscious experience which you undergo. You feel a sort of pang, something which might consist in the perception of the physiological changes you are going through. A number of thoughts might cross your mind. You might think that the dog is about to tear you into pieces and that you'll never escape from this monster. In addition to this, your attention focuses on the dog and its movement, as well as, possibly, at ways of escaping or defending yourself. Finally, your fear comes with action-tendencies, such as an urge to run away.

Whatever the details of the story, it is clear that a typical emotion episode involves a number of different components. Roughly, there is a perception (or more generally an informational component), and there are physiological changes, conscious feelings, thoughts, action tendencies and attentional processes. One central question in emotion theory is which, if any, of these components, *is* the emotion? Is the fear you undergo a feeling, a thought or an action-tendency? Or else, does it involve several or maybe all of the components present in the episode we considered? What can we subtract without losing the emotion of fear? In other words, the question is what, if any, components are essential to the emotion of fear. More generally, emotion theorists have

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tried to determine what, if any, are the essential components of emotions in general irrespective of the emotional kind to which they belong.¹

The question I'm interested in is whether modification of someone's attention is an essential component of emotion.

1) Two models

Psychologists and neurologists, as well as some philosophers – apart from some notable exceptions, most philosophers haven't been interested in this question and have blissfully ignored relevant empirical research – have claimed that at least some emotions and what I will loosely call “attentional phenomena” are closely related. As far as I can see, there are two main ways of thinking of the relation between emotions and attentional phenomena. On the first model, which I shall call the “causal model”, emotions and attentional phenomena are taken to be distinct events, which causally interact. Though the question is not usually addressed explicitly, this seems to be the picture that is most often assumed in psychology. Thus, Douglas Derryberry and Don M. Tucker claim that what they call motivational processes – they keep the term “emotion” to refer to the “experiential accompaniments of motivation” – “involve two separable types of *effects* on attention. First, they exert a general influence that serves to broaden or narrow the breadth of attention. Second, they exert more specific *effects* serving to direct attention toward particular sources of information.” (1994: 168, my emphasis) In the same way, Gerald Matthews and Adrian Wells, the authors of *Attention and Emotion: A Clinical Perspective* (1994) write: “[e]motions and attention are intimately linked. States of emotions *influence* both the contents of consciousness and performance on tasks requiring selection of stimuli or intensive concentration” (1999 p. 171, my emphasis).²

This picture is explicitly embraced by Jesse Prinz.³ After having rejected the claim that emotions have to be identified with changes in mental operations, including changes in attention and information processing, Prinz claims that such “things are only

¹ This is what Prinz calls “the problem of parts” (2004: 4)

² But see Oatley & Johnson-Laird 1987 for the claim that emotions *are* changes in modes of processing.

³ This seems also to be Wilson's conception. He claims that something is the object of an emotion only if the emotion is caused by attention to its object, in the sense that the object must be perceived or thought about, for instance (1972, p. 90).

contingently related to emotions. They are the causes and effect of emotions [...]” and “should not be mistaken for the emotions themselves”. (2004: 244)⁴

It should be underlined that the causal model is compatible with the thesis that emotions have as one or as their unique function to cause attentional phenomena. This functional claim is often made in the literature. For example, Derryberry and Tucker argue “that motivational states serve to regulate orienting, directing attention toward perceptual information that is important or relevant to the current state.” (1994: 170)⁵ This of course does not entail that the attentional phenomena which is involved in emotion is an essential part of the emotion. And the reason for this is simply that the function of something is not a part of that thing.⁶

According the second model, which I will dub the “essentialist model”, attentional phenomena are essential components of emotions.⁷ There are two ways to understand this claim. On the first, attentional phenoma are considered to be one among several essential components. This is the view Paul E. Griffiths seems tempted to adopt with respect to basic emotions: “The central idea of affect program theory is that emotional responses are complex, coordinated, and automated. They are complex because they involve several elements. These are usually taken to include (a) expressive facial changes, (b) musculoskeletal responses such as flinching and orienting, (c) expressive vocal changes, (d) endocrine system changes and consequent changes in the level of hormones, and (e) autonomic nervous system changes. Emotion feelings and cognitive phenomena such as directing of attention are obvious candidates to be added to this list.” (1997: 77) There is of course no need to adopt the affect program theory to subscribe to this version of the essentialist model. Ronald Alan Nash, for instance, writes: “My thesis [...] is that what makes some evaluation/desire complex emotional is [...] the presence of a focussed attention of a particular sort on the object of emotion, resulting in the agent’s

⁴ The things mentioned are “bodily changes, propositional attitudes, action dispositions, and feeling”s. But from the context, it is clear that modes of processing could have also been mentioned.

⁵ See also de Sousa 1987: 195; Vuilleumier, Armony and Dolan 2003: 419; Brady 2007: 278.

⁶ Note that if one considers that the functional role of a state is essential to it – being a state of that kind consisting in having a certain functional role – one could both say that attentional phenomena are not essential parts of the emotion, but that it is essential to emotion that they have the function to cause attentional phenoma.

⁷ Those who deny that emotions have essential component, such as Pitcher and Elster, will reject this model. They could accept some version of the causal model, however: whatever is the emotion could be in causal relation with attentional phenomena.

overvaluation of that object (relative to his dispassionate evaluation of it). (1989: 482)
So, the necessary parts of emotions are (over)evaluation and desire plus a focussing of attention.

The other, more radical, way to understand the second model is to claim that attentional phenomena are the only essential components of emotions. This seems to be Ronald de Sousa's view. According to him, an emotion "limits the range of information that the organism will take into account, the inferences actually drawn from a potential infinity, and the set of live options among which it will choose" (1987, p. 195). But instead of thinking of this as a causal effect of emotions, he suggests that emotions have to be identified with attentional phenomena: emotions, he claims, *are* "species of determinate patterns of salience among objects of attention, lines of inquiry and inferential strategies." (1987: 196)

Now, which of the two models is correct? Are attentional phenomena essential components of emotions or not? As it stands, this question is extraordinarily broad.

2) Types of emotions and forms of attention

The term "emotions" is sometimes used in a quite unspecific way to refer to emotional phenomena, be they emotional traits, moods or emotional experiences. To narrow down the scope of the question, I'll concentrate on what philosophers have called "occurrent" emotions, such as exemplified in the fear case I started with. Occurrent emotions are distinct from emotional dispositions or traits, such as a dog phobia, which you might possess without undergoing any experience. Moreover, the states I will consider are relatively short-lived and unified experiences. They are to be distinguished from what could be called long-term emotions, which might last for years, and which involve a variety of elements, such as episodes of emotional experience; these latter include perceptions, thoughts, feelings and bodily changes, but also a number of dispositions, such as the disposition to have further emotional experiences, thoughts, feelings or dispositions to act in certain ways (Goldie 2000: 12-3). Finally, the states I'm interested in have intentional objects, in the sense that such states are directed at things which they

represent in a certain way. In so far as it is not clear whether moods, such as elation or depression, have intentional objects, I will not consider them here.⁸

But even narrowed down to intentional emotional experiences, the question is still very broad. One reason for this is that there are a great many different emotion-types and it is plausible that the answer to the question of the relation to attentional phenomena will be different depending on the type of emotion considered. Thus, it seems difficult to deny that interest, which is often considered to be an emotion, essentially involves attentional phenomena. Being interested in a problem seems necessarily to involve an attentional focus on this problem. Indeed, being interested seems to be nothing but a form of attention. Yet when we consider emotions such as fear, anger, disgust, surprise, sadness and joy, to name some of the emotions which have been considered to be basic, or emotions such as pride, shame, envy, jealousy or compassion, which are often claimed to involve higher cognitions, things are less clear.

Moreover, there is variety of attentional phenomena. Selectivity in information processing is considered to be the essence of attention. But such selectivity can be voluntary or involuntary, depending on whether one controls the process, such as when one voluntarily focuses on some task, or whether something simply attracts one's attention, such as when a loud noise makes us look up. Moreover, different aspects of attention are usually distinguished. First, there are the different movements of attention, such as orienting oneself towards, or shifting away from, stimulus as well as the maintenance of attention on the stimulus. Then, there are differences in the scope of attention. Attention can zoom in and concentrate on details, or it can zoom out and focus on global features. Finally, vigilance or alertness, as a state in which attention is not yet focussed on anything, but is ready to focus on a range of stimuli, is also considered to be an important form of attention.

In fact, different types of emotions seem to involve different kinds of attentional phenomena. Quite generally, there seems to be a difference between negative and positive emotions. As Barbara Fredrickson argues, a number of studies suggest that

⁸ It is common to deny that moods have intentional objects. Some, however, consider moods to have less specific objects, compared to emotions (Solomon 1976; Prinz 2004). Thus, Prinz suggests that while fear represents a specific danger, an anxious mood represents general peril. If so, the attentional phenomena which are involved are likely to be different, for it seems difficult to focus your attention on the whole world.

“negative emotional states – particularly high arousal ones like anxiety and fear – serve to narrow people’s attentional focus”, while “positive emotions, even high-arousal such as elation and mania, lead to an opposite effect: an expansion of attentional focus.” (1998: 307; see also Derryberry & Tucker 1994). In one particularly telling study, subjects had to assess the similarity of two figures to a third figure, where the two figures resembled the third figure either with respect to global configuration (three squares vs three triangles) or with respect to local features (four squares vs three squares). As Fredrickson explains, “(w)hereas negative emotional traits such as anxiety and depression predict a local bias consistent with a narrowed attentional focus, positive emotional traits such as subjective well-being and optimism predict a global bias consistent with a broadened attentional focus.” (1998: 307; Fredrickson & Branigan 2005) One would expect something similar to happen with full-blown emotions and not only with emotional traits.

Actually, even finer-grained distinctions seem required. While interest comes with an orienting of attention towards its object and the maintenance of attention towards it, this does not seem true in the case of happiness, where attention is likely to wander away from what we are happy about. If we consider negative emotions, it would seem that when experiencing disgust your attention at least sometimes quickly shift away from the object of your disgust – what Kenneth Hugdahl and Kjell Morten Stormark have called “cognitive avoidance”⁹ – while it tends to orient itself towards the object of fear or anger. Or consider boredom. If you are bored by a film, your attention will simply drift away. Vigilance or alertness, another form of attention, is something which would seem to come with fear and perhaps anger, but certainly not with boredom or sadness.

Moreover, it could well turn out that some attentional phenomena are essential to an emotion type, whether some other attentional phenomena are not essential to the same type of emotion. Focussing on the object of one’s anger might be an essential component of anger, while having one’s attention attracted by unrelated offensive stimuli might simply be an effect of one’s anger.

⁹ Kenneth Hugdahl and Kjell Morten Stormark claim that there is cognitive avoidance of aversive stimuli: “We believe that this effect may have been caused by cognitive avoidance in the sense that, after initial perception and registration of the cue, the participant actively avoids further processing if the stimulus is perceived as aversive. Thus there seems to be a mechanism of rapid disengagement of attention from the cue when it is aversive, moving attention to different spatial location.” (2003: 289)

Given this, it would seem that one would have to ask for each type of emotion whether each of the different attentional phenomena that are usually distinguished is an essential component or not. To make things more manageable, I will consider the case of fear and its relation to a specific attentional phenomenon, the involuntary focussing of attention on its object, that is, the involuntary orienting of attention on this object and its maintenance on it as long as the experience of fear lasts. The question, then, is whether it is true, as Nash claims, that when you fear something, your attention is involuntarily focussed on what you fear. We have seen that this claim lacks plausibility in the case of emotions such as disgust or, even more clearly, boredom.¹⁰ But it certainly sounds plausible in the case of fear.

Let me start with the discussion of some arguments against this claim.

3) *Contra essentialism*

The arguments I have in mind and which are put forth by Prinz actually consist in general arguments against what I called the essentialist model (Prinz 2004: 243-4). Prinz considers different experimental results which might be interpreted as showing that emotions are changes in mental operations or, in Oatley and Johnson-Laird's words (1987), modes of processing. Examples of such findings are that happiness tends to facilitate creativity, that fear increases risk estimates, or that all emotions seem to facilitate recall of prior events in which the same emotion was experienced. What Prinz claims is that it is not necessary to identify emotions with modes of processing to explain the link between emotions on the one hand and attention, memory and styles of reasoning, on the other hand. Instead, the empirical results can be accounted for by appealing to general principles governing the works of the mind. Thus, the *priming principle*, according to which present states facilitate recall of related states would explain why present sorrow facilitates recall of past sorrows. The *confirmation bias principle*, according to which there is a general tendency to search for evidence that confirms what we take to be true, would explain why depressed people tend to attend to

¹⁰ Nash himself considers momentary emotions, such as surprise and irritation, which are too fleeting to involve the focus of attention he considers typical of fear, and joy, in which the attention soon moves from its object to positive features of the world, to be counter-examples to his account. (1989: 501-2)

their flaws – they prefer to be right than to be happy –, why fear may promote high risk estimates or why happiness promotes creative thinking, something which can stimulate further happiness.

The question is whether such general principles can account for the relation between fear and the involuntary focussing of attention on what one fears. Of the two principles Prinz considers, only the confirmation bias principle has any chance to do any explaining. But in fact, the suggestion that this principle explains the link between fear and the involuntary focussing of attention is not plausible. It seems difficult to believe that we concentrate our attention on the dog that is about to jump on us because we unconsciously look for evidence that confirms that there is danger. Such doubts are confirmed by the fact that we might be completely certain about the existence of some danger while nonetheless having one's attention focused on it. Moreover, we might fear something and have one's attention focused on that thing while firmly believing there is no danger. Thus, we might experience fear at a hairy spider and be focussed on it while believing that this spider is innocuous. In such cases of conflict, it is not clear what the confirmation principle would predict: we would have to find evidence for both the danger our fear represents and the lack of danger in which we believe. The focussing of attention on the spider is thus not well explained by this principle. Maybe some other general principle explains why fear comes with attentional focus, but it would seem that the onus is on the anti-essentialist to say what that principle could be.

The second argument Prinz gives is that experimental results actually show that “the relation between emotions and information processing is not fixed. That relation is ordinarily influenced by default mechanisms and biases, such as priming and the confirmation bias, but it can be renegotiated to meet contextual demands.” (2004: 244). While some studies show that happiness tends to promote successful problem solving, other suggests just the contrary, since they show that happy people reason poorly. According to Isen (2000), this is explained by the fact that happy people are good at solving problems in which they are interested, but bad at problems they find boring. Prinz claims that “this finding is hard to reconcile with the view that emotions simply are (or inevitably cause) specific modes of information processing.” (*ibid.*) He claims that instead what happens is that emotions tend to cause whatever processing mode that

promotes their continuation, and do so unless there are other influences, such as a desire not to have the emotion in question. This, he claims, is confirmed by the fact that “emotions normally facilitate retrieval of congruent memories [b]ut the opposite happens in situations where people want to suppress their emotions.” (*ibid.*)

The gist of this argument is that two occurrences of the same emotion can have very different cognitive effects in different circumstances, so that it would be wrong to say that the cognitive effects are essential components of emotions. This argument is certainly convincing with respect to the cases Prinz considers. The question, again, is whether it can be applied to fear and its relation to attentional focus. What would have to be the case is that fear can come without the attentional focus on its object, depending on the different factors at play, such as a desire not to experience fear. I am not aware of any empirical study which suggests that fear sometimes comes without involuntary attentional focus on its object.¹¹ In the absence of hard evidence, we have to revert to thought experiments. Would there be something similar as in the case in which our desire not to be happy modifies the usual effect of happiness? It is often the case that we desire not to be afraid. For instance, we might think that fearing this spider is irrational and desire not to be afraid. We might thus try to focus our attention on something else. The problem is that it would seem that to the extent that we succeed, not only the attentional focus changes, but our fear disappears.

The verdict is that these arguments fail to show that fear is only related to attentional focus as a cause is to some effect which might or might not occur, depending on the particular circumstances of the case. But do we have positive grounds to adopt the essentialist model?

4) *Pro essentialism*

¹¹ In certain cases of epilepsy, there is amygdale activation that causes intense objectless fear. Since I have limited the question to the case of intentional fear, i.e. fear that has an object, such cases are not directly relevant to the question I am addressing. Moreover, one would think that the fear in question would involve alertness. My thanks to Patrick Vuilleumier for drawing my attention to such cases.

The first argument I would like to consider claims that the claim that fear involves attentional focus on its object is a conceptual truth.¹² Aaron Sloman (personal communication) proposes something along those lines: “Consider”, he says, “someone who claims that it is possible to be in very intense pain without paying attention to it, even when there’s nothing else to divert attention elsewhere, e.g. a life-threatening attack. We might wonder whether such a person has learnt the ordinary concept of “pain” or was perhaps confusing it with “injury”. We know that injury, even serious injury, sometimes does not direct attention, e.g. under anaesthetic. But a state is not pain if there’s not the slightest disposition to attract attention”.¹³ The same might be true, he suggests, with emotion and attention. Maybe someone who says he experiences an emotion like fear without paying attention to the object of his emotion is not really having a *bona fide* fear emotion directed at an object, but just a general increase or decrease of excitation that he mislabels as a fear emotion.¹⁴

It certainly seems right to claim that it is not possible to experience fear without having one’s attention focused on the object of one’s fear. However, the reason this is so is not conceptual. As far as I can see, it is a mistake to suggest that our concept of fear is such that we shouldn’t apply it to cases which are just like normal experiences of fear but which lack attentional focus. This is not something which comes with the concept of fear. There is certainly more involved in the concept of fear than what Griffiths suggests when he claims that there is nothing more interesting about fear that holds by definition than that “[f]ear is ‘whatever is happening to people in these paradigm cases’” (1997, p. 5). That fear is related to danger (or fearsomeness), possibly in the sense that fear is what danger (or fearsomeness) makes appropriate, is certainly part of the concept of fear. But it would seem a stretch to claim that when we learn the concept of fear, we learn that fear involves attentional focus. Or else, we would have to say that the many philosophers who

¹² This paragraph is taken from Faucher & Tappolet 2002.

¹³ It could be objected that certain drugs and some forms of leukotomy can lead patients to insist that they still *have* the pain, but no longer *mind* it (see Dennett (1978) “Why we can’t make a computer feel pain”). It thus seems that one could feel pain without desiring to avoid it. The question, of course, is whether the patients are right when they claim they feel pain.

¹⁴ That this is so can be explained in terms of the genealogy of our concepts. This is what Sloman suggests: “Our words and concepts have been honed for centuries against the intricacies of real life under pressure of real needs and therefore give deep hints about the human mind.” (1987: 231)

have proposed conceptual analyses of emotions and more particularly of fear without ever mentioning attention didn't grasp the ordinary concept of fear.

But even though the possibility of fear without attentional focus does not violate any conceptual truth, it nonetheless seems one that has to be excluded. Why so? Would it violate natural laws? In fact, things do not look better if we turn to empirical results. The numerous psychological studies, such as the modified Stroop task, clearly establish correlations between emotional phenomena such as trait anxiety, particular anxiety disorders, such as phobia, and state anxiety and involuntary orienting of attention towards congruent stimuli.¹⁵ As Gerald Mathews puts it, “anxiety and worry are associated with an automatic processing bias, initiated prior to awareness, but serving to attract attention to environmental threat cues, and thus facilitating the acquisition of threatening information” (1990, quoted by Öhman, 2000: 581). But these studies certainly do not establish that involuntary orienting of attention towards congruent stimuli necessarily comes with these forms of anxiety, to say nothing of fear and its relation to attentional focus.

Results in neuroscience do not establish this either. What we are told is that the cerebral structure underlying fear – the amygdala – interacts with the ones responsible for attention and for perceptual processing.¹⁶ As Patrick Vuilleumier explains, “[i]ncreased perceptual processing of emotional (especially threat) stimuli might therefore result from direct ‘feedback’ signals imposed by the amygdala on cortical pathways, potentially additive or competing with other top-down influences imposed by attentional systems in frontal and parietal cortex.” (2005: 589) So, it might be claimed that given this feedback loop in the structure of the brain, fear and its underlying amygdala activation necessarily come with attentional focus.¹⁷ A first question is whether this is really a physiological necessity for human beings. Given the assumption that the brain is plastic, could a more or less normally functioning human brain not be wired slightly differently? Suppose it could not. The question then is whether this physiological necessity in human beings is more than just that. Can there be fear in a being, whose reactions are very much like our fear reactions but to which no feedback loop is associated? It is not clear that we should

¹⁵ See Faucher & Tappolet 2002 for a survey.

¹⁶ See Vuilleumier 2005.

¹⁷ I'm grateful to James Blair for suggesting this line of thought.

deny this. Actually, the necessity involved in the brain's circuitry might just be causal necessity: given the brain's structure, the activation of the amygdala causes the activation of the region associated with perceptual processing. Thus, neurological findings are, as far as I can tell, compatible with both the causal and the essentialist model of the relation between fear and attentional focus.

Here is a last argument, one which I find persuasive, but which in fact does not establish essentialism. It appeals to the function of emotion and more particularly of fear. It is generally agreed that fear's function is, or at least was in our Pleistocene past, to help us cope in an efficient way with danger. Part of what is necessary to do so is certainly to allocate attentional resources to the danger one faces. This is particularly important given the fact that our mental resources are limited: we need to pick out what is important from all the information that we receive.¹⁸ Given this, one has to conclude that the association between an emotion like fear and attentional phenomena is not just fortuitous. As Ronald de Sousa claims (personal communication), "[...] the mechanism [that concentrates attention on the object of fear] is one that is presumably set up by natural selection. But it would be pointless engineering for one part of the mechanism (the attention) to be present without the other (the other functional features of fear) [...]." This is "what justifies the intuition that there is something 'conceptual' about the conjunction of the two." So, one could claim that given its general aim of putting in place a device which helps us to cope with danger, purposeful engineering will make sure that whenever there is a reaction of fear, there will be attentional focus. In other words, the best way to ensure that fear emotions fulfill their function is to ensure that they involve attentional focus not just as an optional feature but as a feature that is always present.

It could be objected that natural selection might have been less efficient than we usually suppose it to be. However, as long as we have no reason to think that fear can occur without attentional focus – and, as I said, there seems to be no empirical evidence against this claim – we have no reason to doubt the efficiency of natural selection in this respect.

¹⁸ As Vuilleumier, Armony and Dolan write: "[f]rom an adaptive-evolutionary perspective, it can be assumed that emotion has a privileged role in biasing the allocation of attentional resources toward events with particular significance for an organism's motivational state." (2003, p. 419, quoted in Brady 2007: 283, note 21).

More worryingly, philosophers are likely to point out that this argument only establishes that normal cases of fear always comes with attentional focus, not that it necessarily does. This is true. The conclusion of the argument falls short of essentialism. To be frank, I don't know of an argument which would show more than this. In other words, we don't have reasons to take attentional focus to be an *essential* component of emotions. But if I am right, we don't have reasons not to. So we might well do so.

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