On the Primacy of Affect

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ABSTRACT: Lazarus has challenged the view that there are circumstances under which affect precedes cognition and that affective arousal that does not entail prior cognitive appraisal exists. His argument, however, is based entirely on an arbitrary definition of emotion that requires cognitive appraisal as a necessary precondition. To satisfy this concept of emotion, Lazarus has broadened the definition of cognitive appraisal to include even the most primitive forms of sensory excitation, thus obliterating all distinction between cognition, sensation, and perception. No empirical evidence is offered to document the principle of cognitive appraisal as a necessary precondition for emotional arousal. The contrasting view of an affective primacy and independence, however, is derived from a series of findings and phenomena, including the existence of neuroanatomical structures allowing for independent affective process.

Only a few years ago I published a rather speculative article entitled "Feeling and Thinking" (Zajonc, 1980). The title also included the provocative subtitle "Preferences Need No Inferences," deliberately suggesting an occasional independence of emotion from cognition. In this article I tried to appeal for a more concentrated study of affective phenomena that have been ignored for decades, and at the same time to ease the heavy reliance on cognitive functions for the explanation of affect.

The argument began with the general hypothesis that affect and cognition are separate and partially independent systems and that although they ordinarily function conjointly, affect could be generated without a prior cognitive process. It could, therefore, at times precede cognition in a behavioral chain. I based this proposition on a number of diverse findings and phenomena, none of which alone could clinch the argument, but all of which taken together pointed to a clear possibility of an affective independence and primacy. This idea was first advanced by Wundt (1907) and later reiterated by others (e.g., Izard, 1984). Lazarus (1982) takes a very strong issue with all of this and almost categorically rejects the likelihood of the independence of affect of cognition, let alone the possibility of an affective primacy. In this article I will review Lazarus's position and contrast it with mine.

Lazarus employs two definitions, one for emotion and one for cognition. All of his inferences are based on these two definitions. Lazarus's definition of emotion (which requires cognition as a necessary precondition) is central to his position. On the basis of this definition alone, therefore, the argument is unassailable. If Lazarus insists on his definition, as he has the right to do, we must agree that affect cannot be independent of cognition because *by definition* cognition is a necessary precondition for affective arousal.

For Lazarus, cognition is an ever-present prior element of affect and since the presence of cognitive functions cannot always be documented, a rather special definition of cognition is required. Thus, Lazarus's definitions of cognition and of cognitive appraisal also include forms of cognitive appraisal that cannot be observed, verified, or documented. Because the emotional reaction is *defined* as requiring cognitive appraisal as a crucial precondition, it must be present whether we have evidence of it or not. Even if cognitive appraisal of a given emotional excitation cannot be documented, according to the definition it must have nevertheless taken place, albeit at an unconscious level or in the form of most primitive sensory registration. Therefore, Lazarus's proposition cannot be falsified.

Perhaps because the argument is circular, more need not be said. However, there are important reasons to say more. Whether cognitive appraisal is always necessary for emotion or not should not be settled by definitions alone. Empirical facts should contribute to the formulation of these definitions, and if we wish to understand how cognition and emotion interact, it is important to know what is true. Assuming that cognitive appraisal is always a necessary precondition of emotion preempts research on the matter. My preference is to leave the question of cognitive appraisal open for empirical research, postponing the task of precise and extensive definitions of both processes until we know more about them. Solving problems by definition is not an incentive for further study. It is a useful maneuver that allows us to proceed with our work for awhile, pretending that one aspect of our problem had already been solved. But we can pretend just so long. At some point of theoretical development, we must look to the empirical side of the problem and confront our assumptions and definitions with empirical reality

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and examine our theoretical consistency. I believe that this point of theoretical development has now been reached. Of course, the question contested here cannot be *fully* resolved unless we have a full understanding of consciousness. Such an understanding is at the moment beyond our reach. But we have learned just about enough about cognition and emotion to move beyond definitional disputes. Conflicting results that I pointed out in my earlier article (Zajonc, 1980) need to be integrated. Questions about the independence and primacy of affect can now be seriously asked at the empirical level. I offered the notion of affective independence and primacy as a hypothesis to be empirically verified, not as a definition to be disputed. Above all, however, defining affect as heavily dependent on cognition should make it rather clumsy to study the interaction of cognition and emotion, and especially those forms of emotion in which the latter influences cognition (for example, in phobia and prejudice).

"Widespread Misunderstanding"

Lazarus (1982) bemoans "widespread misunderstandings of what it means to speak of cognition as a causal antecedent of emotion" (p. 1019). According to Lazarus, "Cognitive appraisal means that the way one interprets one's plight . . . is crucial to the emotional response" (p. 1019). But "cognitive appraisal" need not be a deliberate, rational, or conscious process (p. 1022). We "do not have to have complete information to react emotionally to meaning" (p. 1021). Perceptions that are "global or spherical" (p. 1020) will suffice. In this respect, however, Lazarus mistakenly assumes that I equated intention, rationality, and awareness with cognition *in general,* or with cognitive appraisal *in particular.* This is not so. I selected some examples in which deliberate, rational, or conscious processes could be shown to be clearly unnecessary for the generation of affect. I selected these examples on purpose. If Lazarus and I could agree that *these* forms of cognition are not necessary for an emotional arousal, then part of our problem would be solved. Now we would only need to determine whether the forms of cognition that are hidden from the cognizer are necessary antecedents of emotion. Only the requirement for an unconscious cognitive appraisal remains to be analyzed, because Lazarus and I agree that cognitive processes which are unintentional and irrational but conscious are unnecessary for emotional arousal. My definition of cognition (Zajonc, 1980, p. 154) required some form of transformation of a present or past sensory input. "Pure" sensory input, untransformed according to a more or less fixed code, is not cognition. It is just "pure" sensation. Cognition need not be deliberate, rational, or conscious, but it must involve some minimum "mental work." This "mental work" may consist of operations on sensory input that transform that input into a form that may become subjectively available, or it may consist of the activation of items from memory.

The essence of the question can be stated as follows. If there is a detectable emotional response but there is, at the same time, no detectable antecedent cognitive process, did such a cognitive process take place nevertheless, albeit at the unconscious level? Lazarus's position is that it was there but we could not document it. Lazarus asks, "Are there any exceptions?" (p. 1201). "I think not," he answers himself.

Now, a host of theories, within and outside of psychology, assume entities and processes that cannot be observed given current observational capabilities. These unobservable processes are postulated because otherwise explanation of the phenomena under investigation would be impossible. Moreover, they are postulated only when they do not conflict with empirical evidence. This is not true of emotions. Many emotional phenomena can be explained and have been explained without invoking cognitive processes of any kind (e.g., Izard, 1977; Tomkins, 1962), and conflict with empirical reality is in fact created if we assume a cognitive appraisal for every emotion. The facial feedback theory of emotion (Darwin, 1955; Izard, 1971; Tomkins, 1962), which is gaining increasing empirical support (Duncan & Laird, 1977; Laird, 1974; Laird, Wegener, Halal, & Szegda, 1982; Lanzetta & Orr, 1980; Rhodewalt & Comer, 1979; Zuckerman, Klorman, Larrance, & Spiegel, 1981), requires no assumptions about prior cognitive appraisal, and appraisal of the kind Lazarus postulates would play havoc with the opponent process theory of affect (Solomon, 1980).

For Lazarus (1982), "cognitive appraisal (of meaning or significance) underlies and is an integral feature of all emotional states" (p. 1021). Thus, all three aspects of emotional reaction—bodily processes, overt behavioral expression, and subjective experience—need cognitive appraisal as a necessary precondition. I believe that this is not so, and I shall try to show why not.

Empirical Basis of Affective Primacy

There are various phenomena that cannot be ignored when one questions the independence of affect from cognition. At the moment, the best single explanation for these phenomena is the assumption that affect can be aroused *without* the participation of cognitive

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processes and that it may therefore function independently for those circumstances. This is true provided we mean by "cognition" something more than pure sensory input. I have reviewed some of this evidence elsewhere (Zajonc, 1980; Zajonc, Pietromonaco, & Bargh, 1982). However, it did not impress Lazarus. I will now briefly summarize these and some previously unmentioned findings and phenomena. These findings need comment from theoreticians who assume all of affect to be always postcognitive and always depending on appraisal.

1. Affective reactions show phylogenetic and ontogenetic primacy. Izard (1984) reviewed the evidence on ontogenetic primacy of emotion, and the picture that emerges from his extensive examination of the literature is quite convincing. Thus, if emotion precedes cognition at some level of the individual's development, then at that level of development no cognitive appraisal is necessary (or even possible) for the arousal of an affective reaction. In my 1980 article I hypothesized the *independence* of affect *of* cognition. At the formal level, therefore, affect could be simultaneous or secondary and still independent of cognition. Proving this hypothesis requires no demonstration that affect is primary. Nor must affect be *always* primary. If evidence can be uncovered about the primacy of affect in only one situation, the independence hypothesis would be confirmed.

2. Separate neuroanatomical structures can be identified for affect and cognition. For example, Izard (1984) wrote,

> The case for considering emotions as a separate system seems fairly well established at the neurophysiological-biochemical level. At this level it is well known that some brain structures, neural pathways, and neurotransmitters are relatively more involved than others with emotion expression, emotion experience or feelings, and emotion-related behaviors. The limbic system is sometimes referred to as the "emotional brain," and the fact that at least one limbic structure, the hippocampus, has been strongly implicated in information processing (Simonov, 1972) and memory (O'Keefe & Nadel, 1979) suggests the existence of brain mechanisms specially adapted for mediating emotion–cognition interactions. (p. 25)

(a) Emotional reactions are likely to be under the control of the right brain hemisphere, whereas cognitive processes are predominantly the business of the left hemisphere (Cacioppo & Petty, 1981; Schwartz, Davidson, & Maer, 1975; Suberi & McKeever, 1977). This evidence is not strong, but it is very suggestive. In a recent review of work on lateralization, Tucker (1981) concluded that the two hemispheres do participate differentially in cognitive functions and in emotion, and that cognitive activity would not be possible without the independent neurophysiological processes that give rise to emotion.

(b) Emotional features of speech are apparently controlled by the right hemisphere, whereas semantic and lexical aspects are controlled by the left. Ross and Mesulam (1979) found a number of patients with lesions in the right hemisphere, directly across from Broca's area. All these patients produced intelligible speech, but it was speech totally devoid of emotional inflections and other affect-dependent prosodic parameters.

(c) A *direct* pathway from the retina to the hypothalamus has been demonstrated in a large number of species (Nauta & Haymaker, 1969). On the basis of an extensive review, Moore (1973) concluded that "a retinal projection to the suprachiasmatic nuclei is a regular feature of the mammalian visual system" (p. 408). Since the hypothalamus plays a central role in the arousal and expression of emotion, the retinohypothalamic tract allows the organism to generate an emotional reaction from a purely *sensory* input. No mediation by higher mental processes is apparently required. Emotions could be only one synapse away. Thus, it is possible that rapidly changing light gradients, such as those that arise with looming objects, could generate fear reactions directly. Other studies show that direct aggression can be elicited by the electrical stimulation of the hypothalamus (Flynn, Edwards, & Bandler, 1971; Wasman & Flynn, 1962), and other efferent projections have been found issuing from the suprachiasmatic nuclei (Stephan, Berkley, & Moss, 1981). These findings would imply that pure sensory input requiring no transformation into cognition is capable of bringing about a full emotional response involving visceral and motor activity. There is no reason why subjective feeling could not follow as well. Only a specific form of activity at the retina is required; this could be produced by a looming object or by a rapidly changing illumination gradient. For many species, efficient stimuli exist that are capable of eliciting fixed action patterns by virtue of an automatic process that short-circuits even "global or spherical" perceptions. Extremely small changes in retinal excitation can produce these reactions (Goodale, 1982; Ingle, 1973). Newborn infants respond in this manner to a host of stimuli, and with over-learning all sorts of other stimuli may acquire the ability of eliciting emotional reactions automatically, short-circuiting cognitive appraisal that initially may have been a necessary part of the emotional reaction.

d. Some olfactory and gustatory stimuli, when of sufficient amplitude, produce clear overt emotional reactions, and they produce them immediately and directly (Steiner, 1974). These responses are universal across cultures and require no learning.

3. Appraisal and affect are often uncorrelated and disjoint.

(a) Affective judgments of persons are characterized by a primacy effect, whereas appraisal infor-

mation is more likely to display recency effect (Anderson & Hubert, 1963; Posner & Snyder, 1975).

(b) Weights associated with trait adjectives that contribute to liking judgments of hypothetical individuals are uncorrelated with the recall of these adjectives (Dreben, Fiske, & Hastie, 1979).

(c) Multidimensional space for preferences cannot be decomposed to reveal descriptive dimensions. The dimensions generated by similarity judgments of an array of objects (e.g., hues, soft drinks) are independent of the dimensions generated by comparisons of preferences among these objects (Cooper, 1973; Nakashima, 1909).

(d) If cognitive appraisal is a necessary determinant of affect, then changing appraisal should result in a change in affect. This is most frequently not so, and persuasion is one of the weakest methods of attitude change (Petty & Cacioppo, 1981).

4. New affective reactions can be established without an apparent participation of appraisal.

(a) Taste aversion can be established even when the possible association between food (CS) and the delayed nauseous UCS is obliterated by anesthesia (Garcia & Rusiniak, 1980). The UCS is administered and takes its effect when the animal is unconscious. Therefore, the appraisal, if it takes place at all, must make a rather remote connection between the ingested food and the nausea that occurred during anesthesia (and has probably been only vaguely registered). It is highly unlikely that any sort of appraisal process, even unconscious, could have been involved when the animal rejected the CS food following conditioning.

(b) Lazarus and McCleary (1951) have found that subjects are able, without awareness, to make autonomic discriminations (GSR) among nonsense syllables. Lazarus insists that in their experiment *some* form of appraisal occurred prior to the emotional excitation, but there is no evidence that such was the case in fact. The argument is simply that appraisal occurred because, by definition, it must have occurred (Lazarus, 1982, p. 1021).

(c) Preferences for stimuli (tones, polygons) can be established by repeated exposures, degraded to prevent recognition (Kunst-Wilson & Zajonc, 1980; Takenishi, 1982; Wilson, 1979). Interestingly, Mandler (personal communication) reported that he was unable to obtain the above effects. Yet, Seamon and his colleagues replicated the results more than once without difficulty (Seamon, Brody, & Kauff, 1983a, 1983b). In one of their first studies they demonstrated that the affective discrimination, obtained in the absence of recognition memory, was subject to lateralization effects. Thus, affective preferences were best for stimuli presented in the right visual field, and recognition memory was best for stimuli shown in the left visual field. A subsequent study (Seamon et al., 1983b) has shown that affective discriminations in the absence of recognition memory can be made by the subject even when the test follows the initial exposure by as long as one week.

(d) In blind tests, smokers are unable to identify the brand of cigarettes they customarily smoke, but when asked which cigarettes of those tasted they liked best, they unknowingly point to their own brand (Littman & Manning, 1954).

5. Affective states can be induced by noncognitive and nonperceptual procedures.

(a) Emotional excitation can be induced by drugs, hormones, or electrical stimulation of the brain. Individuals who are given valium concealed in their food will change their mood, whether they know about having ingested the drug or not. They may have all sorts of explanations for this change, and it is possible, as Schachter and Singer (1962) have shown, that some qualities of the valium-induced state may be altered by cognitive input. But in the final analysis, at least some very significant aspects of the change in the emotional state will be caused directly by the valium, regardless of what information the subjects are given and what justification they themselves offer afterwards.

(b) Ekman, Levenson, and Friesen (1983) have shown that the action of facial musculature unaccompanied by the subjective component of emotion produces distinctive autonomic reactions that correspond to the facial musculature patterns.

(c) A little-known theory advanced at the turn of the century by Waynbaum (1907) claimed to explain why particular emotional expressions and no others are associated with the particular emotional states. Why, Waynbaum asked, do we laugh in joy and cry in distress? His answer was that emotional reactions, in the form of muscle action, act as ligatures on veins and arteries regulating cerebral and facial blood flow. The altered blood flow, and especially cerebral blood flow, was considered a sufficient condition for the elicitation of pleasurable and noxious states. Although it is probably wrong in several respects, Waynbaum's theory merits close attention. There are means today of testing Waynbaum's vascular theory of emotions, and several of its aspects will no doubt prove to be correct.

Facts or Definition

These are facts, not conjectures, and they have to be somehow explained. If we require affect, by definition, to have cognitive appraisal as a necessary precondition, then we must discover for all the above findings and phenomena where and how cognition could possibly enter. Of all of these, Lazarus mentions only autonomic discrimination without awareness (Lazarus & McCleary, 1951). The effect is explained by assuming "that emotionally relevant meanings (con-

notations) could be triggered by inputs whose full-fledged denotations had not yet been achieved" (p. 1021). This argument may be quite correct, and one is tempted to suppose that some cognitive work took place because we deal with lexical material. But we must not prejudge the case. Marcel (1980) and Fowler, Wolford, Slade, and Tassinary (1981) have demonstrated that semantic features of words are accessible earlier than perceptions of physical stimulus properties of words, and they are accessible under viewing conditions so impoverished that even simple detection is at a chance level.

Experiments that use semantic material presented at levels that do not allow the subject to identify the stimuli or even to detect them may be questioned because we are tempted to assume that in some unknown ways, the meaning of the stimuli becomes accessible to the subject *prior* to her or his affective reaction. But affective reactions are established without awareness to such stimuli as food (Garcia & Rusiniak, 1980), tone sequences (Wilson, 1979), Japanese nonsense words (Takenishi, 1982), or geometric figures (Kunst-Wilson & Zajonc, 1980; Seamon et al., 1983a, 1983b). Especially intriguing are the Garcia–Rusiniak data described earlier, because in their case the conditioned stimulus was presented at optimal level while the noxious UCS was given much later and under anesthesia. The fact that the animal subsequently avoided the food in question (CS) is significant because it suggests that all sorts of cognitive appraisal processes must have been circumvented. Perhaps, if the experiment were conducted with humans, when asked why they refused the food, some of the subjects might have said that they did not find it appetizing in the first place. But we could not tell whether these appraisals came *before* rejecting the food and therefore caused rejection, or whether they came *afterwards* as a justification.

Nowhere in Lazarus's article is there any empirical evidence to suggest that cognitive appraisal *must* precede affect. The argument is based entirely on definition, and as such it becomes circular when applied to the explanation of the kinds of results that I discussed here and previously. Given Lazarus's definitional stance, there is no empirical evidence that can be marshalled to show that appraisal is *not* necessary. There is always the possibility that some appraisal took place, even if there is no evidence that it did.

Independence of Affect of Cognition

If cognition is not a necessary condition for emotion, then there must be instances in which affective reactions are primary in the course of behavior. What are they?

The individual is never *without* being in some emotional state. Emotional reactions may have chronic (e.g., depression) or phasic character (e.g., mood), tonic character (e.g., jealousy), or acute character (e.g., surprise or mirth). The chronic state may be overlayed by the tonic arousal, and tonic state may be altered by an acute reaction. No emotional reactions occur in a vacuum. They manifest themselves as changes in the emotional state characterizing the organism at the given time.

What are the first steps in the course of a change from one emotional state to another? Clearly, one such condition is cognitive activity. One may recall a sad event or be reminded of an impending unpleasant obligation. As a result, one's mood changes. But there are other reactions that cause people suddenly to change the focus of attention or to become generally alert. I have represented the course of such behavioral changes as having an early affective trigger (Zajonc, 1980, Figure 5). What makes the frog shift attention from a lily pad to a snake is not the perception of the snake itself. What shifts the frog's attention is a particular form of change in the environment, perhaps a change in the light pattern caused by a movement of the lily pad that differs from the patterns of the previous few minutes. There may have been perhaps a minute change in the ripple patterns of the water, or in a reflection that was sensed peripherally. A sensorimotor program is activated, muscles tense, and there is readiness for flight. Emotional state changes radically as a result of this minimal sensory input that needs not be transformed into meaningful information. The neuroanatomical structures necessary for such a cognition-free reaction are available and the relevant motor processes are also available (Goodale, 1982; Ingle, 1973). The retinohypothalamic fibers that lead from the retina project to the suprachiasmatic nucleus, and they can directly activate hypothalamic neurons (Moore, 1973). In turn, there are all sorts of projections from the hypothalamus and from the suprachiasmatic nucleus (Stephan et al., 1981) that participate in such typical emotional reactions as recruitment of carbohydrate from the liver; transfer of blood from the abdomen to the heart, lungs, and limbs; piloerection; and at the behavioral level, retraction of the lips, exposure of canines, or immobility.

Conclusion

The question of affective primacy must be settled on empirical grounds. If one insists that cognitive appraisal is always a precondition to emotion, one is forced to allow cognition to be reduced to such minimal processes as the firing of the retinal cells. Thus, if we accept Lazarus's position, all distinctions between cognition, perception, and sensation disappear.

Lazarus says that we do not need complete stimulus information to react emotionally. There can be no disagreement about that. However, the question

is not how much information the organism requires from the environment but how little work it must do on this information to produce an emotional reaction. Lazarus insists that perceptions that are "global or spherical" will suffice. I ask what forms of cognition *will not* suffice? Lazarus must answer this question if he wishes to hold fast to the proposition that cognitive appraisal is a necessary condition for all emotional states. His argument cannot generate clear answers. He cannot declare that cognitive participation in emotion must allow for an appropriate emotional response, because that is simply begging the question. Nor can he assert that cognitive participation must allow for stimulus identification, because research (including Lazarus's own classic work) has shown that emotion can be generated without identification. Lazarus argues that although there was no conscious identification there was some form of unconscious identification. But we cannot be sure, can we?

It is a critical question for cognitive theory and for theories of emotion to determine just what is the minimal information process that is required for emotion. Can untransformed, pure sensory input directly generate emotional reactions? The answer is likely to be yes, because the pattern of various findings seems to point in that direction. Already in 16-week-old infants, the blink reflex is suppressed much more substantially when the child is exposed to smiling faces than to blank slides. Perrett, Rolls, and Caan (1982) have recently found a group of cells in the superior temporal sulcus of monkeys that respond only to faces. These neuronal cells produce evoked potentials to monkey faces and to human faces, but not to scrambled facial features or to other parts of human and monkey bodies, such as hands. The cells did not respond to faces shown in profile, and even a slight rotation decreased responding. Thus, these face detectors may act as sufficient triggers for the emotional arousal that is produced in response to faces. When areas in the brain that are in proximity to the temporal sulcus are damaged there is a severe disruption in the emotional responding to faces (Kluever & Bucy, 1939). The disruption is especially severe when there is damage to the amygdala, and it is interesting in this respect that (a) heavy projections into the amygdala that lead from the superior temporal sulcus were found (Aggleton, Burton, & Passingham, 1980), and (b) there are also in the amygdala neurons that respond selectively to faces (Rolls, 1981; Sanghera, Rolls, & Roper-Hall, 1979). Given that the amygdala modulate the emotional response to faces, the organization of these systems suggests the possibility of processes whereby an emotional response to faces may occur directly to untransformed sensory information.

At the simplest level, any sufficiently intense physical stimulus produces an escape reaction. There is no doubt, therefore, that the organism is pre-programmed for particular classes of reactions (at the grossest level, for approach and avoidance) to particular classes of stimuli. Some property of afferent excitation, perhaps the extent of neural firing, selects between approach and avoidance reactions. If other stimuli or situations can acquire this property, they too will select between approach and avoidance, and the new process will become pre-programmed. Afferent excitation that acquired affective potential by virtue of cognitive processes, however complex, may become autonomous, and affective reactions may rid themselves of the cognitive mediators (Zajonc & Markus, 1982). Neutral stimuli that acquire emotional significance through an initially extensive cognitive process may eventually become able to select between approach and avoidance on the basis of a very rudimentary sensory process that involves no mental work. This sensory process short-circuits cognition and links the response to sensation in a most direct fashion. If it is possible to react emotionally on the basis of pure sensory input in one case, then it is possible to so react in other cases as well.

If cognitive appraisal must be involved in all affect, then a completely new view must be taken of a variety of phenomena that I have described here. The emotional system becomes subordinated to complete cognitive control. Such a system has a questionable adaptive value. It is emotional reactions that categorize the environment for us into safe and dangerous classes of objects and events. In contrast, if we assume that there may be conditions of emotional arousal that do not require cognitive appraisal, we shall dedicate our research to the questions of what these conditions are and how they differ from those that do require appraisal. Should it turn out that not all emotion depends on appraisal, we may wish to enquire about the precise role that appraisal plays in the natural history of emotional reactions. When does appraisal enter as a significant element of these reactions? What is its role in the three manifestations of emotional states: bodily process, overt expression, and subjective feeling?

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