



Categorizing the function of positive emotions

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This paper considers the principles of a functionalist perspective with regard to positive emotions. We discuss various ways that positive emotions have been studied historically and how these approaches bear on discussions of function. We then cover more recent attempts to categorize positive emotions and make recommendations for future endeavors. Our aim is not to pick and promote an existing view of emotions but rather to demarcate the various perspectives through which emotion scientists have viewed the question of function, which have in turn driven research on positive emotions. Taken together, this paper provides a brief introduction to the possible ways of focusing one's scope when viewing the function of positive emotions.

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Current Opinion in Behavioral Sciences 2021, **39**:93–97

This review comes from a themed issue on **Emotion, motivation, personality and social sciences** *positive affect*

Edited by **Gilles Pourtois, Disa Sauter, Blair Saunders** and **Henk van Steenbergen**

<https://doi.org/10.1016/j.cobeha.2021.03.001>

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What is functionalism?

Why do human beings experience emotions nearly constantly? The question of what function emotions serve has engaged scholars and laypeople for centuries. Emotions are considered functional to the extent that they lead to a favorable outcome or effect—that is, they serve a function that furthers one's interests in terms of physical and social survival [1]. Functionalist perspectives conceptualize emotions as systems that help individuals solve survival-related problems by coordinating adaptive responses to environmental input [1]. In this view, emotions serve as an interface that allows individuals to quickly process and deal appropriately with environmental problems [2,3].

Functionalist discussions vary widely in their focus and often describe emotions in aggregate, general terms,

devoid of context. In practice, however, people can only experience emotions during specific episodes, which involve a specific eliciting situation, time frame, and cultural context, as well as an individual with his or her own idiosyncrasies. These contextual features are important for identifying the function of discrete emotions. In this paper, we provide an overview of how the field of emotion science has come to understand the function of positive emotions and how consideration of the context in which positive emotions arise can strengthen theoretical approaches to emotion.

Functionalism in the context of positive emotions

Many theoretical perspectives on the function of emotions are based in evolutionary theory, which considers emotions across all of the countless times that a given emotion has arisen across humans' 'environment of evolutionary adaptedness' [e.g., 4–8]. Evolutionary theories typically assume that emotions function to maximize inclusive fitness in a broad context. This evolutionary system includes a population of every human and human ancestor, across the time frame of all human evolution, and every context and culture in which humans have lived. That is, on average, across human ancestors, each emotion that people currently experience has tilted the scales in favor of survival, reproduction, or the survival and reproduction of one's young [see Refs. 3,9,10]. However, we argue here that in the present day, emotions do not always serve the same function across contexts and may not be functional at all in some contexts. Emotions may function (or lead to dysfunction) in drastically different ways in certain eras, cultures, individuals, or situations [e.g., 11].

The question of emotions' function is deeply intertwined with the question of how emotions are defined and categorized, which have produced considerable controversy in the field. Some researchers argue that emotions are a collection of component responses (e.g., subjective experience, physiological response) triggered by relevant situational features; this perspective includes action tendencies, or functional motivations, as simply one component of emotions. Other researchers view emotions simply as culturally constructed labels for an otherwise indistinct experience, and still others believe that emotions emerge from a pattern of appraisals [see Ref. 12* for a review]. According to these perspectives, any adaptive function of emotions arises via the process of labeling or appraising.

Despite their differences, most emotion theorists agree that emotions are characterized by some type of subjective experience that emerges from more basic processes

[13]. However, of particular interest to a functionalist perspective are the wide variety of adaptive outputs, or consequences, of emotions. These outputs include physiological signatures, unique patterns of activation in the brain [e.g., 14], behavior that communicates something to others [e.g., facial or vocal expression; 15–17], appraisal patterns and action tendencies [e.g., 18], and shifts in cognitive processes [e.g., 19–21]. That is, a functionalist approach is less interested in what emotions *are* and more interested in what emotions *do*.

Regarding positive emotions in particular, recent functional approaches have defined positive emotions as those that direct behavior in situations that have the potential to confer positive consequences (i.e., rewards)—for example, by promoting social or achievement goals [22,23]. This view departs from earlier approaches to defining positive emotions, which largely focused on their pleasurable subjective experience. Of course, a definition of positive emotion as reward-based belies considerable complexity around the concept of rewards. Indeed, pleasant emotions may lead to undesirable consequences, particularly in the case of compulsive behaviors such as addiction, obesity, overspending, and others [23,24*]. Additionally, emotions that promote some types of rewards (e.g., in conflict resolution) can be subjectively unpleasant—and to the extent that positive emotions are subjectively pleasant, that subjective experience itself can serve as a reward that incentivizes some behavior that preceded it (e.g., a successful social interaction that leads to an enjoyable feeling of connection, gratitude, or pride).

Both approaches to defining positive emotions (i.e., as subjectively pleasant experiences or as states that are responsive to reward potential) have merit. These definitional issues are beyond the scope of this paper; however, we note that understanding the function of positive emotions requires sensitivity to the context in which they arise rather than a simplistic understanding of positive emotions as ‘good feelings’.

Broaden-and-build model

Initially, negative emotions largely drove researchers’ agendas; in fact, the framework of functionalism was initially based almost exclusively on deep empirical dives into the nature and apparent function of specific negative emotions [e.g., 27–31]. Only more recently have researchers attempted to fit positive emotions into a functional framework.

The limited theory and research on the function of positive emotions has focused on demonstrating that the experience of positive emotion—like that of negative emotion—serves a specific, future-oriented function. The broaden-and-build theory of the function of positive emotion begins with the assumption that positive

emotions must serve some sort of evolutionary function, like negative emotions do [32]. Fredrickson argues that, unlike negative emotions, which are typically associated with specific and physical action tendencies, positive emotions have non-specific and non-physical action tendencies that signal that things are going well [33,34] and prompt a broadening of one’s perspective and approach to the world—referred to as a ‘thought-action repertoire’. In this creative, explorative state, people can then build long-lasting resources, such as friendships or knowledge. Furthermore, positive emotional states promote long-term ‘upward spirals’ because the type of broadened thinking and behavior spurred by positive emotions lead to future positive emotions, and thus future opportunities to broaden and build [35*].

Since its introductions in the late 1990s, the broaden-and-build perspective has been at the center of discussions about the function of positive emotions since its proposal in the late 1990s. Numerous studies have provided supporting evidence that positive emotions predict tangible positive outcomes, presumably via their function of broadening thought-action repertoires. Notably, one meta-analysis combined cross-sectional, longitudinal, and experimental studies to demonstrate that positive emotion is associated with, predicts, and even causes success across multiple domains, including friendships and romantic relationships, physical and mental health, and work [36]. Positive emotions may also have an ‘undoing’ effect on the physiological stress associated with negative emotions [37,38]. Echoing these findings, positive emotions are linked to dampened reports of negative health symptoms and pain, as well as lower morbidity [39], better health-related physiological function, and health-protective psychosocial factors [40; see Ref. 41 for a review].

Although the broaden-and-build model has inspired many studies and garnered considerable empirical support [see Ref. 35*], it has several weaknesses. First, the model does not accommodate some contradictory findings—namely, that under some conditions negative emotional states lead to greater creativity than positive emotional states [e.g., 42,43] and that emotions like nurturant love and awe promote effortful and systematic processing rather than the broadened thinking pattern induced by emotions like enthusiasm, contentment, attachment love, and amusement [23]. Second, the model is largely neutral *vis-à-vis* distinctions among discrete positive emotions, which may vary in important ways and have different action tendencies associated with them (e.g., nurturant love and awe versus other positive emotions). In sum, the broaden-and-build model provides a solid base for research on the function of positive emotions, but other emotion features may be important to consider in order to fine-tune the specific function of discrete positive emotions.

Categorizing positive emotions

Just as definitions of emotion are controversial, so are efforts to categorize discrete emotions into distinct groups. Efforts to organize emotions into discrete groupings have yielded different categories based on the feature used as a criterion (e.g., facial expressions, subjective experience, vocal expressions). To illustrate this point, imagine trying to categorize foods. The categories would be quite different if one categorized foods based on culture of origin, texture, color, sweetness, fattiness, or tendency for co-occurrence in a meal. Certain foods would be indistinguishable in some categorizations but categorized as very different in other systems.

For similar reasons, simple categories or dimensions that meaningfully and consistently distinguish among discrete emotions have proven elusive. Just as food categories depend entirely on the dimension of focus, emotion categories would differ greatly depending on whether one categorizes emotions based on universality, pleasantness, activation, approach and avoidance motivations, facial or vocal expressions, and so forth. Some approaches would group emotions together that other approaches would differentiate; for example, anger and excitement would be in the same category if one focused on approach motivation or activation but in different categories if one focused on pleasantness or facial expression.

In order to sidestep these challenges of choosing semantically meaningful dimensions and then categorizing emotions based on those dimensions, some researchers have searched for a few key dimensions that explain most variance in emotional experiences. One common approach along these lines is to empirically determine which emotions tend to occur together in time, in response to a given triggering situation. This approach has produced a dimensional structure of affect that has been replicated numerous times, most often with two dimensions: positive-negative valence and high-low activation/arousal [e.g., 25,26]. Although this approach has considerable merit in terms of accurately representing physiological and neural signatures (or lack thereof) of discrete emotions, it leaves out phenomenological distinctions among discrete emotions that may be key to understanding their function. Despite the challenges associated with categorizing discrete emotions, we argue that the endeavor is a necessary one to gain a full understanding of emotion function, given that discrete emotions almost certainly have discrete functions.

A review of the literature reveals two primary approaches to identifying categories of positive emotions, with varying attention to function. First, some efforts have focused on gaining a deep understanding of specific categories of emotion rather than attempting to categorize all emotions, or even all positive emotions. For example, a number of researchers have turned their attention to

self-transcendent emotions, including gratitude, awe, compassion, and elevation [44]. These emotions are united in part by their action tendency—namely, appreciating and promoting the well-being of others [e.g., via reciprocal acts of kindness or care and affection; 45–49]. Other investigators have focused their attention on moral emotions. As is typical in emotion research, negatively valenced moral emotions (e.g., shame, guilt) have received the bulk of empirical attention; however, moral pride is sometimes included in these efforts [e.g., 50], and some researchers include gratitude and elevation in this category as well [see Ref. 51 for a review]. These emotions are in part linked by their associated action tendency of incentivizing future moral behavior [51].

Second, some researchers have attempted to identify discrete emotion categories for all emotions, or in some cases positive emotions specifically. In the broadest effort, Cowen and Keltner [52] proposed a comprehensive conceptual taxonomy of emotions with 27 empirically derived emotion categories, nearly half of which represent positive emotional states (e.g., admiration, amusement, calmness, excitement, joy, pride). Although their approach was not primarily focused on the function of discrete emotions, Keltner [53*] called for a pivot in the focus of emotion research from debating terminology and minor definitional distinctions toward an understanding of how emotions truly function in people's lives. To this end, he specifically called for more systematic attention to a set of understudied and thus poorly understood positive emotion categories—namely, amusement, awe, contentment, desire, ecstasy, gratitude, interest, joy, love, pride, relief, sympathy, and triumph [53*].

Two recent efforts focused specifically on positive emotions, with varying relevance to the current paper. First and most relevant, the PANACEAS model [23] identifies eight positive emotion categories (pride, amusement, nurturant love, attachment love, contentment, enthusiasm, awe, and sexual desire) based on common event types that evoke positive emotions. For example, according to the model, enthusiasm and contentment are responses to opportunities for some kind of material reward, with enthusiasm arising in anticipation of reward and contentment in response to consumption. The PANACEAS model is not necessarily comprehensive with regard to positive emotion categories, but the approach of considering common evocative situations among discrete emotions is a promising one in terms of understanding discrete emotion functions. A second, less relevant effort by Yih *et al.* [54*] identified unique profiles in the appraisals, motivations, and coping patterns for 12 positive emotions. However, the emotions were predetermined, so the goal of their endeavor was not so much to identify emotion categories as to determine how familiar positive emotions differ along various dimensions, organized around each emotion's motivational function.

Consistent with Keltner's [53*] call to action and Shiota *et al.*'s [23] general approach, we suggest that understanding the function of discrete emotions requires an examination of the contexts in which emotions arise in daily life. However, we recommend that future efforts cast a broader net than does the PANACEAS model to capture the full spectrum of positive emotions and use a data-driven approach to characterizing emotions along an array of contextual characteristics. As one example, an ongoing study by the authors of this paper entails trained coder ratings of hundreds of feeling states in terms of a wide array of subjective and contextual features that might evoke a given emotion. For example, coders separately rated the extent to which each emotion was caused by having something good happen to a person versus avoiding something bad. Top-rated emotions for 'something good happens' included *delighted, elated, happy, optimistic, and capable*; top-rated emotions for 'something bad avoided' included *amused, collected, elated, humble, and liberated*. As a final intriguing example, coders also indicated the extent to which each emotion has no particular cause (i.e., arises seemingly out of nowhere); *self-love, creative, hopeful, clear-headed, and uninhibited* topped that list. Although this approach has elements in common with studies of appraisal dimensions of emotions, it focuses more on contextual features in an effort to focus on function rather than subjective perception or experience.

Conclusions

In sum, understanding the functions of positive emotions would benefit from a categorical approach that takes into account the myriad contexts and conditions under which emotions are likely to emerge. When it comes to positive emotions, all of these contexts arguably involve the individual gaining evolutionarily adaptive rewards and avoiding threats or punishments. Yet how individuals accomplish this—and even how they construe what is rewarding and what is threatening—is highly variable and complex. A comprehensive framework that can catalog positive emotions along function-relevant dimensions on multiple axes could decode this variability—for example, by isolating different types and magnitudes of rewards (e.g., spiritual versus material). Such a framework could also potentially identify novel functions or benefits—for example, positive emotions associated with avoiding something bad within oneself. This approach could also offer insights into which positive emotions might be valuable (or harmful) to co-experience, thus informing future interventions (e.g., simultaneously inducing two seemingly disparate emotions, such as elation and humility, to combine their functional benefits).

Positive emotions are critical for survival, reproduction, and human flourishing and, after decades of neglect, they have finally achieved the prominence in research they deserve. Research that aims to classify positive emotions in ways that illuminate their functions—in the

contexts where they arise—will not only shed light on why humans feel happy, awe-struck, proud, grateful, and affectionate, but also guide recommendations for how to make these experiences more frequent and more fruitful.

Conflict of interest statement

The authors of this manuscript certify that they have no affiliations with or involvement in any organization or entity with any financial or non-financial interest in the subject matter or materials discussed in this manuscript.

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