

Functionalist and Constructionist Perspectives on Emotion Dysregulation

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Abstract and Keywords

Two theoretical perspectives—functionalism and constructionism—predominate modern research on emotion. This introductory chapter describes these perspectives and offers points of convergence and divergence. It pays special attention to common misconceptions about functionalism and to the strengths and limitations of each perspective. Functionalism, which draws in part from phylogenetic accounts of emotion and motivation, is limited by difficulties drawing inferences about human emotion from animal research, even though animal research is conducted using very precise methods of high spatial and temporal resolution. In contrast, constructionism is limited by difficulties falsifying its core propositions given reliance on research using functional magnetic resonance imaging, which has poor temporal resolution. These limitations notwithstanding, both functionalism and constructionism have much to offer current interpretations of and future research on emotion dysregulation. Thus, pitting the perspectives against one other is counterproductive.

Keywords: constructionism, emotion, emotion dysregulation, functionalism, psychopathology

Introduction

It is an honor and a privilege to coedit this *Oxford Handbook*, in which contributors describe diverse perspectives on emotion dysregulation. We were fortunate to receive contributions from internationally renowned experts in affective science, who together summarize contemporary approaches to and future directions in emotion dysregulation research. Chapters are grouped into six sections: (1) conceptual issues; (2) cognitive, behavioral, and social approaches; (3) neurobiological approaches; (4) psychopathology; (5) assessment and treatment; and (6) future directions. Collectively, these sections describe the effects of emotion dysregulation on core aspects of human function across levels of analysis including genes, neural networks, electrophysiology, and behavior. During 3 years of planning and editing this volume, Sheila Crowell and I (TPB) learned more about

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emotion dysregulation than we otherwise could have known, and we are indebted to a brilliant team of contributors. We hope readers find the diversity of topics useful in advancing their thinking about emotion dysregulation and its multiple determinants across the lifespan. In this chapter, we summarize functionalist and constructionist perspectives on emotion, which sets the stage for the chapters to follow.

Over the past two decades, *emotion regulation* has received burgeoning attention as a scientific construct, as evidenced by foundational articles, dedicated volumes, and extended scientific debate (e.g., Aldao, Nolen-Hoeksema, & Schweizer, 2010; Cole, Martin, & Dennis, 2004; Gross, 1998, 2014). Although emotion dysregulation has received more circumscribed attention, it is of considerable interest to developmentalists, psychopathologists, and other invested parties (e.g., Beauchaine, 2015; Bradley et al., 2011; Gratz, Rosenthal, Tull, Lejuez, & Gunderson, 2006; Linehan, 1993). In this volume, we place primary emphasis on emotion dysregulation and how it compromises adaptive human functioning through its effects on initiating, maintaining, and modulating diverse human behaviors (cf. Campos, Mumme, Kermoian, & Campos, 1994; Thompson, 1990). Given our objective of conveying contemporary perspectives on emotion dysregulation, both emotion and emotion regulation must be discussed. However, they are not primary foci given widespread coverage in other sources. Interested readers are referred to excellent recent reviews (Aldao et al., 2010; Barrett, 2017a; Braunstein, Gross, & Ochsner, 2017; Gross, 2014; Gross & Barrett, 2011).

Variants of Functionalism

When defining emotion dysregulation, one must first consider what emotions are, and the day-to-day functions they serve and do not serve in both their ordinary and extreme forms. From this perspective, affect dysregulation cannot be defined by overt expressions of emotion without first specifying the contexts in which such expressions occur, then evaluating whether the emotion expressed and the intensity of its expression are context appropriate, inappropriate, or neutral vis-à-vis social and cultural norms. For example, intense expressions of anger toward others may be fully functional if the safety of one's offspring is threatened, but similarly intense displays of anger interfere with adaptive behavior in most social and cultural contexts. Although often not considered, it is also important to note that in some situations expressions of anger are *afunctional*. Even moderately intense solitary displays of anger, for example, such as those elicited by frustration while driving, may serve no function or dysfunction whatsoever. Thus, whether particular displays of emotion are functional, dysfunctional, or afunctional, and whether they are regulated, dysregulated, or unregulated, depends in large part on eliciting contextual events, and match or mismatch between context and expressive intensity (e.g., Aldao, 2013). Furthermore, given two common usages of the term *functionalism* that partly but do not fully overlap (see immediately below), classifying emotions as functional or dysfunctional, regulated or dysregulated, is not as straightforward as it might first appear (e.g., Barrett, 2017b).

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One common use of the term *functionalism* assumes evolutionary selection of at least some human emotions. Such accounts presume that broad classes of emotion evolved to motivate adaptive, survival-related functions including approach, avoidance, and social affiliation (e.g., Keltner & Gross, 1999). According to evolutionary functionalist perspectives, emotions that subserve these functions are preserved across species and experienced by all mammals, including humans, because they were selected in our environments of adaptation (e.g., Panksepp, 2011, 2016). For example, approach emotions (e.g., wanting, enthusiasm) elicit consummatory behaviors (e.g., foraging, food seeking); avoidance emotions (e.g., anxiety, fear) elicit precaution (e.g., passive avoidance, suppression of approach); and affiliative emotions (e.g., compassion, affection) elicit prosocial behaviors (e.g., group cohesion, pair bonding). Without emotions motivating approach, avoidance, and affiliative behaviors, the likelihood of survival in our environments of adaptation would presumably have been lower. Evolutionary functionalist perspectives have a long history in animal, human, and comparative research on emotion and suggest that emotion and motivation are inextricable facets of human function, despite being separated in the history of behavioral science (see, e.g., Beauchaine & Zisner, 2017; Gray & McNaughton, 2000; Panksepp, 2011; Porges, 1997).

An important corollary of this perspective is that humans sometimes behave at the behest of their emotions. Such is especially likely when environmental contingencies are extreme and pull strongly for survival-relevant actions (e.g., in situations of food deprivation, threats to physical safety to oneself or one's kin). Strong emotional reactions to these situations motivate urgent behavioral responses that override ongoing activities (see, e.g., Corr, 2004). Notably, however, evolutionary functionalist accounts do not imply that all or even most emotional reactions are survival relevant. In fact, evolutionary theorists have long recognized that (1) over any extended period of time individual differences in emotional and behavioral response tendencies confer probabilistic rather than deterministic effects on adaptive fitness, and (2) some behavioral response tendencies are coincidental byproducts of evolution—not direct outcomes of adaptive selection (Beauchaine, 1999; Buss, Haselton, Shackelford, Bleske, & Wakefield, 1998; Gould, 1991). In the latter case, such response tendencies have no bearing on adaptive fitness. Despite its name, evolutionary functionalism therefore does not imply that all or even most emotional experiences or expressions are functional, a point we return to in later sections (see “Points of Divergence and Convergence in Functionalism and Constructionism”).

In a second common use of the term *functionalism*, experiences and expressions of emotions are linked to outcomes in our day-to-day lives, with limited if any consideration of our evolutionary environments of adaptation (see Keltner & Gross, 1999). Among children, for example, emotionally complaisant, well-mannered behavior in the classroom is seen as functional and adaptive, whereas emotionally exuberant, impulsive behavior is seen as dysfunctional and maladaptive. Notably, however, exuberance and impulsivity were likely not maladaptive in our evolutionary environments of adaptation and may have conferred selective advantages in certain environmental niches (see Mead, Beauchaine, & Shannon, 2010). Thus, whether specific emotions and behaviors are functional or dysfunctional in our modern-day lives may have nothing to do with their phylogenetic adap-

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tive value. Our intent here is to call readers' attention to the important distinction between these two common uses of the term *functionalism*, the latter of which is especially prone to circular reasoning in definitions of adaptation.

Given potential confusion brought about by different uses of the term *functionalism*, and given other issues described in foundational articles across the affective sciences (e.g., Campos et al., 1994; Cole et al., 2004; Keltner & Gross, 1999; Thompson, 1990), coeditor Sheila Crowell and I (TPB) encouraged authors to adopt a common definition of emotion dysregulation as “a pattern of emotional experience and/or expression that interferes with *appropriate goal-directed behavior*” (Beauchaine, 2015, p. 876, emphasis added; see also Cole, Hall, & Hajal, 2017). Here, we chose the word *appropriate* instead of *adaptive* to avoid teleological undertones. Teleological explanations are those that define phenomena based on specific purposes they serve, including assumptions that specific emotions either (1) evolved to serve highly specialized functions or (2) always serve an immediate function. As already noted, many displays of emotion are afunctional, and in Western culture, situations that require “appropriate” dampening of strong emotions are far removed from our evolutionary environments of adaptation. Moreover, testing evolutionary functions of emotions and emotion-subserving neural circuitry is a difficult proposition (see Barrett, 2017b). These observations contributed to modern *constructionist* accounts of emotion, which eschew several assumptions of traditional functionalist theories, as described in the next section.

A common although not universal assumption of evolutionary functionalism is that at least some emotions or subsets of emotions represent categories in nature. This notion follows from seemingly different classes of behavior—including approach, avoidance, and social affiliation—that specific emotions seem to support (see earlier; Beauchaine & Zisner, 2017; Gray & McNaughton, 2000; Panksepp, 2011; Panksepp & Watt, 2011). Furthermore, many evolutionary accounts presume that either rudiments of or fully formed approach, avoidance, and affiliative emotions (1) are present across mammalian species, (2) are experienced by human infants at birth, and (3) transcend human cultures (Ekman & Cordaro, 2011; Ekman & Friesen, 1971). These theories articulate phylogenetically old, subcortical neural networks that subserve basic emotions (see, e.g., Beauchaine, Neuhaus, Zalewski, Crowell, & Potapova, 2011; Panksepp, 2016).

Full articulation of anatomical and functional characteristics of these subcortical structures is beyond the scope of this introductory chapter, but both are specified in extensive reviews of the animal and human literatures (e.g., Beauchaine et al., 2011; Ikemoto, Yang, & Tan, 2015; Koob & Volkow, 2010; Panksepp, 2016; Tovote, Fadok, & Lüthi, 2015). In brief, early work on subcortical neural circuits of approach and avoidance derived from studies of associative learning, motivation, and addiction in rodents and nonhuman primates. This work, including lesion studies, single cell recording experiments, and pharmacological manipulations, identified subcortical neural systems of appetitive and aversive motivation that are largely preserved across species. These systems include (1) the medial forebrain bundle—particularly projections from the ventral tegmental area to the nucleus accumbens—as integral to appetitive motivation and approach emotions

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(Sagvolden Johansen, Aase, & Russell, 2005; Schultz, 2002; Wise, 2004) and (2) the septo-hippocampal system—including the hippocampus and its afferent projections from the amygdala—as integral to aversive motivation and associated avoidance emotions (Corr, 2013; Gray & McNaughton, 2000; Strange, Witter, Lein, & Moser, 2014).

Although general consensus exists regarding the primary roles these systems play in approach and avoidance motivation and emotion (for reviews see Beauchaine, 2001; Beauchaine & Zisner, 2017), it is also well recognized that the systems interact structurally and functionally (e.g., Corr, 2013; Corr & McNaughton, 2016). For example, neurons in the nucleus accumbens (NAcc) respond to punishment as well as reward, and the amygdala responds to reward as well as punishment (e.g., Sauder, Derbidge, & Beauchaine, 2016; Schultz, 2016). Both are therefore intricately involved in associative learning. Moreover, the NAcc and the amygdala share interconnections via the paraventricular nucleus and the stria terminalis (e.g., Dong, Li, & Kirouac, 2017; Tovote et al., 2015). Thus, although the distinction between appetitive and aversive subcortical systems is useful heuristically, subcortical CNS networks of approach and avoidance interact complexly and are not functionally independent (see also Beauchaine & Constantino, 2017; Beyeler, 2016).

Implications for Emotion Regulation and Dysregulation

Functionalists often distinguish between bottom-up, subcortically mediated emotion generation processes and top-down, cortically mediated emotion regulation processes (e.g., Beauchaine, 2015; Gross & Barrett, 2011). According to such perspectives, subcortical neural circuits that initiate strong emotional responses are modulated by cortical functions (see also Hare et al., 2008). This literature is voluminous and cannot be reviewed comprehensively, yet several findings are noteworthy. First, cortical structures, particularly in prefrontal and orbitofrontal regions, have long been implicated in executive function and self-regulation (see Beauchaine & Zisner, 2017; Etkin, Büchel, & Gross, 2015; Heatherton, 2011). Modern neuroimaging studies identify functional subdivisions of the prefrontal, anterior cingulate, and insular cortices as integral to effortful downregulation of negative affect (e.g., Tone, Garn, & Pine, 2016; Zilverstand, Parvaz, & Goldstein, 2017). In fact, volitional reappraisal of negative emotion elicits increased neural responding across a distributed network of frontal structures, including the dorsolateral, medial, and ventrolateral prefrontal cortices; the lateral orbitofrontal cortex; the inferior frontal gyrus (IFG); and the insular cortex (e.g., Goldin, McRae, Ramel, & Gross, 2008).

Second, subcortical structures reach volumetric and functional maturity many years before cortical neural structures (e.g., Brain Development Cooperative Group, 2012; Casey, Getz, & Galvan, 2008; Galvan et al., 2006). Differential neuromaturation of subcortical and cortical brain regions is a likely contributor to the impetuous, impulsive, and emotionally labile behaviors common to adolescence (e.g., Casey & Caudle, 2013). As prefrontal neuromaturation completes in early adulthood, self- and emotion regulation im-

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prove markedly. Notably, children and adolescents show stronger subcortical responses to incentives than adults, yet their prefrontal cortex responding is weaker and more diffuse (Macdonald, Goines, Novacek, & Walker, 2016). Furthermore, adolescents with impulse control problems show blunted frontal neuromaturation (De Brito et al., 2009).

Finally, deficits in functional connectivity between cortical and subcortical structures are observed in both impulse control and anxiety disorders, which are characterized by excessive approach- and avoidance-related emotions, respectively. For example, reduced functional connectivity between the anterior cingulate and dorsal striatum is observed among externalizing adolescents (e.g., Shannon, Sauder, Beauchaine, & Gatzke-Kopp, 2009), and reduced functional connectivity between the amygdala and the orbitofrontal cortex is associated with compulsive behavior and emotional lability (e.g., Churchwell, Morris, Heurtelou, & Kesner, 2009; Hilt, Hanson, & Pollak, 2011). Notably, although findings are complex and not fully consistent, several studies show improved cortical-subcortical connectivity following effective treatment for internalizing and externalizing disorders (for a recent review see Beauchaine, Zisner, & Hayden, 2019). Collectively, these findings lend support to the notion that emotion regulation is subserved by top-down cortical control over subcortical neural responding, and that disruptions in frontal cortical function and cortical-subcortical connectivity characterize emotion dysregulation (see also Beauchaine, Constantino, & Hayden, 2018).

Constructionism

An alternative to functionalist perspectives is *constructionist* theory. Constructionists assert that what humans perceive as discrete emotions are not encoded by specific brain regions, but rather constructed through learning processes that are highly individualized. According to this perspective, emotions and other experiential states, including perception and cognition, emerge from interactions among more primitive sensory and neural mechanisms, which humans interpret and categorize based on prior experience (see Barrett, 2009). Constructionist theory identifies *core affective processes*, including *valence* and *arousal*, which transcend multiple emotional states. Through repeated visceral pairings of these core affective processes with sensory and neural input elicited by our environments, we learn to associate instances of core affect with higher order, discrete *representations* of emotion such as happiness and sadness (e.g., Russell & Barrett, 1999). Neural mechanisms of core affective states are presumed to be present at birth, universal among humans, and supported by the same neural networks as other psychological processes and states, such as perception and decision making (see Duncan & Barrett, 2007).

Constructionists make a clear distinction between core affective processes and emotions. Whereas core affective processes refer to general experiences of positivity–negativity (valence) and activation–deactivation (arousal), emotions are more specific experiential states, such as sadness, anger, fear, and shame (Ekman, 1992; Ekman & Cordaro, 2011). Thus, despite being experienced discretely, all emotions can be characterized along di-

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mensions of valence and arousal (Barrett, 2016). According to constructionist theory, we rely on learning and memory from prior experience to infer the meaning of core affect in current situations. In this way, we construct context-dependent emotion representations (Barrett, 2017a). Of note, core affective processes, similar to basic emotions, can motivate behavioral response tendencies. For example, Pavlovian bias is a “hard-wired” tendency to approach positively valenced stimuli and avoid negatively valenced stimuli (Guitart-Masip et al., 2011). In some cases, Pavlovian bias is so strong that organisms cannot learn stimulus–response contingencies that require avoidance to attain reward (Hershberger, 1986).

Constructionists have been critical of functionalist theories on a number of grounds. Although we cannot review all such critiques here, three especially important issues concern (1) teleological arguments concerning adaptive evolution of emotion, as outlined earlier (see “Variants of Functionalism”); (2) opposition to the notion that specific neural structures and networks subserve particular emotional states and functions; and (3) disagreement on the extent to which animal research on reward learning, fear learning, and motivation informs our understanding of human emotion. Although we agree that these points warrant consideration when evaluating functionalist theories, we argue that functionalism is often oversimplified and thus misconstrued in critical discussions concerning its merits. This creates an artificial distinction between functionalist and constructionist views on emotion. We view functionalism and constructionism as largely compatible, so long as one avoids teleological misconceptions of evolution and acknowledges interactive complexities and functional dependencies of neural responding across subcortical and cortical networks. In sections to follow, we briefly outline our reasoning.

Implications for Emotion Dysregulation

Constructionist accounts now rival functionalist perspectives as explanatory theories of emotion, yet constructionists have written far less than functionalists about emotion dysregulation per se. This may be because constructionist approaches, including the theory of constructed emotion (TCE; Barrett, 2017a, 2017b; Lindquist, 2013), view emotions as emergent properties of complex neuro-architectures, which exhibit individualized affect-imbuing response patterns that are byproducts of unique learning histories. These learning histories produce cognitive–affective schemas, attributional biases, and stimulus–response associations that contribute collectively to emotional experience. From this standpoint, emotion dysregulation *is* emotion, because it arises through the same highly individualized neural processes and unique learning histories (see, e.g., Papa & Epstein, 2018).

According to TCE, emotion dysregulation emerges at least in part from neural mechanisms of core affective processes (e.g., valence, arousal) and disruptions in *situated conceptualization* (Barrett, Wilson-Mendenhall, & Barsalou, 2013). Situated conceptualization refers to “the brain [as] a situated processing architecture, designed to process situations in the moment and to simulate non-present situations in thought” (Barsalou, 2016,

p. 6). This includes evaluating what eliciting events represent, how to act upon those events, and the nature of core affective processes to expect. Barrett et al. (2013) suggest that emotion dysregulation could emerge from highly canalized, inflexible conceptualizations that are not situational. In turn, nonsituational conceptualizations could arise from disruptions to one or more among several processes, including memory retrieval, autonomic regulation, and attention, to name but a few. As reviewed by Barrett and Satpute (2013), many such deficits correlate with abnormalities in connectivity among intrinsic neural networks, including the salience network and the fronto-parietal network, as seen in diverse forms of psychopathology. Thus, disrupted connectivity plays a central role in *both* functionalist and constructionist theories of emotion dysregulation.

Points of Divergence and Convergence in Functionalism and Constructionism

As already noted, teleological explanations are those that define phenomena based on the specific purposes they serve. The notion that emotions were *designed* by evolution to serve specific, adaptive functions is therefore teleological (Barrett, 2017b). Basic emotion theory identifies approximately six discrete emotions (happiness, sadness, fear, surprise, anger, and disgust) that are shared across cultures, some of which are documented in other mammals (Chevalier-Skolnikoff, 1973; Ekman & Friesen, 1971). A teleological explanation takes cross-species and cross-cultural expressions of affect as evidence that discrete emotions evolved to facilitate adaptive behaviors (e.g., fear evolved with the purpose of signaling organisms to danger). In other words, evolution by natural selection *purposefully designed* basic emotional states to preserve the organism.

Here it is important to note that purposeful design has been explicitly eschewed as a mechanism of evolution since Darwin (1859) wrote *On the Origin of Species*. Thus, even though evolutionary psychologists have at times appealed to purposeful design, evolutionary biologists rejected the notion over a century ago (see Beauchaine, 1999; Buss et al., 1998; Gould, 1991). A more accepted approach among evolutionary theorists is to infer function from the *consequences* of emotions throughout evolutionary history (Wright, 1973). For example, we may infer that the function of fear is to alert an organism of immediate danger because fear in the face of danger creates conditions that are conducive to survival. By way of natural selection, the most likely consequence of an emotion is *therefore the function* of that emotion specifically in our environments of evolutionary adaptation (see Wright, 1973). Provided such inferences are supported by observable, biological mechanisms, they are not dubious philosophically (e.g., Barrett, 2017b; Neander, 1991). This Darwinian (1872) perspective is infused in contemporary thinking about emotion (see Keltner & Gross, 1999), despite terminology that sometimes leads to confusion. Indeed, even within biology, where most scientists decry language implying that evolution proceeds with goal-directed intention, some nevertheless use such language as a literary device (e.g., Hanke, 2004).

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A second critique of functionalism concerns its linking of emotional states to specific brain regions and networks. As outlined under “Variants of Functionalism,” for example, functionalist theories often link (1) appetitive emotions to neural responding in the medial forebrain bundle, including projections from the ventral tegmental area to the nucleus accumbens (Sagvolden et al., 2005; Schultz, 2002; Wise, 2004), and (2) aversive emotions to neural responding in the septo-hippocampal system, including the hippocampus and its afferent projections from the amygdala (Corr, 2013; Gray & McNaughton, 2000; Strange et al., 2014). According to such accounts, basic emotions are presumed to be initiated/generated by localized, phylogenetically old neural structures that are largely preserved across mammals and, in some cases, other vertebrates (Panksepp, 2011, 2016). As already noted, these conclusions are based on decades of extensive research with animals (rodents and nonhuman primates). This research includes localized lesion studies, pharmacological manipulations, and implanted electrode stimulation and recording experiments that are highly precise both spatially and temporally (e.g., Gray, 1982; Olds & Milner, 1954).

Most studies of this nature cannot be conducted with humans for obvious ethical reasons. As a consequence, neural studies of human emotion rely primarily on functional magnetic resonance imaging (fMRI), which evolved more recently. When fMRI technology was first applied in emotion research, region-of-interest (ROI) and effective connectivity analyses predominated. Most early ROI and connectivity studies were *deductive* (top-down), with ROIs specified a priori based on theory. Early meta-analyses of these studies revealed modest evidence for emotion localization, consistent with animal research (e.g., Murphy, Nimmo-Smith, & Lawrence, 2003; Phan, Wager, Taylor, & Liberzon, 2002).

More recently, *inductive* (bottom-up) approaches that capture coactivated neural circuitry have ascended to prominence in the fMRI literature. These approaches show that distributed patterns of neural activity account for more variance in basic emotions than specific brain regions (Celeghin, Diano, Bagnis, Viola, & Tamietto, 2017; Saarimäki et al., 2016). Such findings are sometimes cited as evidence against functionalism (Kober et al., 2008; Lindquist, Wager, Kober, Bliss-Moreau, & Barrett, 2012; Touroutoglou, Lindquist, Dickerson, & Barrett, 2015). It is important to note, however, that linking basic emotions to specific brain structures oversimplifies the functionalist perspective. In fact, functionalists have long recognized that multiple emotional states activate common brain regions (see, e.g., Gray & McNaughton, 2000), and that complex neural circuits and interacting cortical-subcortical networks generate and regulate affective responses (e.g., Beauchaine, 2015; Beauchaine & Zisner, 2017; Braunstein et al., 2017; Etkin et al., 2015; Goldin et al., 2008; Gray & McNaughton, 2000; Gross & Barrett, 2011). Indeed, functional deficiencies in cortical-subcortical connectivity characterize several psychiatric disorders for which emotion dysregulation plays a prominent role (see, e.g., Beauchaine, Constantino, et al., 2018; Shannon et al., 2009; Tone et al., 2016).

It should also be noted that neural signals propagate across brain regions and networks at much faster rates than fMRI is capable of resolving. For example, reactivity to reward cues by midbrain dopamine neurons—as assessed via direct electrode placement in pri-

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mates—peaks at about 0.2 seconds and returns to baseline at about 0.7 seconds (e.g., Lak, Stauffer, & Schultz, 2016). In contrast, the fMRI blood oxygen level-dependent (BOLD) signal peaks between 4 and 5 seconds poststimulus and returns to baseline after 10 seconds (e.g., Lohrenz, Kishida, & Montague, 2016). Thus, the BOLD signal is a sluggish indicator of neural responding and is not well suited for detecting rapidly propagating patterns of neural responding that originate in the subcortex and project to both cortical and other subcortical structures. Although modern imaging sequences provide whole-brain coverage of slices at well under 1-second resolution (e.g., Uğurbil et al., 2013), this does not circumvent sluggishness of the BOLD signal being measured. It is important to recognize this limitation when evaluating strengths and weaknesses of modern imaging techniques that characterize and correlate widely distributed patterns of BOLD coactivation with attentional and emotional processes (e.g., Yoo et al., 2018). It remains quite possible that among humans, at least some emotional states arise from patterns of neural reactivity that originate in the very subcortical structures identified in decades of animal research. As described earlier, several functionalist accounts suggest that vulnerability to emotion dysregulation occurs when rapid subcortical responses to eliciting events are not modulated effectively by cortical reactivity (e.g., Beauchaine, 2015; Casey & Caudle, 2013; Etkin et al., 2015).

In contrast, functionalist accounts suggest that *regulated* emotions should be associated with (1) subcortically generated responses to eliciting events that are (2) modulated by cortical responses via (3) strong cortical–subcortical connectivity (e.g., Beauchaine, Constantino, et al., 2018; Beauchaine, Zisner, et al., 2018). If such is the case, we would expect to find distributed neural activity for any given instance of emotion due to the limited temporal resolution of fMRI. From this perspective, prominent functionalist accounts look much like constructivist ones—both assume that primary-process emotions (*core affective states*) that promote approach and avoidance behaviors are subserved by phylogenetically old structures (primarily subcortical structures), and that cortical networks interact with these subcortical networks to produce what we consciously experience as emotional states (see Panksepp, 2011).

Finally, the *locationist* basic emotion perspective of functionalism is only a single perspective—albeit a pervasive one in certain areas of research. Other functionalist perspectives focus on the dimensional nature of emotions and various contextual factors that influence our experience of affect (cf. Campos et al., 1994; Haines et al., in press), similar to constructivist ideas. In summary, although language used to describe functionalist and constructivist theories is quite different, underlying ideas are more similar than some recent discourse in the literature suggests.

A final critique concerns the utility of animal research for making inferences about human emotion. Because evolutionarily functionalism is a phylogenetic account of emotion, many functionalists assume that the neural structures implicated in generating basic emotions among humans should overlap considerably (if not fully) with their vertebrate homologues. As noted earlier under “Variants of Functionalism,” such arguments are most persuasive when applied to subcortical regions that are structurally similar across

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species. Nevertheless, some constructivists have taken a strong stance against comparative research on emotion, noting that functionalist accounts often fail to specify mechanisms adequately, and that it cannot be assumed that emotions are experienced by animals in the same way as they are by humans (see Barrett, 2017b; LeDoux, 2012).

Given (1) overwhelming structural differentiation of the human cortex, (2) the phenomenon of human consciousness, and (3) the role that language plays in shaping human experience of emotion, this critique also holds merit. Here again, however, prominent functionalists have made the same point. Indeed, Jaak Panksepp, who spearheaded functionalist emotion research with rodents, was very clear in describing qualitative differences between animal and human experiences of emotion: “Are the various affects—diverse feelings of positive and negative valences (‘good’ and ‘bad’ feelings in the vernacular)—identical across species? Of course not! Evolution persistently generates abundant differences, but always on top of conserved-homologous foundational principles at genetic, neural and primal psychological levels” (Panksepp, 2011, p. 1796).

Our contention is that interspecies differences in emotion notwithstanding, basic animal research offers extensive insights into the neural substrates and representations of emotion, as discussed in previous sections. Models of dopamine reward prediction error signaling in nonhuman primates provide one example (Schultz, Dayan, & Montague, 1997). These models capture moment-to-moment affective states among humans (Rutledge, Skandali, Dayan, & Dolan, 2014) and extend further to explain individual differences in mood states, including positive affectivity, irritability, and anhedonia (e.g., Eldar, Rutledge, Dolan, & Niv, 2016; Laakso et al., 2003; Zisner & Beauchaine, 2016). With continued development of computational models of emotion generation and regulation (e.g., Etkin et al., 2015), we expect that many more such examples will become realized in the near future.

Conclusions

In this chapter, we introduce functionalist and constructionist theories of emotion, discuss their implications for understanding emotion dysregulation, and consider points of divergence and convergence across perspectives. Although constructionist theories have gained remarkable traction in affect research and offer key insights into the complex individuality of emotion, we argue that functionalist perspectives still hold value, especially when they are not oversimplified. Functionalist perspectives derive from a long tradition of painstaking neuroscience research, including elegant experiments with animals using techniques of very high spatial and temporal resolution. Although such techniques are not available to those who test constructionist theories with humans, fMRI studies yield insights into the roles that widely distributed neural networks play in emotion and emotion dysregulation. We look forward to research from both perspectives in upcoming years, and we hope this chapter provides a framework for readers as they digest the many interesting chapters to follow.

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