Evaluating the Status of Theories of Emotion in Political Science and Psychology

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To be presented at the 2022 Annual Meeting of the American Political Science Association, Montreal, September 15-18. An earlier version of this paper was presented at the 2022 Annual Meeting of the Midwest Political Science Association, Chicago, IL, April 7-10.

Draft 6.1: Monday, August 15, 2022

Abstract: Emotion is an increasing influential area of research in psychology, political psychology, political science and other social sciences. Research is best when driven by theory because the absence of theory generates research that is subject to vagaries of meaning, interpretation, and lack of coherence, study to study. In brief, theory provides essential foundations that enable scientific explanations to be rigorously tested. As I demonstrate below, absence of, or reliance on, incomplete theories have generated results that are demonstrably flawed. I evaluate the extent to which current emotion research programs rely on a full blown theory. The programs under consideration, in alphabetical order, are: appraisal theories in psychology and political science; emotion regulation; and, valence based accounts. After a brief overview of the elements, individually and collectively, that constitute a theory of emotion. I find this worthy ambition awaits fulfillment.

Key Words: emotion, valence, appraisal theory, affective intelligence theory, emotion regulation, neuroscience

I. Introduction

Millennia before the development of the social sciences it was common to view emotion as a singular phenomenon, most often juxtaposed antagonistically to reason (Gottlieb, 2016; Maiz, 2011). The turn to science to understand emotion offers three advantages not hitherto available to those seeking better understandings of what emotion is and what influences it has on human judgment and agency.

The first is secured by the requirement of a specific clarity as to what constitutes a scientific property (i.e, concept in contrast to a lay word). A scientifically valid concept must identify one specific property.[1] Further, the property must take on different levels, ranging from less to more of that property. It is for this reason that the empirical manifestation of scientific concepts are commonly identified as variables.

The second is that scientific theories should advance explicit causal claims. Causal claims are explanations for why one or more variables cause variations in other variable(s). In brief, do changes in variables X (and, or, A, B, C, etc.) explain changes in variable Y? The availability of theory helps reduce the ever-present risk of ignoring consequential factors, that is to say, "third" variables, which can and have lead to misleading results.

The third is that by setting aside authorial claims as to the truth of the matter we can, instead, rely on empirical data to confirm or disconfirm theoretically derived causal claims.

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[1] In everyday parlance many words identify compound or complex facets of any given object. In science such concepts are treated as confounds. Confounded term conflate, i.e., combine different phenomena. That in turn generates analytic problems as conflated concepts preclude identifying which facet(s) are doing what.

Obviously, any one specific empirical result is not by itself definitive. New data often leads to revelations not previously observed. One important consequence of this advantage is that the heavy hand of embedded convictions is given less purchase. Reliance on evidence to test claims, ensures that theoretical claims always subject to disconfirmation. This advantage is very important as it inspires scientists to continually pursue yet better understandings.

My ambition is to describe projects on emotion in different disciplines over the past fifty or more years. This inquiry will necessarily preclude a more granular examination that ideally should also be undertaken. What then is required to constitute a scientific theory of emotion? The answer depends on when the criteria are posed (Reisenzein, 2021). I begin with a list of pre-1970 criteria.

II. What Constitutes a Theory of Emotion?

A. Five Essential Elements of Theory

The five elements I identify are but a modest beginning. Any theory should successfully address at least these to be recognized as a theory. These are:

1) offers an explicit scientific definition of emotion;

2) offers a clear taxonomy that defines the explicit criteria for assignment of each member of the class by reliance on these criteria;

3) advances testable claims of cause and effect;

4) advances a measurement component to define the proper means of operationalizing latent concepts as empirical variables; and

5) Karl Popper held that scholars should be ambitious in seeking to test their conceptions (more on that below).

Turning to the first, a rather uncontested point of agreement is that a consensus definition of emotion has proven to be elusive (Kleinginna Jr. & Kleinginna, 1981). To illustrate this I turn to the second edition of the textbook, *Psychology of Emotion* (Niedenthal & Ric, 2017). The authors, Paula M. Niedenthal and François Ric, present two definitions of emotion. From Keltner and Gross (1999, p. 468), they offer the following:

> "We define emotions as episodic, relatively short-term, biologically based patterns of perception, experience, physiology, action, and communication that occur in response to specific physical and social challenges and opportunities."

A second definition, this by Cole, Martine, and Dennis (2004, p. 319) is presented:

> "Emotions are a kind of radar and rapid response system, constructing and carrying meaning across the flow of experience. Emotions are the tools by which we appraise experience and prepare to act on situations."

To state the obvious, these two definitions of emotion are incompatible. They differ on many elements. Among these, one issue deserves special attention. For the first, emotions come and go. For the second, emotions are continuously present, generated by a "radar response" system, that is, always active, always on. Some thoughtful efforts to generate proper definitions of emotion are a recurring feature of review papers (Adolphs, 2017; LeDoux, 2017).

The next requirement is to advance a comprehensive taxonomy of the members that constitute the overall class.[2] A common approach has been to turn to emotion words. And, here, the challenge is that there are hundreds of emotion words in the English lexicon (Storm & Storm,

[2] Some argue that this requirement is not essential. That much can be learned without have a taxonomy (Adolphs & Anderson, 2018).

1987). Consider some of the many English emotion words available to that identify feelings of grievance: *rage, angry, wrathful, ire, annoyed, hassled, miffed, vexed, bothered, upset, insulted, disdainful, livid, peeved, pestered, offended, troubled, hateful, exasperated, irritated, ruffled, affronted, outraged, cross, disgruntled, disgusted, resentful, bitter, contempt, incensed, infuriated, displeased, annoyed, miffed,* and*, offended*.[3] Do each these thirty-five emotion words identify a unique emotion? Or, perhaps each, or some, share a common underlying property while others identify yet another? If some differ in what manner do they differ? This problem has long been recognized but remains unresolved (Clore & Ortony, 1988). And, as noted below, especially with respect to appraisal theories, the absence of taxonomy has often generated research that too casually treats emotion words as if they identify different emotions (Tunç et al., 2022).

On what basis do we move from hundreds of emotion words to a reduced, but more importantly, validated set (Kron, 2019; Ortony, 2021)? Before a theory of emotion can be seriously considered it ought to present at least a provisional taxonomy of emotion. And, that requires an explicit statement of the theoretical and empirical grounds by which some emotion word candidates are accepted and others rejected (Celeghin et al., 2017). After all, emotion is a lay word, one among many lay words seemingly also used to name this class of phenomenon,

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[3] For reasons of decorum I exclude the many slurs used to express a person's outrage directed toward some disfavored target. To that one can add the many facial displays and hand gestures intended to wound or intimidate others. Most of us can readily bring forth the rich array of slurs that disparage others and anticipate just when people are most likely to use them (Fischer et al., 2018; Gould, 2003).

among these are, *feelings*, *desires*, *moods*, *sentiments*, *intuitions*, and *passions* (Montagu, 1994; Rorty, 1982; Dixon, 2006; Reddy, 2001). And, lay words are often poor candidates for scientific terms.

Moreover, are emotion words the right place to begin? Darwin (1998) focused on emotions as they expressed in humans and in other species in non-semantic forms, i.e., as facial expressions and gestures see also (Ekman & Oster, 1979; Lang & Ohman, 1988; Bradley & Lang, 2000a). Moreover, while the human capacity to assign words to things is of great value, especially with respect to emotion, words are too often too crude to capture the fullness of experience and are too often blind to experiences that are not represented in consciousness.

LeDoux (2017) warns of confusing the words used to describe a subjective feeling state with the relevant preconscious neural process, see also Adolphs and Anderson (2018, pp. 227-228). They suggest identifying neural systems that subserve emotion might well prove to be a better foundation for validating a taxonomy. Neuroscience offers a variety of tools for identifying neural structures that subserve different dynamic processes. Among these are: lesion studies; split brain experiments: facial EMG; various technologies for scanning active brains such as fMRI, PET, and EEG; assessing the functions of specific neurotransmitters; and, other

techniques that enable data gathering that can test various aspects of theories of emotion.[4] These tools, and others, properly understood as to their limitations, have proven very useful in testing the validity of theoretical formulations (Gray, 1987; Rolls, 2014; Maratos, 2011; Maratos et al., 2012; Paulus et al., 2010; Decety & Cacioppo, 2012).[5]

Fourthly, a substantive theory of emotion should include a measurement component to generate reliable and validated operational measures of theoretically identified emotions. Measurement begins with a theory to identify the scientific phenomenon of interest.

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[4] I offer, here, one an instance to demonstrate of how the absence of theory can undermine the value of empirical data. fMRI (functional magnetic resonance imaging) identifies active regions of the brain by measuring the ebb and flow of oxygen uptake therein. This variation is displayed as colored images. Dark areas in these images indicate regions with little blood uptake. Vivid red areas indicates high blood uptake (intermediate colors identifying intermediate levels of uptake). But neural systems work both by activation and inhibition. Identifying inhibited areas requires prior theoretical identification of the specific brain regions that ought to be dark. Absent a theory, those dark areas might dark because they are just in a normal resting states (Brascamp et al., 2015). For a recent comparison of the temporal and spatial resolution capabilities of these various methods for mapping brain activity see Prasad and colleagues (2019, p. Figure 9).

[5] Use of non-human species provides a useful approach as it enables a greater span of methodologies than would reliance on humans, but it has its risks. The human species has evolved strategies that are not replicated in any other species making some conclusions, as for example, how other species respond to threat, inaccurate when applied to the human species (Adolphs & Anderson, 2018, p. 55; Mlodinow, 2022).

Operationalizing the concepts can then be used to generate empirical data to test the claims theories advance.

In 1993 Karl Popper set forth some important standards for scholars engaged in testing of theories. Though not directed specifically to theories of emotion, they are applicable and worth quoting at length (Popper, 2000, pp. 336-337):

> "Confirmations should count only if they are the result of risky predictions; that is to say, if, unenlightened by the theory in question, we should have expected an event which was incompatible with the theory — an event which would have refuted the theory.
>
> Every "good" scientific theory is a prohibition: it forbids certain things to happen. The more a theory forbids, the better it is. A theory which is not refutable by any conceivable event is non-scientific. Irrefutability is not a virtue of a theory (as people often think) but a vice.
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> Every genuine test of a theory is an attempt to falsify it, or to refute it. Testability is falsifiability; but there are degrees of testability: some theories are more testable, more exposed to refutation, than others; they take, as it were, greater risks.
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> Confirming evidence should not count except when it is the result of a genuine test of the theory; and this means that it can be presented as a serious but unsuccessful attempt to falsify the theory.
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> Some genuinely testable theories, when found to be false, are still upheld by their admirers — for example by introducing ad hoc some auxiliary assumption, or by reinterpreting the theory ad hoc in such a way that it escapes refutation. Such a

> procedure is always possible, but it rescues the theory from refutation only at the price of destroying, or at least lowering, its scientific status."

I apply Popper's challenge by posing two questions to each candidate theory. First, does the operationalization of emotion generate data that can challenge the enabling definitional presumptions? Second, do the proponents of a theory expressly consider contrary claims advanced by competing theories?

B. Neuroscience - two core disruptions

During the 1960s and 1970s neuroscientists produced two insights that have direct consequences for understanding emotions. The first insight, now a general consensus, is that conscious awareness is not immediately available (Libet et al., 1979; Matsuhashi & Hallett, 2008). Consciousness becomes available approximately 500 milliseconds after sensory signals arrive in the brain (Hoffman, 2019). Thus, well before conscious awareness is available, the human brain can and does considerable preconscious processing of sensory and interoceptive inputs. Further the brain acts on those understandings well before consciousness is available (Zajonc, 1980; Hoffman, 2019).This claim is hard for most to accept as the human brain has the

robust capacity to construct the illusion of instantaneous access to the world in all of us (Nørretranders, 1998).[6]

Second, the general character of neural processing before conscious awareness is quite unlike the serial character of conscious awareness (Cisek & Kalaska, 2010). The principal feature of preconscious neural processing is massive parallel processing (McClelland & Rumelhart, 1988; Rumelhart & McClelland, 1986). With respect to emotion, multiple neural processes are executed in parallel and each well before consciousness. Further, each has a different appraisal task and each initiates different downstream consequences (Gray, 1987). Hence, a comprehensive theory of emotion should identify each of the multiple distinct neural processes, identify what each attends to, and identify what each influences before, as well as later during conscious awareness (Gray, 1991; Rolls, 2015). Failure to do so may lead to mis-attribution of causal effects as has already been shown as to be case in the distinct influences of fear and anger on human judgment (Lambert et al., 2010; Lambert et al., 2019; MacKuen et al., 2010; Vasilopoulos et al., 2019; Erisen & Vasilopoulou, 2022).

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[6] Appropriately, some have challenged the specific methodology of Libet (Miller et al., 2011). Nonetheless, a considerable array of research confirms the general claim of Libet: that conscious awareness is not instantaneous. Additionally, consciousness is not especially accurate in its representation of the world before us (Celeghin et al., 2015; Bechara et al., 1995; Aglioti et al., 1995). In sum, the brain has more information than is displayed in consciousness, has more accurate information than the mind, has that information before it is available to the mind, and acts thereupon well before conscious awareness.

These early, fast, preconscious, and parallel, affective processes offer continuously updating focused assessments. But, it is only the more robust and persistent of these assessments that, reduced and simplified, are subsequently expressed in consciousness as subjective feeling states. Thus, for example, fear, tasked with identifying the presence of the novel and the unexpected. The lower ranges of fear are not generally expressly manifest in conscious awareness. Rather, it the moderate to high levels of fear that are expressed in consciousness. The examination of subjective feeling states is of limited value in fully understanding preconscious affective appraisals.

Further, if each affective process is active alongside others, and each remain actively influential, then failure to have a defensible taxonomy leaves unclear which affective processes must be considered. And that, in turn, can lead to gravely mis-specified theories wherein empirical results may generate statistics estimates that maybe over or underestimated. Moreover, absent theoretical guidance where to look, any mediation and moderating effects of concurrent affective appraisals are likely to remain hidden (Miller et al., 2009).

Moreover, it is now clear that conscious awareness is generally not only too slow to ubiquitously generate timely self initiated actions, it is too limited because conscious awareness does not have direct access to procedural memory (Schacter, 1996; Kim & Baxter, 2001), nor to the vestibular system (Cheng & Gu, 2018; Öztürk et al., 2021), nor to the motor cortex (Jeannerod & Jacob, 2005), among other limitations, see also Hoffman for an excellent overview (2019).[7]

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[7] For a contrary view, one that understands preconscious affective processes as "rudimentary" and irrational see Winkielman and Berridge (2003).

Research in the neurosciences challenges the long held normative view that consciousness is the preferred platform for judgment. It does so because conscious awareness is not capable of executing the normative imperatives long thought to be reasoning's responsibility (Pinker, 2021; Bechara et al., 1997). Consciousness is a platform that is very limited in its ability to construe the world. That diminishes the importance of subjective feeling states in as much as many of the action humans undertake are deftly executed well before the conscious availability of feeling states (Zajonc, 1980; Hoffman, 2019).

These insights add two additional requirements for a useful theory of emotion. First, does the theory take into account the affective neural processes active during the preconscious period? Second, does it account for multiple concurrent active affective appraisals during the period of preconscious neural processing (Calder et al., 2001)?[8]

[8] This work also led to a new understanding of consciousness. Though we all experience conscious awareness as giving us instantaneous access to a global representation of ourselves, others, and the world wherein we move and reside, that is not true. Rather than being "one thing", consciousness shifts between two states (Chaiken & Trope, 1999; Kahneman, 2011). The default state of consciousness is well named as 'intuitive' or 'motivated reasoning' (Kunda, 1990; Mercier & Sperber, 2011). The second is best named motivated deliberation (MacKuen et al., 2010; Marcus, 2002b). Preconscious processes plays a vital role as to when we rely on the default mode and when we abandon extant certainties for, instead, thoughtful consideration (Marcus & MacKuen, 1993; Haidt, 2001).

C. Summary of Core Elements of That Form a Full Theory of Emotion

Table 1 lists seven components to form a minimum set of requirements for a theory of emotion. This list is neither definitive nor final.

Table 1: Core Components of a Theory of Emotion	
Conventional components for a theory of emotion	
	A formal definition of the phenomenon: Emotion
	A taxonomy of emotions
	Causal claims - both as to antecedents and consequences
	A measurement component
	Two Karl Popper Criteria
Requirement following the neuroscientific revolution	
	Integrates preconscious affective neural processing
	Integrates multiple affective parallel processing

III. Candidates - three from psychology; one from political science

Space does not allow a full exploration of each of the four candidates. Nor does space allow for consideration of those offered by an individual or team of scholars. For a succinct review see (Adolphs & Anderson, 2018, p. chapter 10). Thus, it is certainly appropriate to hold the descriptions that follow as too slight to sustain firm conclusions.

I have set aside two approaches, cognitive appraisal theory and the circumplex, later described as the two dimensional, approach (Plutchik, 2001; Watson & Tellegen, 1985).[9] The

[9] I also set aside "constructivist" approach to emotions such as that offered by Lisa Feldman Barrett (2017) as beyond the available space to include here. For another wide ranging comparison of theories of emotion see Moors (2022).

former has been recast as appraisal theory, that is dropping the word "cognitive".[10] The second was largely generated by an unanticipated finding. When questions were asked of people to assess, say a political candidate for office, they were presented with multiple emotion words, each selected because each was thought to identify a distinct emotion. Instead, these emotion words were found to describe two dimensions (Kinder et al., 1979; Abelson et al., 1982; Watson et al., 1988; Russell, 1980). However, that depiction proved to be short-lived, as Watson and Clark went on to demonstrate with their revised PANAS-X schedule (1994), that two dimension models are not a viable solution. The enriched PANAS-X list of emotions words reveal that anger and fear are distinct dimensions, a result that should have come as no surprise (Arnold, 1950). In any case, research on 'positive' and 'negative' emotions continues even as the notion of 'negative emotion' as a coherent scientific phenomenon no long has much validity. Hence, I exclude cognitive appraisal and two dimensional models from this consideration.

For each theory candidate I list some core readings for those that seeking a fuller account. I then turn to the principal assertions of each, followed by an assessment of its status as a fulsome theory of emotion using the criteria listed in Table 1. At the end of the presentation of the four candidate theories, you will find Table 2 which offers summary evaluations of the four candidates.

A. Valence as a Theory of Emotion

Selected Core Readings: (Hibbing et al., 2014; Lodge & Taber, 2005; Bradley & Lang, 1994; Bradley & Lang, 2000b; Russell, 2003; Barrett, 2006).

A too succinct summary of its claims: Emotion Definition

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[10] Most likely a deft, if limited, response to Zajonc (Zajonc, 1980; Lazarus, 1984; Zajonc, 1984).

An ancient presumption has long been accepted as self-evident: humans respond to reward and punishment (Skinner, 1969; O'Dougherty et al., 2001; Rilling & Sanfey, 2011). This focus on reward (approach) and punishment (avoid) has long been a central feature of models of learning (Mowrer, 1973). Thus, the presumed ability to swiftly identify any and all individuals, groups, or anything else as either positive **or** negative would seem to address this fundamental concern (Cosmides & Tooby, 2000; Brandt et al., 2015). As Lodge and Taber (2005, p. 456) put it:

> "All political leaders, groups, issues, symbols, and ideas thought about and evaluated in the past become affectively charged—positively or negatively—and this affect is linked directly to the concept in long-term memory. This evaluative tally, moreover, comes automatically and inescapably to mind upon presentation of the associated object, thereby signaling its affective coloration... "

Here, emotion is tasked with identifying the reward-punishment status of any object or activity under consideration. Valence remains a presumed scientific concept as, for example, in investigations of campaign sentiment (Geer, 2006), and, as well as in utility theory and prospect theory, each of which attends to gain or loss, punishment or reward (Skinner, 1969; Kahneman & Tversky, 1979).

This valence conception leaves unresolved whether emotion serves:

(A) as a storage system of prior experience tagged with an assigned value, positive **or** negative; or,

(B) emotion serves as a very fast system of contemporary affective appraisal; or,

(C) both.

Taxonomy

The valence conception of emotion leaves no theoretical or empirical space for any other emotions. When valence research explores the influence of 'core affect' it perhaps unintentionally acknowledges that there are other emotions, the non-core variants. The use of the phrase 'core affect' seemingly offers a semantic justification for such research as needing *only* to consider 'core' affect (Bakker et al., 2021; Russell, 2003). And, that presumption carries a considerable weight as there is little empirical evidence that at any given time people experience one and only one affect response. To the contrary the evidence is that multiple emotional responses are ever present (Abelson et al., 1982; Watson & Tellegen, 1985; Watson et al., 1988; Watson & Clark, 1994; Marcus et al., 2017; Neuman et al., 2018).

Causal Claims

The fundamental claim is that this 'affective tally' serves to guides choices, such as which candidates to support and which to oppose. What is typically absent is any consideration of non-core emotions and what roles they might play in impacting choices.

Measurement Model

A common measurement of valence, the feeling thermometer, gathers data that precludes its falsification (Zavala-Rojas, 2014; Marcus, 2022). It remains presumed valid as when it is used to measure "affective polarization"(Jost et al., 2022). People are presented a range that requires

them to choose how much they like **or** how much they dislike the target of inquiry.[11] As there is only one response, the data cannot test the internal validity of the construct. Other approaches to measuring valence have been used. For example, in experiments, using exposure to a stimulus thought suitable to trigger an affective response so briefly that it cannot be consciously perceived (Lodge & Taber, 2005). But, as previously noted, the validity of this approach rests on confirming that the stimulus induces the intended emotion and does not engage other emotions. And, such demonstrations are exceedingly rare (Marcus, 2022).

Popper Criteria

Beginning in the 80s and continuing since, research uniformly demonstrates that when people are able to report their feelings with an available list of emotion words, their responses cannot be reduced to one dimension (Abelson et al., 1982; Marcus, 1988; Brader et al., 2019). These studies have generated some limited post-hoc theorizing. One response, by those wedded to the idea of valence, sought to preserve the status of valence, largely by labelling one of evident two dimensions as "valence" or "core affect" (Russell, 2003; Rahn & Rudolph, 2000). However, once the measurement of fear and anger began to be concurrently examined, the scientific

[11] The American National Election Studies have been using feeling thermometers for many years. This is the instruction given to study participants (Overseers, 2021): "I'll read the name of a person and I'd like you to rate that person using something we call the feeling thermometer. Ratings between 50 degrees and 100 degrees mean that you feel favorable and warm toward the person. Ratings between 0 degrees and 50 degrees mean that you don't feel favorable toward the person and that you don't care too much for that person. You would rate the person at the 50 degree mark if you don't feel particularly warm or cold toward the person."

validity of ‘negative’ emotion, either as a dependent or as an independent variable, collapses because fear and anger, the principal components of ‘negative emotion’ each have different antecedents and different downstream consequences on thought and action. More succinctly, fear and anger are distinct properties. They do not share an underlying ‘negative’ property (Watson & Clark, 1994; MacKuen et al., 2010; Lerner & Keltner, 2001; Lambert et al., 2019).

In sum, the only way the concept of ‘negativity’ remains in use is the researchers and reviewers ignore the extensive research showing it is a concept that conflates two contrary emotions, and by using methods of data collection that preclude data that could challenge its validity (Marcus, 2022).

Valence remains widely used by many without any acknowledgement of the challenges this conception has long failed to address. Those using valence largely remained so wedded to the conception of valence that contrary evidence is ignored (Hibbing et al., 2014; Fournier et al., 2020; Johnston & Madson, 2022; Schumacher et al., 2022; Bellovary et al., 2021; Brandt et al., 2015).

Neuroscience Criteria

As to the first of the two neuroscience considerations, there is the Lodge and Taber’s ‘hot cognition’ account. But, as to the second, there has been no recognition of the fundamental character of preconscious processing as massively multi-channel concurrent appraisals, especially as to emotion (McClelland & Rumelhart, 1988; Rumelhart & McClelland, 1986).

In sum, valence remains sheltered, a testament to its enshrined status for some than a warrant for continued use by them or others.

B. Appraisal Theories

Selected Core Readings: (Ekman, 1992; Scherer, 1987; Scherer, 2005; van Kleef & Côté, 2022; Moors et al., 2021; Smith & Kirby, 2001).

A too succinct summary of its claims: Emotion Definition

As Moors (2017, p. 1) puts it: "The basic premise of appraisal theories is that emotions are caused and differentiated by an appraisal process in which values are determined for a number of appraisal factors such as goal relevance, goal in/congruence, un/expectedness, control, and agency." Contained therein is are two core claims: 1) the manifestation of a given emotion is the consequence of a unified appraisal process; and 2) the primary task of appraisal is to identify which discrete emotion is then made manifest (Brosch & Sander, 2013; Scherer & Moors, 2019). Hence, there is a clear idea of what emotions are: emotions are subjective feelings expressed in consciousness.

Taxonomy

Little progress has been made in developing a comprehensive taxonomy of emotions. Ekman, early on, proposed six "basic" emotions bases on his analysis of facial expressions (Ekman & Oster, 1979). In that same period, Izard offered ten (Izard, 1977). Shaver and colleagues (Shaver et al., 1987), using a lexical analysis of emotion words, claimed 25 distinct categories of emotion. More recently, Keltner and colleagues have proposed twenty (2022). There are yet other continuing efforts to secure a comprehensive taxonomy (Scherer, 1987; Scherer & Moors, 2019; Cowen et al., 2019; Wiedman & Tracy, 2020; Keltner, 2019).

If only one discrete emotion is general manifest at any given moment, then the number of discrete emotions and their specific characteristics is of lesser importance. If only one emotion is

manifest, then research can focus on that one manifest emotion. But of course that rests on the same presumption that drives valence approaches, that at any given moment one emotion is salience and therefor the only one that is consequential.

Many appraisal scholars acknowledge the difficulty of generating a taxonomy of emotions (Ortony, 2021). But, even here the focus is not on all variants of emotion. Little attention is given to whatever falls into the non-basic emotions class, let alone identifying what functions non-basic emotions might serve or what influences they might have.

While there are many studies that compare a presumed set of ‘basic’ or ‘discrete’ emotion to other supposedly ‘discrete’ emotions, the choice of the emotions is largely ad hoc (Harmon-Jones et al., 2016; Fridkin et al., 2020; Young et al., 2011; Trafimow et al., 2005; Valenzuela & Bachmann, 2015). There is infrequent reliance on a defined taxonomy to guide the selection. This often leads to selecting some emotion words, each presumed to identify a different emotion, even when some of those chosen emotion words have long been shown to be effective markers for the same emotion (Just et al., 2007; Bil-Jaruzelska & Monzer, 2022).

Studies that analyze one emotion are vulnerable to misspecification as such studies rely on the aforementioned presumption: that a given affect’s influence can be accurately assessed without determining and controlling for the possible influences of other concurrent, and active, affective appraisals. That presumption has been shown to be unsound (Marcus et al., 2017; Paulus et al., 2010; Neuman et al., 2018; Marcus, 2021). More significantly, research focused on one specific ‘discrete’ emotion often does not entertain the need to collect data that could test that presumption, thereby violating one of Popper’s tenets.

Focusing on a specific emotion, often not attending to the emotion word emotion dilemma, invites a balkanized research literature that is largely inward looking. This is not merely a hypothetical warning. For example, it continues to be a core presumption that threat elicits fear. Indeed, Choi and colleagues (2022, p. 1) speaks of this clearly in a recent paper: "people are constantly exposed to threatening language, which attracts attention and activates the human brain's fear circuitry." However, a considerable body of literature has demonstrated that fear is but one of two crucial appraisals that threats elicit, anger being the other (Wagner, 2014). And, further, that much of what has been attributed to heightened fear is actually driven by heightened anger (Vasilopoulou & Wagner, 2017; Wagner & Morisi, 2020; Vasilopoulos et al., 2019; Marcus et al., 2019; Lambert et al., 2019; Amengay & Stockemer, 2019).

Causal Claims

Psychology based appraisal theories have largely focused on direct effects and treat affective appraisals as if they can each be understood without consideration of other active affective appraisals.[12] Appraisal research in psychology has largely been inattentive to research published elsewhere showing robust interactions between fear and diminished reliance on otherwise influential dispositions (Marcus & MacKuen, 1993; Marcus et al., 2000; Brader, 2005; Brader, 2006; Valentino et al., 2008). Additionally, research on anger shows a robust effect of

[12] I set aside the investigation of ambivalence. Ambivalence is very constrained understanding of co-occurring emotions, as the conception limits the number of concurrent emotions to two (bi), one pro and one con (valence) (Craig & Martinez, 2005; Groenendyk, 2016; Lavine et al., 2012). While, it does acknowledge multiple concurrent appraisals, it is too constrained to offer a comprehensive account of how multiple affective appraisals can influence thought and action.

anger enhancing reliance on extant dispositions and blocking attention to contrary information and sources (Suhay & Erisen, 2018; Lüders et al., forthcoming; Vasilopoulos et al., 2019; Webster & Abramowitz, 2017). Much of this research has been published in political science.

In psychology appraisal theories, the treatment of discrete emotions is focused on how each 'discrete' emotion differs from other supposed 'discrete' emotion. As a result, appraisal theories tend to treat each discrete emotion more as a constant rather than as a variable. Moreover, by attending solely to the 'high' range of any emotion, basic or not, any consideration of what lower ranges of any given discrete emotion generates in thought and action has been largely absent.

Measurement Model

Appraisal theory directed research into emotions uses a diverse array of available analytic and operationalization practices to measure emotion. Many studies pay attention to the reliability and validity of their measures. However, especially with respect to validation, many of these efforts are undermined by inattention to the second of the two neuroscientific insights. I shall take that issue up in that subsection below.

Popper Criteria

As to the Popper criteria, though some of the relevant research outside of the discipline of psychology gains some attention from some psychologists, it would be a stretch to say that psychologists are eager to explore what lies beyond their discipline's borders. As I noted above, the swift effort to disarm Zajonc's claim that cognition was not necessary to account for the influence of emotion on judgment is telling.

Neuroscience Criteria

In appraisal approaches the issue of timing has been too often ignored.[13] Subjective feelings are not instantaneously available in conscious awareness. They become available well after sensory information arrives in the brain. Moreover, given the limited capacity of conscious awareness, the more fleeting, swiftly shifting and less 'elevated' appraisals are gated from being displayed therein. That leads to an often unstated presumption that whatever seems to be the dominant affective state is the only influential affective state (Dias & Lelkes, 2022; Marcus, 2022).

Investigations into subjective feelings constitute a very restricted range of any given emotion. Unless research demonstrates that emotion has no influence on human action and thought unless and until it is manifest as subjective feelings in conscious awareness, the failure to model the preconscious affective processes across their full ranges leaves us with misspecified models.

Attention to parallel processing has largely been largely ignored. As noted above, parallel processing is the fundamental feature of preconscious processes while serial processing is the fundamental characteristic of conscious awareness.

The focus on a presumed singular dominant discrete emotion also impacts the use of manipulation checks to secure validation of treatment effects. Validating that an experiment

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[13] The very long history of conceptualizing passion and reason in spatial terms has been the source of lay and scientific descriptions even as passion became emotion and emotion became affect. Spatial metaphors have continued to be the common parlance of science on emotions such as, inside outside, or lower order versus higher order processing (Kosslyn & Miller, 2013).

treatment impacts a specific appraisal is insufficient if does not also assess whether other concurrent appraisals are impacted (Marcus, 2022).[14]

Another common presumption is that there is such a thing as a "no emotion" condition (Gasper, 2018; Gasper et al., 2021; Wood & Rünger, 2016; Gasper et al., 2019). While feeling states in consciousness can be quite low, and such are often described as non-emotional, that does not mean that the preconscious affective appraisals are inactive and inconsequential. For example, all levels of fear have consequence for thought and behavior. The lowest part of that appraisal's range, i.e., low levels of fear, signal an absence of novelty or the unexpected. Low levels of fear enables efficient and deft focused reliance on the vast inventory of habits of thought and action (Marcus, 2002b). Research focusing only on the 'high' end, emotions, those expressed in subjective awareness, i.e., in the mind, is not exhaustive of the range of influences that preconscious affective appraisals execute.

In sum while neuroscientific research on the neural processes has been receiving some attention, attention to the centrality and importance of these multiple concurrent affective processes as prior to feelings in conscious awareness remains largely absent (Brosch & Sander, 2013; Todd et al., 2020).

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[14] Some meta-analyses of fear did not screen the studies to ensure they control for the influence of anger (Onraet et al., 2013; Jost, 2017). Research has consistently shown that anger has quite robust effects among those who are threatened (Rudolph, 2021). Studies reliant on the presumption that fear is the sole force for identification and response to threat generally do not measure anger but in studies when anger is included in the analysis, it is anger that drives support for stronger authority (Lambert et al., 2010).

C. Affective intelligence Theory

Selected Core Readings: (Brader, 2006; MacKuen et al., 2010; Marcus & MacKuen, 1993; Marcus, 2002a; Marcus et al., 2019).

A too succinct summary of its claims: Emotion Definition

The research that later became the theory of affective intelligence hereafter AIT commenced in the 1980s in political science (Marcus, 1988). From the outset it has been an appraisal theory. Unlike appraisal theory in psychology, the purpose of appraisal in AIT is to identify what each preconscious affective appraisal accomplishes. AIT took its foundations from the work done by neuroscientist Jeffrey A. Gray (Gray, 1985b; Gray, 1987). Gray viewed appraisal's task as to assign a value to the sensory and interoceptive datum arriving in the brain. However, rather than generating one value that results from one integrated appraisal, AIT argues that multiple concurrent focused appraisals are each tasked with ascertaining the status of a specific strategic feature.

The theory of affective intelligence from the outset fully accepted the two neuroscience premises (Marcus, 1988; Marcus et al., 2000). It adopted Gray's view that novelty identification was a central function of one of the preconscious systems. One output of this system, when in novel conditions, is to diminish the otherwise normal reliance on the vast inventory of habits of thought and action (Marcus, 1988). It accepted Gray's insight that humans have two available judgment orientations. One, commonly labeled motivated reasoning, serves to enhance the default reliance on habits (Gigerenzer, 2008) and, the other, motivated deliberation, serves to enable reflexive consideration. That insight has since become formalized in psychology as the dual process model of judgment (Chaiken & Trope, 1999; Kahneman, 2011).

In brief, emotion is an array of preconscious neural processes, each of which assesses a strategical vital aspect of human action and interaction well before subjective feelings are expressed in conscious awareness. Of particular importance is how these affective appraisals influence the shift from conditions of individual agency to collective agency and back (Groenendyk & Banks, 2014; Valentino et al., 2009; Valentino et al., 2011).

Taxonomy

The taxonomic structure of the theory of affective intelligence is not an array of emotion words that each define a specific state, such as joy, anger, or sadness. Rather each element in the emotion taxonomy of AIT is a range of the possible values of a specific appraisal: levels of fear identifying levels of apparent uncertainty being one such example.

Most importantly, emotions are not understood as binary categories, one is angry or not, elated or sedated, and so on.[15] Rather emotions are the language of appraisals that are inherently variable. There are many emotion words available to use across the full range of that appraisal. For the appraisal of novelty, emotion words such as *fear, anxious, uncertain, worried, troubled, at ease, calm, surprised* and so on, all depict different values along the same underlying appraisal: how much novelty/uncertainty is present.

At the outset AIT took as foundational the two neural systems identified by Gray (1987). One being responsible for monitoring and controlling the execution of habituated reward seeking actions of thought and action and the other responsible for monitoring the uncertainty/novelty of external circumstances. Later a third preconscious appraisal tasked with monitoring norm

[15] Which words are chosen is influenced by other factors beyond the preconscious levels, notably the social context in which the selected word will be deployed (Barrett, 2017).

compliance was added (Marcus et al., 1995). This third preconscious system is fundamentally normative, as it identifies breaches in the execution of salient norms (Marcus, 2002b). However, AIT has not been especially interested in subjective feelings states.

Jeffrey Gray offered a useful analogy to explain his understanding of emotions (Gray, 1985a). He analogized emotions pre and post awareness to color pre and post color awareness. In the case of color, three types of cells, called cones, arrayed at the back of the retina, are each sensitive to a different portion of the visual spectrum. One type responds to light in the red range of the color spectrum. Another type responds to the green range of the color spectrum. A third type responds to the blue portion of the color spectrum. Each of the very many cone cells generates electrical signals that continuously report to the brain even as in consciousness we see any given object as having a singular color. The preconscious appraisal of color is manifold, but any object is typically presented in consciousness as single hue. Color in awareness is a consequence of three different color appraisals. The human brain consolidates the multiple streams of information to accommodate to the limited serial capabilities of awareness.

Causal Claims

An important feature of these developments is a change from understanding emotion as a passive receptacle – as emotional response – to an understanding emotion as being active, ubiquitous, continuous, investigations of current circumstances, i.e., emotion as emotional appraisals (Wolak & Marcus, 2007). Currently, AIT has a focus on three distinct affective appraisals:

Enthusiasm covers the range marking failure to success. Understanding the implications of each level in that range adds considerably to such questions as persistence or abandonment of actions taken, or of actions anticipated.

Fear marks the range from all is familiar, normal, to sudden potentially grave uncertainty. Here also attention to the lower level of the range which reports on the normality of the circumstances at that moment, enables focused attention to the task at hand, and efficient reliance on the habits of thought and action (Bargh & Chartrand, 1999; Gigerenzer, 2008).

Anger focuses on the range from norm compliance to norm violation. Here attention to the low range reports on the ongoing actions of those distant, immediate, strangers and intimates, as their evident norm compliance. Appraisals at the lower level of this range enable collaborative and independent actions to be taken without doubts as to the trustworthiness of each and all. Such appraisals enable humans to interact anticipating that all others comply with the norms governing possible or likely interactions given the place and circumstances. Of course, at the higher end, grievances are identified by levels of heightened anger.

Thus, for AIT, each appraisal swiftly generates values within the specific range of that appraisal. This differs from other appraisal theories that select an emotion word, presume it to be an actual emotion, and further presume that it can be properly studied in isolation from other emotions (Capelos et al., 2021; Coifman et al., 2021; Close & van Haute, 2020). Validation of the AIT taxonomy rests on research on the neural systems that subserve each of the identified preconscious emotion channels (Gray, 1987; Rolls, 2014; Caruana, 2017; Celeghin et al., 2017; Calder et al., 2001).

An additional array of causal claims is prominent in AIT. AIT identifies affective appraisals that enhance reliance on extant habituated patterns of thought and action, specifically anger and enthusiasm appraisals. The fear appraisal system has the ability to inhibit reliance on those self-same dispositions when novel/uncertain circumstances are identified. Thus, when fear elevates the fear system initiates explicit consideration of the novel contemporary circumstances freed from the otherwise constraining grip of extant convictions (Marcus & MacKuen, 1993; Marcus et al., 2019; Tiedens & Linton, 2001). This theoretical extension of the roles of emotion and interactions with extant dispositions remains largely opaque to many (March et al., 2018; Xu & McGregor, 2018).

Measurement Model

AIT has a substantial measurement literature (Marcus & MacKuen, 1995; Marcus et al., 2006; Marcus et al., 2017; Marcus, 2022). More can, and should, be done to identify still other preconscious affective channels. Extant research suggests that empathy would be an obvious candidate (Decety & Cacioppo, 2012; Decety et al., 2015; Decety, 2015; Decety & Cowell, 2016).

Popper Criteria

As to the Popper criteria, AIT emerged from the discipline of political science, discipline that has a long history of looking outside its boundaries for theoretical possibilities. Rational theory came over from economics, theories of group formation, perceptual bias, and persuasion came over from psychology. Su dchisciplinary openness makes it easy to add yet another import,

this one from neuroscience. Beyond that it has shown some, if modest, interest in expanding its reach more so than defending whatever was its then current formulation.

Neuroscience Criteria

The two neuroscientific criteria were and are its primary foundations. However, there is little interest in exploring any independent roles for emotions as expressed as subjective feelings states within consciousness. Whether they augment preconscious appraisals, act in some more independent fashion remains to developed.

D. Emotion Regulation

Selected Core Readings: (Gross, 1998; Gross, 2015; Ruiz & Robazza, 2020; Tamir, 2016; Elkin et al., 2015)

A too succinct summary of its claims: Emotion Definition

James Gross, a leading proponent of emotion regulation (2015, p. 3) advances this definition of emotion: "Emotions involve loosely coupled changes in the domains of subjective experience, behavior, and peripheral physiology." This definition does not clearly differentiate emotion from other neural processes.

Emotion regulation holds that people seek to manage their feelings so as to guide their actions. Emotion regulation is the thought that (Tamir, 2016, pp. 199-200):

> " … people try to change an existing emotion into a desired emotion. … emotion regulation involve desired emotional states (e.g., less anxiety), in particular. These desired emotional states serve superordinate end-states that may or may not be emotional themselves (e.g., to perform well). For the sake of simplicity, goals in emotion regulation are defined here as desired emotional states (e.g., less anxiety).

> Motives in emotion regulation are defined here as broad classes of desired outcomes (e.g., to perform well), that are not necessarily emotional themselves, whose attainment can be promoted by emotion goals (e.g., less anxiety)."

Taxonomy

There is no specific taxonomy guiding emotion regulation research. There is some ad hoc mention of presumed distinct emotions, as well as mention of "positive" and "negative" dimensions of emotion as viable descriptors (Gross, 2015). There is little other than a broad generic claim, undifferentiated across all emotions, that subjective feelings serve as a standard for self-medication, though see (Tamir, 2016). Essentially emotion regulation holds that subjective feeling states serve as end-state goals to serve as means to achieve environment fitness and that people actively choose to manipulate them to achieve a desired affective state.

There has been some effort to identify the neural processes that are engaged with affective experience (Elkin et al., 2015). But, as the focus is on subjective feeling states as expressed in conscious awareness there has been little attention to the actual timing of these processes, and no attention to parallel processing by which the multiple concurrent appraisals are simultaneously engaged in directing downstream actions of thought and action.

Causal Claims

Emotion regulation is commonly wedded to valence and notably vague as to the actual causal claims emotion regulation advances. As Gross recently put the matter (2015, p. 10):

> "It is now thought that there are many different valuation systems, although just how many is not yet clear (Rangel, Camerer, & Montague, 2008). My own view is

> congruent with Elliot's (2006) proposition that "humanity's lengthy evolutionary history appears to have resulted in multiple levels of valence-based evaluative mechanisms, ranging from rudimentary spinal cord reflexes (Sherington, 1906) to subcortical affective computations [sic] (LeDoux, 1995; Shizgal, 1999) to our vaunted cortical processes (Davidson, 1993; Lang, 1995)" (p. 113). These valuation systems differ in many important ways. For example, different valuation systems "care" about different types of inputs. They also differ in the time scale over which they operate, in their plasticity (how much they change due to experience), and in the actions they prompt when they encounter a significant input (an input that is relevant to that particular valuation system) (Ochsner & Gross, 2014)."

That leaves a conspicuous void in identifying the tactical options are available to execute emotion regulation, affect by affect, let alone identifying the target level that serve as the desired standard, affect by affect, let alone clarity as to whether the regulation is a process that takes place in conscious awareness and impacts later conscious experience of emotion, and, or whether emotion regulation impacts of ongoing preconscious affective appraisals or is limited to the conscious experience of emotion. In sum, the various accounts are quite vague as to where and when the regulatory process takes place, by what means it takes place, precisely what ends are the desired end states, from what 'tool kit' are regulatory efforts drawn and what controls which options are selected, whether regulation process overrides, or augments, the continuing income flow of new affective appraisals as ever newer information is received as to the state of affairs each affective appraisal process monitors. Moreover, if different affective appraisals serve different tactical and strategic functions, operating concurrently, then are there multiple ongoing

emotion regulatory process each specific to a given affective appraisal or is there one unified regulatory process attending to just one or all of those ongoing affective appraisals?

Measurement Model

As to the measurement model, those in the emotion regulation camp have used a variety of approaches (Elkin et al., 2015; Gross, 2015). The process of cycling of each appraisal and the timing of subsequent consequences requires methodologies that can accurately monitor the timing of each concurrent appraisal. Further, downstream processes that are influenced by the distinct channels of affective appraisal both as to activation and as to inhibition for each concurrent parallel process must have validated measurements. Such efforts, it is fair to say, are at a rather early stage of development and have as yet not developed to the point of providing accurate estimates across all these requirements, though see, among others (Maratos, 2011; Paulus et al., 2010; Fox et al., 2000; Frühholz & Grandjean, 2013; Herbert et al., 2011).

Popper Criteria

The idea of equipoise as a matter of health, proper decorum, and civility as an essential feature of a functioning social order, has long been part of the western canon (Nussbaum, 1994; Locke, 1996). Thus, it was easy to refigure such pre-scientific understandings as 'emotion regulation'. As to the Popper criteria, an "incomplete" might be a generous assessment.

Neuroscience Criteria

Preconscious affective appraisals are generally available and influential at roughly 100 milliseconds (±, approximately 50 milliseconds) after sensory signals arrival in the brain. Yet, conscious feelings are not available until approximately 500 milliseconds. The general benefit of

preconscious multiple processing is speed of analysis. Rather than engaging in a serial process, step 1, followed by step 2, and so, until a final actionable understanding is generated and represented in consciousness, some hundreds of ms later, the multiple preconscious processes generate actionable understandings faster, more fully informed, with faster recycling, and with greater range of sensory and interoceptive processing that is possible with conscious awareness (Marcus, 2012).

From an evolutionary fitness perspective it would seem strange that the benefits of preconscious appraisals would be put on hold by as much as 300 ms before acting on each of those appraisals. And, the evidence is that such a delay is not normal practice (Williams et al., 2007; Paulus et al., 2010; Maratos, 2011; Maratos et al., 2012). And, as Bargh (1992) and Haidt (2001) have argued, the human brain does not. Using a crude, biased, and late standard as the guide for achieving evolutionary fitness seems a rather strange arrangement if the goal is swift and deft flexible social collaborative success (Axelrod, 1983; Gigerenzer, 2008).

The evidence is that people continuously rely on concurrent changing levels of fear to assess the presence of novelty and on changing levels of anger to assess the presence of norm violations and on changing levels of enthusiasm to assess the ongoing success of reward-seeking actions (Neuman et al., 2018). Emotion regulation guided research tends to focus on a specific emotion of interest, a focus that does commonly does not account for the other preconscious appraisals that are also executing their functions (Gross & Barrett, 2011; Coifman et al., 2021; Klimecki et al., 2018; Yih et al., 2018). The issues I have identified do not mean emotion regulation should be abandoned as an overarching guide. Hopefully, those who position their

research as within this rubric can offer a more complete account that strengths the viability of this pathway.

Table 2: Core Components of a Theory of Emotion – Assessing Contemporary Approaches					
		Assessments			
Conventional components for a theory of emotion		**Valence Approach**	**Appraisal Theories**	**Affective Intelligence Theory**	**Emotion Regulation Approach**
	A formal definition of the phenomenon: Emotion	Yes, very limited	Yes, partial and often ad hoc	Yes	Yes, by importing from elsewhere
	A taxonomy of emotions	Yes, but limited	A number of contending candidates	Yes, but likely incomplete	No
	Causal claims - both as to antecedents and consequences	Thin	Incomplete, especially as to interaction effects	Incomplete, especially as to subjective feelings	Thin
	A measurement component	Highly Constrained	Constrained	Yes	Limited
	Two Karl Popper criteria	No	No	Partially	No
Requirement following the neuroscientific revolution					
	Integrates preconscious affective neural processing	Modestly	Yes, but not universally	Yes	Yes, but not universally
	Integrates multiple affective parallel processing	No	Generally, no	Yes	No

III. Conclusions

For millennia passion was understood to be a singular phenomenon of considerable, and often malign, influence on the human condition. As to passion, what was long thought as having one form, it is now better understood as having two states, an early continuously updating state, that of preconscious concurrent appraisals, and a later state informed by and presented in, though in a reduced state, as subjective feelings displayed in conscious awareness.

What the traditional conceptions of reason and passion shared was what each did in conscious awareness. But the development of neuroscience brings to the fore what happens before conscious awareness. At this time there is no theory that adequately integrates both preconscious affective processes and subjective feeling states.[16]

The older understanding of emotion has remained influential thus delaying imagining the possibility that affective processes are many and that each serves a distinct essential function. That possibility has gained considerable purchase from neuroscience research on emotions. It has led to improved understandings of the many essential roles of emotions in human affairs.

All forms of social organization, not just nations, depend on norms to guide, indeed enable, the collaborative agency that is a central feature of the human species adaptive inventory

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[16] And, because of that lack, little has been done on some important issues. That the subjective experience of emotion is heavily impacted by the particulars of the culture is well demonstrated (Barrett, 2017; Boiger et al., 2018; De Leersnyder et al., 2018; Mesquita, 2022). But does cultural specificity apply to preconscious affective appraisals? And, if so to all or but some, and if so to what end? That remains to be explored.

(Haidt, 2001). Psychologist Gelfand's research on nations as to how loosely or tightly they demand adherence to their national societal norms is relevant here (Gelfand et al., 2017; Gelfand et al., 2011). That same variation can be observed across the social science disciplines. One can easily array political science, psychology, and economics from less tight to more tight. Some political scientists began to attend to neuroscience research bearing on emotion in the mid-80s (Marcus, 1988) and some psychology did so even earlier (Zajonc, 1980), but, economists not until the turn of the century (Akerlof & Shiller, 2009) and with only modest influence on the discipline's persistent adherence to utility theory and rational choice.

In this review, I identify some progress. At the conceptual level three changes occurred in the past half century. First, emotion has long been conceived as a passive receptacle, emotional response, but increasingly it is understood as being active in swiftly identifying strategically vital changes enabling swift adjustments to thought and action. Second, emotion has begun to loose its malign characterization. And, third, preconscious emotion has become a new added domain of research on emotion. But, considerably more to be done before anything like a fully comprehensive theory of emotion is before us. As Table 2 makes clear there is not, as yet, a comprehensive theory of emotion. That failure has been duly noted in psychology (Reisenzein, 2021). Hopefully, this comparison offers some trajectories worth pursuing and some backfilling necessary to address gaps identified.

There is an immediate challenge facing researchers, editors, and reviewers. The failure to account for multiple concurrent affective appraisals has been shown to produce biased results (Miller et al., 2009; Vasilopoulou & Wagner, 2017; Vasilopoulos et al., 2018; Marcus et al., 2019; Lambert et al., 2019). Moreover, studies that rely on manipulation checks that fail to show that

treatment effects are specific to the affective evaluation of interest, are likely similarly vulnerable. There are numerous studies that compare an ad hoc selection of 'emotions' some of which are synonyms, and others of which are just different levels of the same emotional appraisal. Addressing these challenges, and other challenges already identified beyond those just discussed need not await a more fully evolved theory of emotion.

Acknowledgements: An overview, such as this, faces a challenging task as its coverage spans multiple disciplines, a span of time that is approximately a half century, and a very extensive but splintered array of literatures. At an early stage I distributed the then current draft to all those I had then cited inviting each so cited to correct any mis-statement or misapprehension. I am grateful to those who responded as it has led to a better, and hopefully, more accurate representation of the published work on emotion that I review herein. Additionally, I would like to thank the many colleagues over many years who have been instrumental in my continuing education. Among these are: Moses Hadas, Lee Anderson, Donald T. Campbell, John L. Sullivan, Jeffrey A. Gray, Roger Masters, Michael MacKuen, W. Russell Neuman, John Cacioppo, Ted Brader, Nicholas Valentino, and Pavlos Vasilopoulos.

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