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## **Dissecting the Sociality of Emotion: A Multi-Level Approach**

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### **Abstract**

In recent years, scholars have come to understand emotions as dynamic and socially constructed—the product of interdependent cultural, relational, situational, and biological influences. While researchers have called for a multi-level theory of emotion construction, any progress toward such a theory must overcome the fragmentation of relevant research across various disciplines and theoretical frameworks. We present affect control theory as a launching point for cross-disciplinary collaboration because of its empirically-grounded conceptualization of social mechanisms operating at the interaction, relationship, and cultural level, and its specification of processes linking social and individual aspects of emotion. After introducing the theory, we illustrate its correspondence with major theories of emotion construction framed at each of four analytical levels: cultural, interactional, individual, and neural.

**Keywords:** emotion, culture, interaction, social construction

### **Dissecting the Sociality of Emotion: A Multi-Level Approach**

Scholars have long understood emotion as systematically influenced by the social and cultural environment, but vary in their conceptualization of sociality and the processes by which social forces guide the generation and regulation of emotion (e.g., Boiger & Mesquita, 2012; Chiao, 2010; Collins, 2004; Kemper, 1984; Manstead & Fischer, 2001; Markus & Kitayama, 1991; Parkinson, 1996; Thoits, 2004). If we take seriously the claim that the social is indeed *constitutive* of emotion, then we cannot fully understand emotion without (1) adequate conceptualizations of the social at the levels of interactions, relationships, and cultural meanings, and (2) an adequate understanding of the mechanisms that link social and individual aspects of emotion.

In the present article, we discuss affect control theory (Heise, 1979; 2007; MacKinnon, 1994; Smith-Lovin & Heise, 1988) as an approach to emotion that can account for these mechanisms at multiple levels of analysis. We position the theory in an interdisciplinary context to demonstrate its compatibility with other key theories of emotion and highlight potential contributions to ongoing research in several scholarly fields. As a mathematically formalized theory of emotion in cultural and situational contexts, we argue that affect control theory provides an adequate conceptual framework for dealing with core questions about the social constitution of emotion while at the same time explicitly accounting for the individual level mechanisms of this constitution.

In line with major sociological accounts, affect control theory conceives of sociality primarily as a multi-layered web of social institutions (e.g., the family, the economy, the educational system) and the various roles and identities that individual selves occupy in relation to such institutions (MacKinnon & Heise, 2010). The institutional order is tied to individual

minds through shared affective meanings of the concepts denoting roles and role-identities (e.g., mothers, managers, and teachers). Accordingly, culture is predominantly understood as shared meaning-making within and across groups and institutions. Society shapes affective experiences when conceptual representations of social situations and their affective meanings are either confirmed or disconfirmed through specific actions or observations (Heise, 2007).

Following a brief review of affect control theory, we make a case that the theory is compatible with prominent models of emotion on four different levels: cultural (e.g., cultural models of self), relational (e.g., social exchange theory), individual (e.g., appraisal theory), and neural (e.g., psychological constructionism). We explain how affect control theory and its well-established research methods can be applied at each of these levels and offer new propositions to be tested by future research. Rather than arguing for a wide-ranging integration of distinct theories, our aim is to highlight existing linkages between different disciplinary perspectives on the social constitution of emotion and to suggest that affect control theory may be an adequate cross-disciplinary framework in attending to these issues.

### **The Affect Control Theory of Emotion**

The basic tenets of affect control theory are (1) that people use culturally shared linguistic categories to interpret social situations; (2) that those interpretations entail characteristic affective meanings; and (3) that people are motivated to maintain those meanings during the course of interaction (Heise, 1979; 2007; MacKinnon, 1994; Smith-Lovin & Heise, 1988). It is imperative to distinguish affective meanings from emotions: While affect is considered “a general mode of consciousness” (MacKinnon, 1994, p. 123) or “a basic kind of psychological meaning” (Barrett & Bliss-Moreau, 2009, p. 172), emotions are singular experiential episodes at discrete points in time, in response to specific events. They have a communicative function, as

they signal to self and others how one interprets situations and recent events (Heise, 2007, p. 57). According to affect control theory, the main source of emotion is a person's identity, which is constrained by the situation, social institutions, and linguistic categories (MacKinnon & Heise, 2010). Emotions are thus shaped by the social environment through their semantic structure, which is widely shared among members of cultural groups and societies.

### **Shared Affective Meaning**

Affect control theory has some of its intellectual origins in symbolic interactionist ideas about the creation, maintenance, and change of meaning through social interaction (Mead, 1934). According to this view, collective experiences with the social environment crystallize in shared linguistic symbols that structure individual minds. Thus, shared semantic structures reflect the institutional and symbolic order of societies (MacKinnon & Heise, 2010). This parallels the view from cognitive anthropology and sociology that culture is largely constituted by consensus on meaning, brought about by the similarity of underlying semantic structures (DiMaggio, 1997; Romney, Boyd, Moore, Batchelder, & Brazill, 1996). When people interact with each other in specific situations, they rest on such semantic structures to generate a shared understanding of the situation. Linguistic categories thus provide the "common ground" (Clark, 1996) that allows for efficient communication and enables people to coordinate social action.

Affect control theory extends the classic symbolic interactionist paradigm in two respects. Conceptually, it assigns a central role to affect and emotion in the process of creating and maintaining meaning in social interaction. Methodologically, it holds that meaning can be quantified and measured, deviating sharply from the predominant interpretative and hermeneutic approaches in symbolic interactionism. Both amendments to the classic paradigm capitalize on Osgood's (1962) finding that meanings of concepts can be measured along the perceptual

dimensions of evaluation, potency, and activity, that these dimensions are universal across the human species, and that they reflect affective and connotative (as opposed to denotative) meanings.

While *evaluation* refers to good and nice versus bad and awful feelings and their associated action tendencies of approach versus avoidance, *potency* denotes strength and control versus weakness and ineffectiveness in the appraisal of situations or persons. The *activity* dimension reflects arousal, and distinguishes between excited and calm affective states as well as active and passive behaviors. Together, these dimensions constitute a three-dimensional “affective space” within which the affective meaning of any concept (e.g., persons, behaviors, situations, objects, and emotions themselves) can be located.

Empirical studies have compiled numerous *affective dictionaries*, language-specific datasets of hundreds or thousands of concepts (e.g., role-identities, behaviors, traits, emotions) that have been assessed by cultural informants with the semantic differential technique (Osgood, Suci, & Tannenbaum, 1957). In these repositories, each word is represented by an evaluation-potency-activity profile, roughly corresponding to the average ratings of a sample of respondents belonging to a specific cultural group. Dictionaries have been created for nation states as cultural groups, but also for sub-cultural groups within a nation state (e.g., Ambrasat, von Scheve, Schauenburg, Conrad, & Schröder, 2013; Heise, 2010; Schröder, 2011).

The claim that affective dictionaries represent socially shared affective meanings is evidenced by findings demonstrating high levels of convergence and long-term stability in ratings of evaluation, potency, and activity within cultural groups (Heise, 2010). In addition, variations in affective meanings across groups (e.g., between different countries) have been

shown to correspond to well-known characteristics of these groups, for example individualism-collectivism and power distance (e.g., Schröder, Rogers, Ike, Mell, & Scholl, 2013).

Affect control theory thus answers the need for an empirically grounded conceptualization of sociality by emphasizing socially shared patterns of affective meaning as constitutive for social groups and institutions. Based on this understanding, another challenge lies in identifying mechanisms that link the social with individual emotional experience.

### **From Shared Affective Meanings to Emotion in Social Situations**

According to affect control theory, emotions are derived from the affective meanings of identities, which fluctuate in response to various social experiences (see Heise, 2007, chapter 8). For instance, a person might identify herself as a “mother” while interacting with her “child,” thereby assuming the culturally shared concept of motherhood. The concept “mother” is typically associated with positive, powerful, and active feelings, *fundamental meanings* that bring about specific expectations on the course of situations and interactions. For example, in most societies it is expected that a mother would applaud a child rather than ridiculing her. When individuals see their identity perfectly confirmed during social events, they experience *characteristic emotions*, which correspond directly to identity meanings (Heise, 2007, p. 59). The mother in our example would experience positive, powerful, and active emotions like satisfaction, optimism, or pride were her identity perfectly confirmed.

However, situations frequently produce temporary (*transient*) affective meanings that deviate from stable and enduring fundamental meanings. Such shifts occur as a result of perceiving identities in the context of behaviors with discrepant meanings. Were the mother to ridicule her child and thereby to violate cultural norms, she would be more likely to experience emotions like horror or anger, resulting from a transient deflection of her identity meaning to a

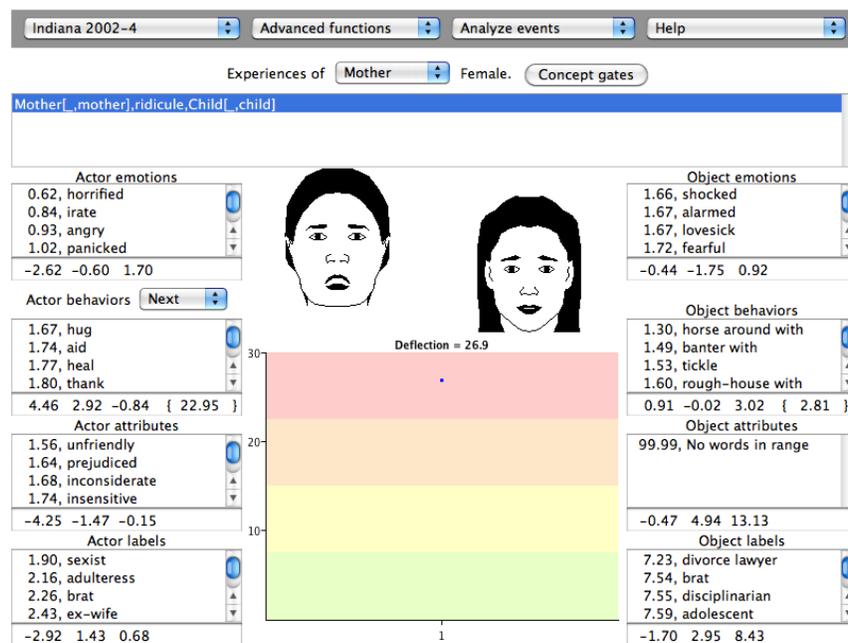
more negative location in affective space. This example nicely illustrates the role of emotion in sustaining the social order (Heise, 2007; von Scheve, 2013). Feeling horrified in response to her action might prompt the mother to engage in reflexive thought about the situation and thus open up a pathway for reconciliation that would restore the fundamental cultural meanings of both identities. In this view, emotions connect the person one is *supposed to be* (as defined by their identity) with the person one *seems to be* in the context of a given social event, allowing for the subtle communication of meaning between interactants and the alignment of social interaction with the broader institutional order of society (Heise, 2007, p. 59).

Affect control theory conceptualizes emotions as highly dynamic and intertwined with ongoing flows of social interaction. In order to deal with the resulting complexity, existing scholarship has suggested formal, mathematical models to specify how fundamental meanings combine to produce transient meanings in given situations, a process known as *impression formation* (e.g., Schröder, 2011; Smith-Lovin & Heise, 1988). These models, which are based on empirical rating studies using the semantic differential technique, have been implemented into INTERACT (Heise, 1997), a software that can be used to derive point predictions about likely behaviors and emotions, given verbal descriptions of situations with words contained in the culture-specific affective dictionaries described in the preceding section.

Since discrete emotion concepts are treated as specific locations in affective space, INTERACT “translates” continuous affective reactions (e.g., “negative feeling”) into qualitatively distinct emotional states (e.g., “anger” vs. “guilt”), thus generating emotion predictions with a precision that supersedes the power of many other theories of emotion. The above examples for emotional experiences of a mother interacting with a child were generated using the INTERACT model for U.S. culture (for a screenshot, see Fig. 1). Numerous

experimental studies provide evidence of the empirical validity of INTERACT predictions (e.g., Schröder & 2009; for review, see Smith-Lovin & Robinson, 2006).

To summarize, affect control theory holds that emotions in social situations result from the transient fluctuations of identity meanings in affective space that accompany interpretations of social events. As the affective meanings of the concepts that people use to make sense of events follow cultural patterns, the individual experience of emotion is inherently social. Given space limitations, our description of the affect control theory of emotion must remain somewhat cursory. We encourage interested readers who want to learn about the theory's nuances and precision to study the mathematical model itself, described in Heise (2007, p. 103-108), or to try out the INTERACT software, which is freely available online (Heise, 1997).



**Fig. 1.** Simulation of the event “a mother ridicules a child” with INTERACT (Heise, 1997). The software (using U.S. data) suggests that the mother is horrified, irate, or angry, while the child is shocked, alarmed, or lovesick.

### **The Sociality of Emotion: Multi-Level Mechanisms**

Researchers have focused on different levels of explanation in their attempts to understand emotions and their social dimension, from physiological and neural mechanisms to cognitive appraisals, social exchange, and culture-specific meaning (for a review, see Gross & Barrett, 2011). We examine the compatibility of affect control theory with a major theoretical paradigm operating at each of these levels and show how the theories can mutually inform one another.

#### **Culture, Self, and Emotion**

Culture conditions emotional experience in various ways (e.g., Reddy, 2008). For example, a large body of research has compared emotions across individualist and collectivist cultures, based on respondents' nationality and culture-specific models of the self (Markus & Kitayama, 1991). Studies using societal and trait-level measures (e.g., Triandis & Gelfand, 1998) as well as experimental manipulations of culture (e.g., Oyserman & Lee, 2008) have yielded convergent results and identified distinct patterns of emotion causation and perception among members of individualist and collectivist cultures.

Scholars have recently emphasized the need for a theory of the relationship between culture and emotion that can account for both macro-level consensus and micro-level fragmentation (or inter-individual differences) in emotional responding (e.g., Mesquita & Boiger, 2012; Miller, 1997). Such a theory should adequately capture the consensus and divergence within and between cultures and the mutually constitutive relationship between various features of culture and individual emotional experience. This requires linking models that view the relationship between self and culture as an important source of variation in emotion with theories that place the culture-emotion relationship in the context of social situations, relationships, and institutions.

For three main reasons, we propose that affect control theory offers a valuable starting point for such an endeavor. First, it is compatible with the view of culture and emotion established by cross-cultural psychology. Affect control theory views the affective-connotative meanings of social concepts as windows into patterns of implicit culture-specific meaning-making. As emotional experiences depend upon the meanings of the roles of *self* and *other* in social interaction, patterns of experience hinge on one's position within the larger social structure, as suggested by the individualist-collectivist or sociocentric/egocentric distinctions (MacKinnon & Heise, 2010). Research based in affect control theory has also shown that cultures with high power distance (cf. Hofstede, 2001) attribute less potency to concepts denoting stigmatized stereotyped groups than cultures with low power distance (Schröder et al. 2013).

In terms of cultural differences within societies, recent evidence suggests that working-class models of self are more interdependent while academic-class models of self are more independent (Fiske & Markus, 2012). Coinciding with this view, Ambrasat and colleagues (2012) have shown that people with low socio-economic status attach more positive and powerful affective meanings to community-related concepts (e.g., family or friendship) than individuals with higher socio-economic status. An open question for future research is whether and to what extent cultural differences in the elicitation of specific discrete emotions can in fact be derived from differences in affective meanings using the formal models suggested by affect control theory.

Second, cultural psychological emotion theories can be linked to affect control theory in view of the momentary relationship between culture and emotion in specific situational and institutional contexts. Sociological research has demonstrated that routine embeddedness in particular institutional environments and social networks is an important structural predictor of

shared cultural meanings. These meanings primarily arise from the enactment of particular role-identities in social situations (MacKinnon & Heise, 2010). Hence, emotions are importantly conditioned by the social environment in that they result from the shared affective meanings that individuals attach to social situations and institutions.

This is compatible with certain cultural psychological views of emotion according to which individual and collective realities are intricately linked via socio-psychological processes, both producing and being reinforced by habitual emotions and certain forms of instrumental behavior (Markus & Kitayama, 1994). The enactment of one's identity serves as a link between the schematic organization of cognition and the social context. Stability in cultural beliefs and meanings is supported by the schematic organization and representation of information. Given that emotions depend on this information, they are importantly determined by cultural patterns in the mental organization of information (in schemas, frames, and scripts) and the situational cues that activate these structures (e.g., Cerulo, 2010; DiMaggio, 1997). Moreover, an individual's embeddedness in patterns of role relations integrates broader cultural practices (e.g., those distinctive of societies) with membership in small groups and networks.

Third, affect control theory forwards a mechanism by which shared culture can coalesce with spontaneous individual meaning-making and the elicitation of discrete emotions. The theory proposes that macro-level consensus and micro-level fragmentation are reconciled via a control mechanism that leads to equilibrium across social interactions while allowing for spontaneous individual variation in social situations (Heise, 2007). While a variety of behaviors with distinct affective meanings can more or less equally confirm the meaning of a given social event, responses that are ineffective in maintaining expectations (or fundamental meanings) prompt corrective action. Thus, individuals, while acting creatively within social interactions, can still

support the stability of meaning at a cultural level. Taking the example we presented above, a mother can similarly confirm her identity by entertaining, rewarding, or applauding her child, associated with powerful positive emotions like compassion and optimism. If she engages in particularly identity-disconfirming behaviors, such as lying to or abandoning her child, the mother is likely to feel flustered or impatient, and might hug or console her child to restore fundamental meanings.

### **Social Interaction: Exchange and Emotion**

Evidence from the micro-sociological literature demonstrates that emotions are importantly linked to social relationships and interactions (Kemper, 1993; Smith-Lovin, 1995). Here we discuss social exchange theory, which argues that emotional experiences systematically condition and are conditioned by patterns of interaction and attributions about interaction partners (e.g., Lawler & Thye, 1999). According to social exchange theory, beliefs about interaction partners based on status- and power-endowments systematically influence both behaviors and emotions. Expectations about the value of each group member's contributions to collaborative tasks, for example, lead to inequalities in task-related behavior (Hegtvedt, 2005). Emotions are determined by both the outcomes of interactions and how those outcomes compare to expectations derived from social context (Hegtvedt & Markovsky, 1995; Molm, 1997). In turn, emotional experiences can also shape interaction structures. For instance, positive emotions during sequential exchange are associated with increasing behavioral commitment and group cohesion (Lawler, Thye, and Yoon, 2008).

This mutual relationship between identity and emotion is also captured by affect control theory, which contributes to exchange theories of emotion in social interaction an understanding of the potential emotional consequences of the (dis)confirmation of affective meanings through

interaction. Negative emotions can result from social exchanges that either fail to maintain positive identities or adequately maintain negative ones; the reverse is true for positive emotions (Robinson & Smith-Lovin, 2006). Furthermore, people strive to maintain salient identities even when they carry negative meanings and lead to the experience of negative emotions, selecting interaction partners that offer identity-confirming feedback despite the emotional cost (Robinson & Smith-Lovin, 1992). In addition, the scope conditions of social exchange theory, which constrain its relevance to task-based, collaborative social exchange, may limit the application of the theory to certain types of social interaction. In contrast, the mechanisms proposed and evidenced by affect control theory can be applied much more generally to social interactions of most any sort, including task-based interactions.

Affect control theory treats our past experiences with a person as a basis for inferring traits, used as modifiers for identities enacted in later interactions (Heise, 2007). While the theory has not identified a specific mechanism that explains the increasing commitment that social exchange theorists have found to result from positive emotions (Lawler, Thye, and Yoon, 2008), a possible explanation is that the overall group identity increases in fundamental positive evaluation when groups collectively experience positive emotions. Following Scholl's (in press) game-theoretic perspective, the capacity of affect to explain variation in group commitment likely extends beyond the evaluation dimension. Scholl finds that the quality of group collaboration can be characterized on all three affective dimensions, with evaluation predicting sympathy and consensus, potency predicting types of power or control, and activity predicting the urgency or intensity of the task at hand.

It is important here to differentiate affect control theory from other control systems theories, such as identity control theory. Both affect control theory and identity control theory

understand the ongoing behavior of a system as driven by the comparison of that system's current state to a reference state, much like the comparison and regulation of a room's ambient temperature relative to the setting on a thermostat (Smith-Lovin & Robinson, 2006). As described above, affective meanings for identities shape interpretations of social events, and disconfirmation of these meanings prompts social actions to restore them. Thus, for example, judgments of interactants' relative status and power determine the confirming emotional responses for a given interaction, via the affective meanings attributed to self- and other-identities. Emotions carry signal value, informing us about when meanings are either being maintained or disturbed.

The theories differ, however, in their conceptualization and measurement of affective meaning, their specification of the control model, and their specific predictions about the emotional consequences of identity control (for a detailed comparison of theories, see Smith-Lovin & Robinson, 2006). While identity control theorists measure the meanings that emerge as relevant within a particular institutional domain, affect control theory utilizes three basic dimensions across domains: evaluation, potency, and activity. The use of parsimonious, universal dimensions allows affect control theorists to specify precise mathematical definitions of numerous event elements, impression formation mechanisms, and divergence from situational interpretations. By contrast, identity control theorists measure only the meaning of identities for self and other, and present verbal statements of the theory without mathematical specification. In addition, affect control theorists view control systems as operating to maintain the meaning of situations, while identity control theorists emphasize the maintenance of individual self-meanings.

While both traditions are fruitful in answering important questions about emotion in social interaction, we advantage affect control theory here for several reasons. First, the use of evaluation, potency, and activity as broad, parsimonious dimensions of affective meaning is amenable to the development of a multi-level and multi-disciplinary model of sociality and emotion. These dimensions have consistently emerged in studies of socio-emotional experience (Scholl, in press). Second, the theory's mathematical formulations of numerous event elements and mechanisms allows for greater precision in generating and testing hypotheses and comparing theories. Third, recent evidence lends credibility to the emotion predictions of affect control theory in instances where the theories' predictions diverge. For instance, identity feedback more positive than expectations leads to fewer negative and more positive emotions than feedback equitable with expectations, running counter to identity control theorists' predictions about the motive for self-verification (Clay-Warner, Robinson, Smith-Lovin, Rogers, & James, 2012).

### **Emotion Causation in the Individual Mind: Appraisal Theory**

Studies on the generation of emotions in individual minds have emphasized the cognitive interpretation of events as important in connecting situations with emotional experiences.

*Appraisal theories* argue that emotional experiences result from the automatic or controlled evaluation of the meaning of events in light of individual goals, beliefs, and desires (Roseman, 1991). For example, Scherer (2001) has developed a model of "stimulus evaluation checks" from which emotions arise. By this model, an individual sequentially appraises a stimulus in view of four different types of information (*appraisal objectives*), i.e. its relevance ("How relevant is this event for me?"), implications ("What are the implications or consequences of this event...?"), coping potential ("How well can I cope with or adjust to these consequences?"), and normative significance ("What is the significance of this event with respect to my self-concept and to social

norms and values?") (Scherer, 2001, p. 94). Each dimension in turn consists of a number of evaluative checks. Relevance, for example, is determined by evaluating the novelty, intrinsic pleasantness, and goal relevance of a stimulus (see Scherer, 2001, for details).

Based on the combination of outcomes of these appraisals, specific discrete emotions arise. For example, a mother ridiculing her child might at first experience contentment, because ridiculing her child was what she wanted to do and successfully accomplished (for whatever reasons). Moments later, she might feel shame and horror regarding the implications of her actions (e.g., inflicting harm, broken social bonds), the fact that she has little control of the consequences, and the normative transgression she committed. Since there is extensive debate over which combinations of appraisals lead to the experience of which discrete emotions, some have suggested the existence of universal psychological mechanisms linking appraisals to affective feelings on the dimensions of valence, power, and activation (cf. Scherer, 2001). Scherer, Abeles, and Fischer (1975), for instance, posited that valence is associated with appraisals of goal- and need-congruence, activation captures the urgency of a behavioral response to the event, and power reflects one's capacity to cope with an event and its consequences.

Generally, appraisal theory shares some basic principles of emotion elicitation with affect control theory. In both traditions, emotions result from subjective interpretations of events rather than from the events themselves, i.e. emotions are seen as the outcomes of the relationship between "internal" criteria for evaluating an event (e.g., goals, beliefs, self, identity) and certain event characteristics. Both theories also rely on dimensional representations of affective meaning, with clear semantic similarities between the dimensions (Gehm & Scherer, 1988; Scherer, Dan, & Flykt, 2006). While both evaluation and valence refer to goodness versus badness, potency

and power reflect power and control versus powerlessness and ineffectiveness, and activity and activation reflect arousal versus calm.

Perhaps the most important difference between appraisal theory and affect control theory is how each conceptualizes the relationship between internal criteria and external objects. While appraisal theorists take a cognitive perspective in which assessments of events relate to individual goals, needs, and beliefs (Smith & Kirby, 2001), affect control theory relates evaluations of a given situation to expectations derived from culturally shared, fundamental affective meanings.

Appraisal theory accounts for the social constitution of emotion in two ways: First, although appraisal theory has demonstrated cross-cultural universality in the basic mechanisms linking appraisal patterns and resulting emotions, it has also shown marked differences across cultural groups in how individuals appraise events (Scherer, 1997). These differences are mostly brought about by culture-specific goals, values, and norms. Second, some appraisal theorists have argued that appraisals are not carried out by individual actors as “isolated information processors” (Schwarz, 2000, p. 150), but rather happen in immediate and larger social contexts. Given that the larger socio-cultural context leads to similarities in goals, values, and norms, the immediate context is constituted by social interactions and the ways they influence appraisals (e.g., Manstead & Fischer, 2001), as outlined in the previous section.

Spelling out the relationship between individual appraisals and culturally shared affective meanings could be a fruitful and mutually informative area of future study, bridging emotion research across disciplines and elucidating the importance of the social for individual, emotion-generating appraisal processes. A consideration of the two theories raises interesting questions: Do the fundamental affective meanings of concepts reflect collective patterns of appraisal,

crystallized in the language of a given cultural group? Does reliance upon culturally shared semantic structures allow individuals to generate appraisals and emotions more efficiently, benefitting from other culture members' prior experiences with similar situations?

Affect control theory may provide a methodological basis for addressing these and other questions. Empirical studies have acquired ratings of evaluation, potency, and activity for thousands of concepts from thousands of raters across different cultures and languages (Heise, 2010). These data give insight into cultural differences and similarities in event appraisals and allow researchers to generate testable emotion predictions for various contexts. Also, social appraisal processes can be operationalized using impression formation models, which can be applied to identify momentary, event-related shifts in affective meaning. Thus, the theory can generate predictions about the emotions likely to result from social encounters, which can be directly compared with parallel work based on appraisal theory.

### **Emotion Causation in Brains: Psychological Constructionism and Neurosemantics**

Affect control theory is largely compatible with a psychological constructionist view of emotion, according to which emotions are constructed dynamically through the interaction of more basic psychological operations, embedded in functional networks of the brain (e.g., Barrett, 2006; Lindquist, Wager, Kober, Bliss-Moreau, & Barrett, 2012). Proponents of this view argue that emotions result from a conceptualization process, wherein people apply culturally derived categories to their inner representations of bodily states. These states, known as "core affect," are characterized on dimensions of valence and arousal (Russell, 2003), which closely correspond to Osgood's evaluation and activity dimensions (for comparisons of the valence-arousal and Osgood models, see Fontaine et al., 2007; Morgan & Heise, 1988).

Affect control theory and psychological constructionism share a view of the dimensionality of affect and, accordingly, the conceptualization of emotions. Systematic explorations of this common ground could prove beneficial because of the validated formal model that affect control theory provides for linking affective dimensions to culturally shared categories and semantic labels. Research capitalizing on this model should elucidate the role of cultural categories in the conceptualization of emotional experience, outlining exactly how culture matters in the psychological construction of emotion. In return, psychological constructionism provides a beneficial new perspective for affect control theory. Recent advances in neuroscience under the psychological constructionist paradigm have shed new light on the correspondence of functional networks in the brain with the psychological building blocks of emotion (Lindquist et al., 2012). The mind-brain relationship, while significant to any multi-level theory of emotion, is undertheorized in affect control theory, along with most sociological theories of emotion. Combining a psychological constructionist understanding of the biological mechanisms underlying emotion with affect control theory's empirical examination of culturally shared patterns of affective meaning could give rise to comprehensive multi-level explanations of emotional experience.

On a broader note, linking mind and brain requires attention to the problem of neurosemantics (Eliasmith, 2005; 2013): How do neurons represent meaning, and what are the neural mechanisms underlying the conceptualization process, considered by psychological constructionists to be crucial in generating emotion? The semantic pointer hypothesis, the core of a new biologically plausible architecture of cognition recently proposed by Eliasmith (2013), provides an elegant solution for linking affect control theory with affective neuroscience. The term "pointer" stems from computer science and denotes a data structure that references a

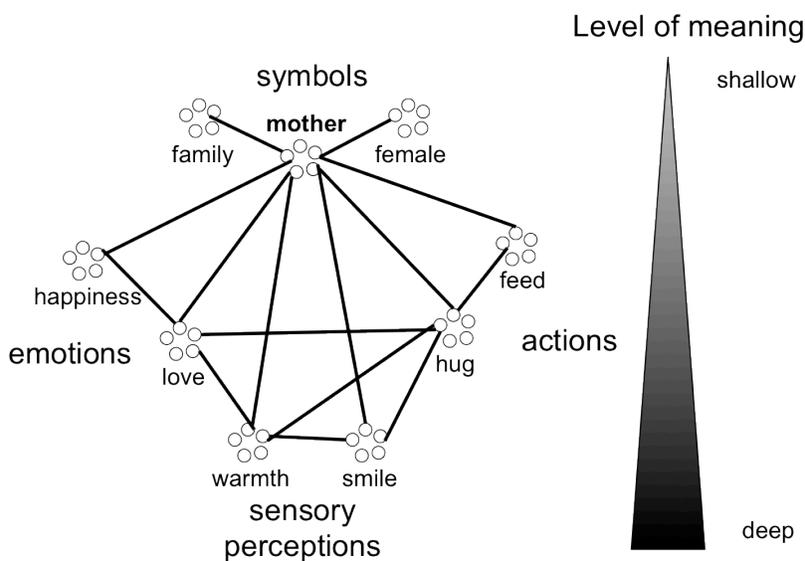
different, richer data structure. Accordingly, semantic pointers are distributed patterns of activity in neural populations that possess shallow and deep meanings (Eliasmith, 2013). Shallow meanings stem from symbol-like relations to other semantic pointers and to objects in the world. Deep meanings stem from the ability of semantic pointers to represent compressed versions of underlying sensory, emotional, and action representations. Compression refers to a certain loss of information that occurs in the process of binding lower level, more embodied representations into higher-level, more symbolic representations.

For example, our understanding of the concept “fear” is constrained by our memories of physiological reactions and cognitive appraisals in past situations where we have experienced fear. However, these memories are only a shallow, compressed mental model of, and certainly not the same as, that immediate experience. Figure 2 elucidates the relations between shallow and deep meanings according to the semantic pointer hypothesis. In the example, the meaning of “mother” arises from constraints that stem from conceptual relations between symbols (such as “family” or “female”), but also from deeper representations of past interactions with “mothers” in different modalities (such as sensory, motor, and emotional).

Eliasmith (2013) shows how the structural relations among conceptual and sensorimotor representations can be implemented in large-scale distributed neural networks that exhibit the spiking behaviors of real neurons. Spikes are sudden increases in voltage that cause the release of neurotransmitters, thought to be the primary mechanism of neuron-to-neuron communication. Eliasmith and Anderson (2003) developed mathematical tools to describe how patterns of spiking in neural populations can encode specific mental representations. Capitalizing on these tools, Eliasmith (2013) shows how neurons can represent ever more abstract concepts by

computing recursive bindings of lower-level representations, thus allowing us to understand how complex symbolic cognition is ultimately embodied in basic sensorimotor representations.

As reviewed above, affect control theory proposes that the emergence of distinct categories of emotional experience results from combining affective meanings of the concepts one would use to describe the specific situation, in particular one's identity. Empirical work has shown that those relations among concepts can be described parsimoniously in evaluation-potency-activity space. Schröder and Thagard (2013) propose that the universality of Osgood's affective dimensions stems from innate structural relations between shallow and deep meanings.



**Fig 2.** Representing a concept in a semantic pointer (cf. Eliasmith, 2013). Small circles represent firing patterns in populations of neurons; lines represent flows of information. Adapted from “The affective meanings of automatic social behaviors: Three mechanisms that explain priming.” by T. Schröder and P. Thagard, 2013, *Psychological Review*, p. 260. Copyright 2012 by the American Psychological Association.

Thagard and Schröder (2013) applied Eliasmith's semantic pointer hypothesis to emotion, proposing that emotions result from the neural binding of semantic pointers representing physiological states with those representing cognitive appraisals. The semantic relations among different folk psychological emotion categories can be described at the shallow level as their

proximity on dimensions of evaluation, potency, and activity. In contrast, the association of emotion categories with specific configurations of physiological reactions, facial and gestural muscle movements, and appraisal patterns constitute the deep meanings of emotions. Fontaine et al.'s (2007) work shows how Osgood's dimensions relate to the deep-meaning features of emotion, such as raising one's eyebrows, feeling one's heart beat faster, or speaking in a louder voice.

Together, affect control theory and the semantic pointer hypothesis can provide a detailed, process-grounded explanation of the role of culture in shaping the interpretation and categorization of core affect. Affect control theory contributes a formal operationalization of the cultural construction and meanings of identity, behavior, and emotion labels in terms of their evaluation-potency-activity structure, and the semantic pointer hypothesis may explain how these structural relations are represented by interrelated patterns of spiking activity in populations of neurons.

### **Discussion**

This paper addressed the need for a theory of the social constitution of emotion that at the same time accounts for elaborate conceptions of sociality and the mechanisms that mediate between societal factors and individual determinants of emotional experience. As such, this article coincides with recent developments in emotion research emphasizing the importance of social and cultural influences on emotion. We have suggested that affect control theory, stemming from the tradition of sociological social psychology, provides an elaborated and well-established theoretical and methodological framework for addressing issues related to the social constitution of emotion at four levels of analysis: cultural, relational-situational, individual, and neural. Our aim was to show that affect control theory may serve as a conceptual and methodological “hub”

capable of connecting lines of inquiry from different disciplines and across different levels. Because affect control theory is well-established primarily within sociological emotion research, we do not suggest that theorizing in other disciplines should be subsumed or wholly integrated under this framework, but rather that (1) certain affect control principles are suited to inform research on the social constitution of emotion in these disciplines, and that (2) this research is in turn invaluable in further developing and refining affect control theory. This approach avoids adding (unnecessary) complexity to existing theories and frameworks.

In highlighting the areas of mutual overlap, we have emphasized that it is conducive to research to understand the simultaneous effects of and interacting relationships between the four levels of analysis. In this respect, affect control theory is an adequate candidate because of its multi-level, interactive theoretical framework, its validated methodological approach, and its specification of mechanisms that link culture, social situations, and individual minds.

We have shown that the theory has a non-localist and non-deterministic understanding of culture, viewing culture as patterns of shared meanings and meaning-making. As such, it is well-suited to accommodate “culture” on various scales, from small groups to social classes, nations, and geopolitical regions, and to interface with most conceptualizations of culture present in established emotion research, such as cultural psychology. The theory also links culture to individual selves and minds, connecting larger-scale perspectives with approaches highlighting individual motives, roles, identities, and self-structures. One of affect control theory’s strengths is its conceptualization and operationalization of social interaction as an intermediary between large-scale institutional embeddedness and individual dispositions and behaviors. At the same time, the theory shares an understanding of emotion elicitation that is compatible with accounts emphasizing the importance of appraisals. It expands upon the role of fundamental affective

meanings in the appraisal processes and how these shape transient affective meanings, which in themselves are outcomes of impression formation (or appraisals). Finally, affect control theory shares assumptions with psychological constructionist views on the neural implementation of core mechanisms. In particular, Eliasmith's (2013) semantic pointer hypothesis provides a pathway to link core affect, transient and fundamental sentiments at the neural level (see also Thagard & Schröder, 2013).

These theoretical linkages are supported by a validated methodological approach, which involves measuring the fundamental affective meanings of words and their underlying concepts using the semantic differential technique. Based upon these measures, affect control theory provides formal models for computing the transient meaning of and emotions associated with specific interactions and situations. Importantly, this approach to measurement can do justice to both large-scale understandings of shared cultural meanings and smaller-scale understandings in view of specific populations of raters. Moreover, words, concepts, and sentences describing social interactions and their corresponding affective meanings can be used as stimuli in experimental designs investigating, for example, the cognitive and biological components of particular mechanisms.

New research testing the proposed connections between theories of emotion construction and analytical levels is essential to the development of such an integrative model. While the links we have presented in this paper illustrate some key areas of overlap between prominent theories of emotion, they are only initial directions for future research. We encourage scholars to identify additional theoretical links beyond those presented here, to critically analyze the mutual implications of empirical findings at various analytical levels, and to develop research capable of unifying theories.



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