

RUNNING HEAD: Meaning and response co-ordination

What holds emotions together? Meaning and response co-ordination

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Abstract

At what stage in the emotion process do people apprehend the relational meaning of their encounters with the practical or social environment? For many appraisal theorists, meaning (usually or always) comes first, shaping the activation of functional response modes by top-down influence. For transactional theorists, meaning emerges bottom-up in parallel with the real-time consolidation of the response syndrome. For attribution theorists, meaning is applied to emotional episodes after the fact, and is not an intrinsic part of any emotion-generative mechanisms. For communicative theorists, emotions are flexible strategies for conveying meanings to others. This paper reviews arguments and evidence for and against these four approaches and attempts to integrate their insights by sketching out a view of emotions as functional modes of engagement with the practical and social environment (relation alignment), whose operation is transformed by the imposition of societal prescriptions and descriptions. From this perspective, relational meaning is often implicated in the causes, content, and consequences of emotion but its roles in these phases of the transaction do not always coincide. Further, emotions should not be modelled simply as determinate responses to separately defined meanings or as communicative acts driven by internal goals, but also as situated adjustments to unfolding events and as active ways of transforming or producing meaning in collaboration with other people.

What Holds Emotions Together? Meaning and Response Co-ordination

Any statement that someone is experiencing a particular emotion carries information about that person's relation to a particular intentional object (the thing that the emotion is about). Saying that I am angry, for example, implies (more or less, and among other things) that I want some obstacle removed. Saying that I feel guilty implies that I would like some circumstance undone, and saying that I am embarrassed suggests discomfort at other people's actual or potential attention. In other words, emotions (or emotion names) are associated with distinctive relational meanings. But what is the precise nature of this association?

The present paper reviews alternative answers to this question that differ in their assumptions about whether relational meanings precede, accompany, or follow emotion, whether emotions are co-ordinated by top-down meanings or emerge from bottom-up adjustments, and whether relational meanings are attached to real-life emotions or simply representations of emotions. Instead of suggesting that any single view is correct across all possible cases, I shall consider when and how each applies and how they may work together.

In brief, the four views I shall consider are as follows:

1. *Appraisal approaches*: Many (but not all) appraisal theorists believe that emotions are co-ordinated responses to detected or inferred relational meanings. Implicitly or explicitly recognising the particular personal significance of a current transaction leads to the activation of an integrated response syndrome designed to address the identified challenge or threat. Outputs are organised on the basis of agendas set by appraisals. Thus, relational meaning takes priority in the generation and patterning of emotional responses.
2. *Transactional approaches*: According to transactional approaches the coherence of emotional response syndromes emerges bottom-up rather than being imposed top-down by co-ordinative meaning-based processes. Separate emotion components adjust on-line

to changing local demands and to the effects of other components. Response patterns depend both on parallel effects of different aspects of the unfolding, structured situation and on the mutual constraints imposed by component processes. Although these emergent response patterns are meaningfully related to the practical and social environment, their relational meaning need not be registered at any level by the individual undergoing the emotion.

3. *Attributional approaches*: A more sceptical view is that the association of “emotions” with relational meaning is a largely contingent matter. Appraisals are only one of the possible sources of evidence used by perceivers to infer emotions in themselves or others. Further, the integrity of differentiated emotional response syndromes is a perceptual phenomenon telling us about how “emotions” are represented and not (directly) about how putative emotion-relevant processes interrelate in reality. Emotional meaning is imposed on fortuitously associated processes that may or may not implicate apprehension of relational meaning.
4. *Communicative approaches*: Communicative approaches emphasise the priority of the social functions of emotions, and their orientation to actual or imagined effects on someone else. Although emotions convey relational meanings to others, they need not be based on any prior apprehension of these meanings. What drives emotion is the unfolding co-constructed relational agenda rather than how that relational agenda is appraised by any individual interactant.

Table 1 sets out the different assumptions made by these approaches about the place of relational meaning in emotion and the processes co-ordinating response components. In the following sections of this paper, each approach is reviewed and evaluated in more detail. The intention is to highlight potential limitations of an exclusively appraisal-based account as often

applied in computational modelling of emotion, and to suggest ways in which appraisal theory might be supplemented or adapted on the basis of the outlined alternatives.

Because modellers typically focus on the way that information needs to be processed in order to generate coherent, differentiated emotions, they tend to work from psychological theories that attempt to uncover an underlying generative grammar, often emphasizing the individual rule-based extraction of meaning from a structured situation (cf. Ortony, Clore & Collins, 1988). Emotions, in this view, are a direct function of the relationship between personal goals and individually perceived environmental cues relevant to those goals. In short, they depend on appraisals of some kind. Such an approach certainly provides a sound basis for mapping emotions to relational meanings, but often fails to address the processes whereby emotions and meanings emerge in real-time embodied transactions with the practical and social environment, where the information value of what is happening may not be the only relevant consideration. Further, emotions are often treated as encapsulated outputs or states rather than as dynamic, continually adjusting modes of active engagement with unfolding events. The present paper reviews different approaches to relational and emotional meaning in order to get a clearer fix on their production, construction, and formulation, and how these related processes might be addressed by modellers.

In particular, I shall argue: a) that appraisals are often only loosely correlated with emotional responses (suggesting that other processes must also contribute to emotion activation and differentiation); b) that emotional response components may be brought on-line as separate adjustments to different aspects of the unfolding situation (as implied by transactional approaches) rather than being regulated by any integrated control program; c) that activation of individual response components need depend on any intrapsychic extraction of meaning; d) that response patterning is not consistent across all instances of any given emotion but depends on the

specific situated demands of the current transaction; e) that experiencing emotion is not equivalent to representing experience in emotional terms (Frijda, 2005; Lambie & Marcel, 2002; Parkinson, 1995), but that the application of emotion representations to experience nevertheless affects regulation and enactment (as implied by attributional accounts); and f) that emotions are often attuned to their actual or anticipated effects on other people (as claimed by communicative theories) rather than being shaped by meanings that are registered in advance. My general conclusion is that emotions should be viewed as means of aligning relations with the practical and social environment which are not always wholly guided by individually apprehended relational meanings, integrated or otherwise.

Appraisal Theory: Meaning Comes First

Perhaps the most popular and well-developed contemporary psychological account of emotion is appraisal theory (e.g., Scherer, Schorr, & Johnstone, 2001), whose central claim is that emotions depend on perceiving the relational meaning of encounters with the environment (see Figure 1). The basic logic is that the mental system cannot generate a functionally appropriate output to any specific challenge or threat without extracting information about its personal significance. Recognising (implicitly or explicitly) that a transaction requires an angry reaction, for example, depends on registering that another person (or agent) is accountable for some event that conflicts with current concerns, and recognising that a transaction requires a guilty reaction depends on registering one's own accountability. Thus, representation and evaluation of what is happening precedes the specification of any particular emotion: Meaning takes priority in the emotion process.

Although most appraisal theorists are relatively clear about emotion's necessary or typical dependence on relational meanings, specification of the processes underlying the production of these meanings is often less tight (Scherer, 1993). In fact, there is a broad consensus that a range

of different processes, both low-level and high-level, implicit and explicit, unconscious and conscious, can contribute to appraisal (e.g., Leventhal & Scherer, 1987). Content rather than process is what makes the vital difference to emotional quality. As Lazarus (1991, p. 160) contended: “it is meaning that counts in emotion, not how that meaning is achieved.” Thus, there is no assumption that individuals arrive at articulated conclusions about relational meanings before reacting emotionally to those meanings. Some appraisal theorists, notably Scherer (e.g., 2001), also deny that the components of relational meaning need to be fully integrated before the emotional reaction begins. This view will be considered in a later section. For now, the focus is on the more common claim that emotions are reactions to patterned relational meanings even when these meanings are not consciously apprehended.

My argument in this paper is not that these appraisal theories are wrong, but that they present only a partial account of the emotion process. It is certainly true that emotions often do depend on prior extraction of relational meaning at some level (Roseman & Evdokas, 2004). For example, you may only work out that a remark was insulting after thinking about it afterwards. Further, appraisals clearly make a difference to how an already developing emotion unfolds (Lazarus & Alfert, 1964). For example, your reaction to the insulting remark will differ if you believe that it was specifically intended to upset you. However, the connection between relational meaning and emotion is not always as direct as many appraisal theories usually claim. In the next sections, I address two of the guiding assumptions of these appraisal theories in turn. First, I shall consider whether each distinctive emotion is genuinely characterised by a consistent pattern of relational meaning. Second, I will evaluate the claim that appraisal co-ordinates emotional response patterns.

Consistency of relational meaning

A number of questionnaire-based studies have shown that when people represent their

experience in terms of a given emotion, they also tend to endorse statements about characteristic appraisals of the situation (e.g., Smith & Ellsworth, 1985). For example, a participant in one of my own studies recalled the following incident as an example of when she had felt “guilty:” “I was working in a shop and a customer forgot a substantial amount of change and I kept it” (Parkinson, 1999, p. 353). Unsurprisingly, this participant also rated herself as accountable for her negative action and scored high on Smith and Lazarus’s (1993) scale measuring the core relational theme for guilt: “self-blame.” By contrast, participants reporting on experiences that they consider good examples of “anger” tend to report that another person or external agency is accountable and score high on “other-blame.”

However, relationships between reported appraisals and reported emotions are not usually as tight as many unreconstructed appraisal accounts might predict. In most questionnaire studies, appraisal dimensions explain less than half of the variance in emotion reports. Further, Parkinson (1999) has argued that many of these studies carry an explicit or implicit demand to report on instances of emotion that are readily justifiable or can be explained in terms of rational processes. In short, when providing accounts of emotions for psychologists, participants selectively report on examples that follow a conventional cultural logic. These examples are precisely those that are likely to follow the common-sense predictions of appraisal theory. When contrary experimental demands are imposed by specifically requesting unreasonable examples of emotion, the predicted appraisals are significantly weaker (Parkinson, 1999). Thus, reportable blame-related appraisals do not appear to be consistently related to anger or guilt under all circumstances.

A problem with much of the questionnaire research described so far is that participants are explicitly asked to report on examples of particular emotions, leading to the possibility that their responses may be distorted by stereotypical perceptions of how these emotions are supposed

to unfold (Russell, 1987; Parkinson & Manstead, 1992). Although it is unlikely that emotion stereotypes bear no relation to emotional reality, they may be biased in accordance with cultural values or ideologies to over-represent instances that have particular significance within a given society (*hypercognized* emotions, Levy, 1973), and to under-represent instances that have less relevance to societal concerns (*hypocognized* emotions, Levy, 1973). If a prototypical example of English-language “anger” is a reaction to someone’s deliberate insult (e.g., Russell & Fehr, 1994) that involves finding the other person to blame for this unwanted event, it seems hardly surprising that participants retrieve memories involving other-blame when asked to think of an instance of this emotion category.

Correspondingly, it might be argued that the apparent dissociations between appraisal and emotion reported in Parkinson’s (1999) study in fact reflected participants’ attempts to generate counter-stereotypical examples in response to the request for unreasonable emotions. Indeed, participants may have downplayed any other-blame in order to present their anger as less reasonable for the purposes of the experiment.

However, these demand characteristics are largely absent in two diary studies that also found similar appraisal-emotion dissociations. Parkinson, Roper and Simons (in press) asked participants to report on all instances of anger, however reasonable or unreasonable they might seem, for two weeks and again found that other-blame was significantly stronger in reasonable than comparably intense unreasonable anger. Even when there was no pressure to distort representations of experience, participants often reported their anger as unreasonable and as low in other-blame. Similarly, Nezlek and colleagues (2008) found evidence of individual differences in relations between appraisals and six different emotions in another diary study, and concluded that there is no one-to-one correspondence between appraisals and emotions in everyday life.

Studies that cue emotion reports using situational prompts rather than emotion names also yield similar conclusions. For example, a series of studies in which participants were asked to report their emotional reactions to incidents where someone close had blamed them (using both diaries and retrospective questionnaires) showed that one possible reaction was a feeling of guilt, even when reports of self-blame were low (Parkinson & Illingworth, submitted). Because participants had not been told that these studies focused specifically on guilt, it seems less likely that these reports were distorted to provide counter-stereotypical representations of this particular emotion. Using similar methods, Kuppens et al. (2003) asked participants to recall a range of incidents in which the appraisals thought to be characteristic of anger were present. They found that although there were probabilistic associations between anger and many of the manipulated appraisals, none of them were either necessary or sufficient conditions for this emotion. In follow-up research, Kuppens and colleagues asked participants to report on the emotions they thought they would experience in some of the situations generated in the earlier study. There were clear individual differences in the strength of association between anger and specific appraisals. For example, other-accountability was a strong predictor of anger for some participants but not others, and some participants reported that they would become angry simply in response to any externally induced disadvantage.

Of course, the fact that measured appraisals failed to account for all variance in reported emotion across these studies may partly reflect the impact of nonconscious appraisals that did not register in self reports (Parkinson & Manstead, 1992). Unfortunately, researchers have not yet refined workable implicit measures of differential appraisals that would allow proper assessment of this possibility. However, some descriptions of emotional situations generated by participants across the studies reviewed above are difficult to read as occasions even for implicit appraisals with the predicted content.

For example, participants in Parkinson's (1999) study presented the following incidents: "I broke my keys and the next day locked myself out of the house"; "A friend had a go at me over something she accused me of telling someone else that should have remained confidential. I hadn't said anything." The first of these incidents implies self-blame but generated anger, whereas the second implies other-blame but elicited guilt. Of course, blame may still have been directed externally at fate or God in incident 1, but then the question remains of whether such external blame is a cause or consequence of any anger. In incident 2, the participant may have felt that if she was being blamed there must be some cause for it. But again, it is not clear whether such reasoning precedes or follows the initial feeling of "guilt."

Other unmeasured appraisals may also have contributed to the emotions reported in these studies. If anger can occur without other-blame, then some more basic appraisal relating to "acute goal interference" (Frijda, 1993) may instead represent the minimal necessary condition for this emotion. Clearly *something* about the situation is helping to shape the specific emotional response, and some theorists would argue that any process underlying such an effect counts as appraisal by definition. Such an assumption is clearly not open to empirical falsification, but nevertheless runs the risk of skating over potentially important distinctions between emotion-shaping processes at different levels (e.g, action vs. reaction, regulation vs. reflex, representation vs. reality, cognition vs. motivation, individual vs. social, etc). If any connection between situation and emotion is defined as appraisal by fiat, then the concept loses any distinctive empirical content. In my view, these apparently unreasonable emotion episodes are better understood as relational adjustments than as direct responses to appraisals (see below).

A final limitation of the self-report evidence is its relative lack of temporal sensitivity and resolution (Scherer, 1993). Assuming that appraisals and coping responses often change rapidly over time continually feeding into a developing emotion process, slippages between emotion and

appraisal self-report may partly reflect failures to calibrate the temporal focus of the two types of question. For example, I may report guilt despite a lack of self-blame because the self-blame report refers to a time period before or after guilt was transiently activated. Again, the only way in which this explanation could be adequately tested requires the development of more sensitive measures of the variables in question: a task that in turn necessitates tighter specification at a theoretical level.

In sum, despite its acknowledged limitations, available evidence argues against the conclusion that each emotion is always accompanied by a consistent pattern of appraisal as indexed by available measures. Empirical associations between self-reported appraisals and emotion are usually reliable but never perfectly consistent.

Appraisal-response coherence

In this section, I turn from appraisal's connection with emotion self-reports to its association with other responses that are often considered to be emotion components. As indicated above, the plausible logic behind appraisal theory is that the mental system needs to know when to output an emotion in order for the emotion to serve its adaptive function. In this view, emotions are patterned response modes designed to meet appraised requirements by preparing the organism for appropriate cognition and action (see Figure 1). Thus, the components of the emotional response syndrome (including attention allocation, action tendencies, responses of the autonomic nervous system [ANS], and facial expression) are co-ordinated by the agenda specified (in advance) by appraisal. The present section reviews evidence that these response components are closely associated with appraisals. Later in the paper, I will revisit the assumption that response components intercorrelate more generally.

The appraisal approach sees action tendencies (or states of action readiness) as the most central component of emotional response (e.g., Arnold, 1960; Frijda, 1986). Indeed, as outlined

above, it regards the main adaptive function of each particular emotion as preparing the mind and body for particular varieties of behavioural response (e.g., warding off antagonists in anger and repairing relationships in guilt). However, whether preparation for consistent physical movements characterises all instances of any given emotion is debatable, with several commentators pointing out that each distinctive functional agenda may be served by quite different behaviours (*equipotentiality*, see, for example, Campos, Frankel, & Camras, 2004; Parkinson, 2004; Russell, 2003). How I remove an annoying goal blockage, for example, very much depends on its particular nature and the resources available to me at the time. I may shout at someone who is about to steal my car, speak sarcastically to someone questioning my authority in a formal meeting, or hit out at someone physically attacking me. According to some appraisal theorists, the action readiness associated with emotion consists of preparation for a default behaviour (a decoupled reflex) that has been most functionally successful in the most commonly experienced antecedent situations over evolutionary history (e.g., Scherer, 2001). For others, the action readiness is at a more general and abstract level consisting of broad goals or agendas about what kinds of response may be required (e.g., Frijda, 1986; Roseman, 2001). In either case, how good is the evidence that states of action readiness are consistently activated by appraisals?

Action tendency self-reports. Two studies by Frijda, Kuipers, and ter Schure (1989) asked participants to recall instances of different experienced emotions and to rate associated appraisals and action tendencies. The combination of all measured appraisals explained on average only 19% of the variance in reported action tendencies in study 1 and only 24% in study 2. Turning to relations with emotion, appraisals and action tendencies explained significant independent variance, meaning that their associations with emotion were separable rather than fully overlapping as predicted. Correct classification of emotion category based on reported action tendencies was also below 50% across both studies. Adding the independent variance explained

by appraisals still left more than 40% of the variance unexplained. Although these classification rates obviously improved when broader classes of emotion were distinguished, the bottom line seems to be that appraisals, action tendencies, and emotions are less tightly intercorrelated than many versions of appraisal theory imply. Similarly, Kuppens and colleagues (2003) found that reported antagonistic action tendencies, like anger-relevant appraisals, were only moderately correlated with anger.

In the previous section, I suggested that part of the association between appraisal reports and emotion reports may sometimes depend on participants' stereotypical or normative representations of the meanings of common emotion words rather than any direct empirical connections between appraisal and emotion (Parkinson, 1997). Similar arguments also apply to Frijda and colleagues' self-report evidence concerning action tendencies. Participants' perceptions of how they felt disposed to act in recalled examples of anger, for example, may have been biased by the cultural representation of anger as implying aggression. Further, participants may have selectively retrieved examples of each relevant emotion that conformed more closely to its stereotypical implications for action.

One way round this problem is to collect response information that is less subject to presentational biases, such as physiological data from the autonomic nervous system. If participants react to appraisals with changes in heart rate or skin conductance, for example, it seems less likely that these associations depend on self-presentation, dissimulation, or responses to demand characteristics. Similar arguments are also sometimes made about "objective" data derived from participants' facial expressions, but in this case participants may well deliberately adjust their displays to suit the perceived demands of the audience (e.g., Ekman & Friesen, 1982).

Autonomic changes. Pecchinenda and Smith (1996) collected skin conductance data and self-reports of problem-focused coping potential while participants solved anagrams that varied

in difficulty. Problem-focused coping potential explained less than 5% of the variance in any skin conductance index, and slightly more variance in objective task performance. The investigators acknowledged “the observed relation between appraised coping potential and skin conductance activity to be an indirect one that depends on the relation between skin conductance activity and task engagement” (p. 499), and pointed out that third variables such as “anxiety, perceptions of threat, or negative emotion more generally” (p. 499) may have contributed to their findings. Indeed a conservative interpretation of these results is that increases in attention or effort (rather than appraisals of required attention or anticipated effort) are generally associated with increased autonomic arousal (see also Wright & Dill, 1993). Without evidence concerning dissociations of different response components across different appraisal dimensions, it is hard to draw firm conclusions about the dependence of autonomic indices of specific appraisals.

Tomaka and colleagues (1997) manipulated appraisals of a mental arithmetic task by instructing participants in advance to treat the task as a challenge or telling them instead that accuracy was important and would be monitored (threat). Predicted parallel effects were obtained on appraisal and several indices of cardiovascular activity but no direct evidence was presented that appraisals mediated the manipulation’s effects on physiological responses.

Van Reekum and colleagues (2004) compared physiological reactions to different emotion-relevant events experienced while playing a space-adventure computer game. Although there were reliable differences in ANS responses to goal-conducive (proceeding to a higher-level galaxy) and goal-obstructing events (losing a ship), these differences may have been attributable to general arousal or to appraisal-irrelevant aspects of the two kinds of event. Few reliable differences resulted from an independent manipulation of intrinsic valence (pleasantness of the noise used to signal goal-conducive or goal-obstructing events) but this may have been because the manipulation of this variable had no real significance in the context of the game.

Facial movements. Reisenzein (2000) found that unexpectedness of quiz answers accounted for less than 20% of the variance in video-coded facial movements (raised eyebrows, eye-widening, jaw dropping) and behavioural responses (delays in reaction time to a parallel task) theoretically associated with surprise. Similarly, a series of studies by Reisenzein and colleagues (2006) showed that surprise expressions (as measured either by video-coding or electromyographic recording of activity in the frontalis muscle) were relatively rare in reaction to events rated as highly unexpected and surprising. In no case was a full three-component surprise expression recorded despite strong evidence for relevant surprise appraisals.

Bonanno and Keltner (2004) intensively examined video-recordings of interviews with recently bereaved participants, coding verbal statements for appraisal content, and facial expressions for evidence of “anger,” “sadness,” laughter and smiles. Although there was no significant correlation between appraisals relating to happiness and pride and any measured facial expression, appraisals of loss were significantly correlated with “sadness” expressions, and appraisals of injustice were significantly correlated with “anger” expressions. Although these relationships were statistically reliable, their absolute size was relatively small, and relevant appraisals only accounted for around 12% of the variance in these last two emotions. Further, these data were collected in a setting where facial display was probably facilitated by communicative demands (e.g., Fridlund, 1994).

Facial and autonomic changes. Smith (1989) assessed both facial and autonomic responses to appraisals. First, he conducted additional analyses of data collected in Smith and Ellsworth’s (1985) study in which participants posed facial expressions associated with fifteen different recalled emotional experiences. The combination of all measured appraisals accounted for just under 40% of the variance in posed smiles, around 30% of the variance in brow frowns, and less than 20% of the variance in all other recorded expression components. Of course,

posing an expression that participants believe should be associated with an emotion more directly reflects their stereotypical representations of that emotion rather than their genuine experience of it (Fernández-Dols & Ruiz-Belda, 1997), and these associations would probably have been substantially weaker if spontaneous rather than posed expressions had been recorded (e.g., Motley & Camden, 1988).

Smith (1989) also collected new experimental data by asking participants to imagine situations that were associated with effort and agency appraisals and measuring their heart rate, skin conductance, and facial EMG. Although many of the predicted relations between appraisals and physiological responses were obtained, none of them suggested tight integration of these emotion components. For example, appraisals of anticipated effort explained less than 5% of the variance in heart rate and skin conductance, and perceived obstacle explained less than 10% of the variance in eyebrow EMG activity (see also Pope & Smith, 1994).

Aue, Flykt, and Scherer (2007) assessed the effects of goal conduciveness and relevance on a range of ANS indices and EMG-based facial measures by coupling symbols indicating monetary gains or losses with slides depicting biological or cultural threats or emotionally neutral objects. Unexpectedly, higher cheek muscle activity was associated with biological threat stimuli, but other findings were broadly in accordance with predictions. However, effect sizes were again relatively low and very few effects associated with the goal conduciveness manipulation were reliable.

Conclusions. The studies reviewed in this section show that manipulated or measured appraisals are often reliably associated with one or more components that are assumed to be part of emotional response syndromes. However, none of these studies has systematically assessed differential effects of a wide range of appraisals on response patterning more generally. In cases where two appraisals have separable effects, this can often be explained in terms of their relative

strength rather than genuine qualitative differences (e.g., Van Reekum et al., 2004). Further, other variables correlated with appraisals, such as direct (rather than appraised) transactional demands or behavioural and attentional adjustments (see below), offer possible alternative interpretations of many of the findings.

Even disregarding these limitations, the extent of reported correlations between appraisals and responses is usually moderate at best, and can vary across individuals, contexts, and emotions. Although stronger relationships may be masked by methodological factors (e.g., dissynchrony of response onset, inter-individual variance in between-subjects designs, use of inaccurate retrospective measures etc, see Mauss et al, 2005, and below), even studies where these problems are minimised find associations that are far from perfect. One possible conclusion, then, is that appraisals contribute more to response coordination in emotion on some occasions but not others. If so, what other mechanisms are influential when appraisal plays a less central role? One answer is that aspects of the emotional syndrome are at least partly shaped by low-level bottom-up processes that do not involve the (conscious or unconscious) apprehension of integrated relational meanings.

Transactional Approaches: Emergent Relational Meaning

The basic idea of transactional approaches is that interconnections between response systems coupled with their simultaneous on-line responsivity to the unfolding structured environment are sufficient to produce emergent meaningful patterns without any requirement for an executive integrating mechanism (e.g., Parkinson, 2001a, cf. Fogel, 1993). Thus, response coherence is not regulated by top-down control processes based on extraction of relational meaning, but rather depends on bottom-up consolidation of response components over time.

Such views are not entirely alien to appraisal theory. For example, Smith and colleagues (e.g., Smith & Kirby, 2000) argue that emotions can be generated as a function of associative

processing as well as reasoning, thus raising the possibility of emotion components being separately activated by simple priming effects rather than co-ordinated by higher-level meaning structures. However, their model still maintains that any activated meaning component needs to pass through an appraisal register that detects the overall pattern of associations before the emotion is output suggesting at least some level of central integration.

Scherer's (e.g., 2001) theory comes closer to the dynamic systems account outlined above. In his view, appraisal is instantiated by a rapidly cycling fixed sequence of stimulus evaluation checks (SECs) whose complexity progressively increases as the process unfolds. First, the system detects novelty, then intrinsic pleasantness, goal/need significance and so on until further downstream, assessments of event aspects such as norm compatibility are made. In addition, Scherer assumes that the emotion itself develops cumulatively as these checks proceed, with response components consolidating as the appraisals become more complex over time. Thus, although meaning still comes first in Scherer's model, it need not be integrated into a coherent relational pattern before the emotion process begins. Emotions are not generated as the end result of some metaphorical decision process, but rather emerge more flexibly in response to the vicissitudes of the unfolding situation.

However, even Scherer's model may be unduly restrictive in its specification of the structure and content of mental mediation. The SECs are performed in a fixed sequence and each picks up an abstractly defined feature of the current situation before outputting an appropriate functional adjustment to the state of the individual's physical and mental system. Thus, the emotion process is articulated as a series of discrete hierarchically organised states based on interchanges between the individual and a separable environment.

A more radical transactional approach would argue that emotions require no extraction of abstract information from unfolding situations even at this piece-meal level. According to such a

view, there is no necessary consistency in the mechanisms of information registration or in the nature of their output to the emotion process. Local and specific adjustments in the course of action are made in continuous attunement with the unfolding context within which action is embedded. Further, the impact of context on action does not entirely depend on its registration by predefined appraisals. Instead of emotions being guided by central mechanisms detecting classes of relevant cue, they adjust responsively to incoming feedback whose nature depends on the characteristics of situated action that is being performed. For example, face-to-face interactions involve mutual attunements of facial and gestural movements over time (e.g., Bernieri, Reznick, & Rosenthal, 1988; Grammer, Kruck, & Magnusson, 1998) which may lead to emergent complementary or contrasting emotional stances.

At present, most transactionalist approaches have not developed into systematic theories that might generate specific hypotheses, and therefore lack an extensive evidence base. Many of the demonstrations that aspects of emotional response can be activated by low-level processes (e.g., Zajonc, 1980) can be accommodated by appraisal theories that acknowledge continually updating appraisals instantiated at an implicit level (e.g., Leventhal & Scherer, 1987). Indeed, without agreed operational criteria for the presence or absence of appraisal, it would be practically impossible to disprove such a theory (Zajonc, 1984). However, transactional approaches present a valuable corrective to former methodological biases of appraisal research by suggesting that emotion should be investigated as a dynamic, embodied, and situated process rather than a packaged response to preformulated relational meanings (e.g., Fogel et al., 1992).

Once it is acknowledged that there is no specific time-point at which non-emotional functioning is transformed into an emotion, and that emotional engagement develops moment-by-moment as the person adjusts to the changing demands of a responsive environment (see Lewis, Sullivan, & Michalson, 1984), the question of whether meaning guides, or is guided by, emotion

starts to seem less decisive. In fact, many appraisal theorists acknowledge that causality flows in both directions (e.g., Lazarus, 1991). Transactional approaches therefore complement more traditional appraisal accounts by suggesting additional routes whereby appraisals and emotions may become inter-coupled (cf. Lewis, 1996). Modelling emotions as real-time processes that develop in tandem with unfolding situational inputs and become selectively attuned to relevant aspects of these inputs would help to accommodate some of these complexities (see also Gratch, 2008).

Coherence of the emotional response syndrome

Although the views distinguished above disagree about how response components are co-ordinated, they broadly share the assumption that emotions are (or become) more or less coherent response patterns or syndromes. Earlier, I reviewed evidence that appraisals are correlated with the various response components thought to be associated with emotions and found it wanting. There is also little evidence that these response components are tightly correlated either with emotions or with each other.

For example, although many theories assume that emotions are typically accompanied by consistent and distinctive patterns of autonomic response, in fact, recorded ANS patterns differ across instances of the same emotion when they are generated using different procedures both within studies (e.g., Stemmler, 1989) and across studies (e.g., Cacioppo et al, 2000). The modest correlations sometimes found between particular emotions and specific ANS indicators can often be explained in terms of extrinsic factors that happen to be associated with emotions as induced in these studies. In other words, anger may tend to be correlated with raised blood pressure or muscle tension when the precipitating situation calls for physical activity, but not when it occurs in more passive contexts (e.g., imagery based procedures). Thus, the apparent ANS-anger connection is best explained by the general attentional and physical demands of the situation

rather than by emotion itself. Correspondingly, it is well known that ANS activity is acutely sensitive to physical activity, attentional states, inhibition of responses etc even in situations where no strong or distinct emotion is present. These same processes clearly also operate in many emotional situations, but this does not mean that their autonomic effects should be attributed to the emotion (or its associated appraisal).

The apparent variability and loose coupling of ANS indices has led many investigators to abandon the hypothesis that there is a high degree of consistency between the peripheral manifestations of any given emotion across different situations. More limited claims that there is consistency in ANS responses relating to pleasure and arousal dimensions (e.g., Barrett, 2006) or challenge and threat (Blascovich & Mendes, 2000) are becoming increasingly common. Even then, questions remain about whether any patterning stays constant across different contexts.

Turning from the ANS to the face, the strongest evidence for facial specificity comes from judgement studies (e.g., Ekman, Sorenson, & Friesen, 1969) rather than from on-line recordings of spontaneous facial responses during ongoing emotional encounters with the environment. However, the fact that participants are consistently able to attribute particular emotional meanings to stylised snapshots of facial “expressions” does not necessarily mean that those expressions are typically produced when the emotion actually occurs (Russell & Fernandez-Dols, 1997). As Russell (1994) points out, rubbing your belly can be used to communicate a desire for food but people do not spontaneously rub their bellies as a direct expression of hunger. Correspondingly, participants from a wide variety of human cultures would often recognise belly-rubbing as indicating hunger or related concepts (given appropriate alternative answers) even if they had never seen anyone rub their belly when hungry.

However, it seems unlikely that the specific depicted expressions that are associated with emotion names in judgement studies bear no relation whatsoever to spontaneous facial behaviour.

Instead, as with ANS patterns, the distinctive facial display probably reflects a set of movements that occur (at least sometimes) in prototypical (but not necessarily representative) instances of the emotion. For example, moral disgust is represented metaphorically in many societies in terms of finding something unpalatable and vomit-inducing (e.g., Rozin & Fallon, 1987). Thus, we have come to associate the flared nostrils and gagging observed when directly confronted with bad tastes and smells (e.g., Fridlund, 1994; Steiner, 1979) with a more inclusive emotion category (cf. Darwin's, 1872, principle of serviceable associated habits). We may even pull a corresponding face to communicate to others that we find someone's actions distasteful under certain circumstances. In other words, facial movements that serve direct practical or communicative functions in certain specific emotional situations acquire more generalised cultural meanings, but these meanings continue to bear at least a metaphorical relation to more basic affective processes.

Moving from emotion judgement to emotion production studies, experiments that have looked for evidence of coherence across different responses while emotion is actually happening have produced mixed findings, and at best moderate positive correlations (e.g., Bonnano & Keltner, 2004). Mauss and colleagues sought to correct methodological problems that might have attenuated the correlations obtained by these earlier studies. They focused on amusement and sadness induced by watching an excerpt from the bittersweet movie drama *Steel Magnolias*. Amusement and sadness experience, ANS and somatic activity and facial expressions were continuously recorded across three separate viewings of the same film-clip. To correct for possible differences in the lag time of the various measures, Mauss and colleagues looked for the maximal within-participant correlation between each pair of measures across a 20-second time window (plus or minus 10 seconds from the predictor variable). This procedure revealed moderate to high correlations between facial and experiential measures for each of the two emotions, and weaker correlations with autonomic and somatic activity. These correlations

varied widely from individual to individual with participants reporting higher intensity amusement showing closer associations between measures relating to amusement than participants reporting lower-intensity amusement, but no corresponding relation to intensity for sadness.

Although Mauss and colleagues' study provides one of the most comprehensive and systematic attempts to uncover response coherence during emotion, its findings may still overestimate the extent of associations between response components under normal circumstances. Their procedure for locating maximal correlations across different possible time-frames potentially capitalised on fortuitous associations, and variance due to autocorrelation (i.e., correlation between consecutive values of the same measure for the same person) was not removed, potentially leading to inflated coefficients. In addition to these statistical issues, it is not clear whether the reported correlations reflect emotional coherence per se because: a) there was no non-emotional control condition; and b) a single context was used for eliciting each emotion raising the possibility of third variable explanations. For example, part of the association between sadness expressions and reported sadness experiences may have depended on exposure to depicted sad expressions of characters in the film which may have induced mimicry in parallel with emotional responses. Further, participants were filmed throughout the procedure and the experimenters' evident interest in their moment-by-moment emotional response may have increased their communicative facial displays (cf. Fridlund, 1991). Levels of autonomic activation may have also played a role in increasing facial activity more directly. Finally, the differing patterns of results even for the two emotions selectively sampled here suggest that the promising results for amusement may be unrepresentative of a broader range of emotions sampled across different contexts.

Demonstrating that response components can cohere for certain individuals in certain

circumstances does not prove that they typically do. Indeed, a range of studies suggest that there can be dramatic dissociations between facial movements and apparent emotion. For example, Fernández-Dols and Ruiz-Belda (1995) showed that athletes who had recently won an Olympic event rarely smiled except when interacting with others in a face-to-face setting. Although there was no direct measurement of their emotion, ratings by other athletes with similar experiences confirm the likelihood that their predominant experience was an extremely happy one, and not mixed with contrasting feelings. The fact that they hardly smiled at all even when there was nobody around to motivate concealment of their pleasure is difficult to explain from an unreconstructed coherence perspective. Further, if they were not happy, why did they show full-pattern, so-called Duchenne smiles (including eye-wrinkling due to contraction of the orbicularis oculis muscle as well as cheek-raising due to zygomatic major contraction) when conversing with Olympic officials immediately after this first stage? According to Ekman and Friesen (1976), this facial configuration reflects the authentic experience of true happiness and cannot easily be simulated when people are not happy. However, Fernandez-Dols and Ruiz-Belda (1995) found similar effects of social interaction on both Duchenne and non-Duchenne “polite” smiles (involving cheek-raising only). Relatedly, Messinger, Fogel, and Dickson’s (1999) careful observations revealed Duchenne smiles emerging from non-Duchenne smiles over the course of behavioural episodes, then changing back to non-Duchenne smiles immediately afterwards. The relevant facial movements seem to be oriented to the specific demands of an ongoing stream of conduct rather than reflecting any prior coherent emotional state. Indeed, like the ANS, the face is not uniquely responsive to emotional activation but instead reflects attentional intensity and direction (gazing, listening etc), direct behaviour (e.g., withdrawal), physiological arousal, muscle tension and so on (Parkinson, Manstead, & Fischer, 2005).

One limitation of the evidence relating to syndrome coherence is its focus on momentary

measures. It seems theoretically possible that patterns of responses corresponding to emotion have a temporal dimension and lie in transitions in components relative to one another, and the patterns in their rates of change over time (e.g., Ekman, 2001; Keltner, 1995), rather than absolute values at any given instant. The challenge of modelling patterns occurring at this level and synchronising them with incoming input in real time may be a considerable one.

Looking for coherence at a single-mindedly individual level may miss relational coherence characterising the person's dynamic orientation to the practical and social environment. Indeed, as argued below, the meaning of any facial movement occurring in an interpersonal interaction may be indexical, with the current shared context shaping its pragmatic force. For example, a fixed direction of gaze has a different emotional meaning when it is trained on an emotional object than when it is trained away from that object or directed into space. Further, smiles can indicate happiness, gloating, or embarrassment depending upon when, how, and to whom they are delivered. To take this point further, coherence may not be apparent at the structural level of physical responses or movements but rather at the functional level, with different possible response profiles serving the same relational purpose across different instances of the same emotional category. Whether closer attention to the dynamic relations operating within person-environment transactions permits detection of such abstract patterns remains to be determined. In any case, modelling dynamic functional relations between response components and changing environments again presents challenges that are not easily met using predefined appraisal-related rules.

Attributional Accounts: Meaning and Co-ordination in Representation but not Reality

Another way of responding to apparent dissociations between supposed components of emotion is to deny the existence of intrinsic or empirical connections between them in the first place. Russell (2003, p. 152) rejects the idea that the various elements lumped together as

“emotion syndromes” necessarily have any integrity apart from the structure imposed on them by perceivers: “There is no need to postulate a mechanism that ties all the various components into one package. Prototypical emotional episodes are coherent packages, not because they stem from one mechanism, but because they are just those cases selected by an observer on the basis of their resemblance to a coherent package: the folk concept.” Thus, top-down or bottom-up explanations of response coherence miss the point and look for integrating processes at the wrong level. Emotions are attributed to individuals when some proportion of the features specified in our conceptual representation of the relevant emotion script is detected, but attribution of emotion does not imply that an intact set of responses is actually unfolding. In other words, ANS activity, facial movements, and situational inputs are all sources of information potentially feeding into meaning structures that loosely represent emotion concepts (see Figure 2). Emotion does not explain any apparent coherence; it is simply a meaning applied to more or less coherent response patterns that occur in certain kinds of situations.

Where do the relational meanings associated with emotion concepts fit into Russell’s scheme? At best, they are represented as features of the prototypical script for the emotional episode. When people think of “anger” in Anglo-American societies, they tend to think of a set of reactions to situations in which someone else has offended them. Thus, categorising oneself or someone else as angry may depend partly on seeing someone else as being offensive. However, it is also possible that enough of the other features specified in the scripted representation are present to activate the anger concept in the absence of other-blame (e.g., Russell & Fehr, 1994). Note that such an account might also help to explain many of the apparent appraisal-emotion dissociations considered earlier in the present paper, since the relevant evidence relied on self-reports of emotions possibly deriving from a self-attribution process of the kind indicated. As for emotional meaning more generally, Russell’s theory argues that this follows rather than precedes

the activation of any response component. Once the emotion concept has been activated, this might also trigger perceptions of other-blame as represented in the script, affecting other-blame rather than reflecting prior other-blame.

In some ways, Russell's (2003) model resembles previous extensions of feedback theories of emotion. Following James (1898), many researchers began to assume that emotional experience derives directly or indirectly from perception or interpretation of bodily responses of various kinds. For example, Schachter's (1964) two-factor theory proposed that emotion is experienced when feelings associated with autonomic activation are attributed to emotionally relevant features of the environment. Anger, in his view, is constituted by the perception that arousal is caused by someone else's provocative actions. However, the arousal need not be genuinely caused by the perceived provocation for the experience to count as anger: it might equally well have been produced by a strong cup of coffee or a surreptitious injection of adrenaline (Schachter & Singer, 1962). The main difference between Russell's model and these earlier accounts concerns the status of self-attributions of emotion. For Schachter, labelling your own emotion was equivalent to being in an emotional state and affected behaviour accordingly (see also Barrett, 2006). For Russell, self-attribution has no further consequences for emotional state (which is partly a cultural fiction anyway). However, categorising yourself as being in a particular emotional state may bring less direct consequences for interpretation and self-regulation further downstream.

Although feedback theories offer a principled account of proximal causes of emotional attributions, their focus does not usually fall on the processes that activate the responses that provide the feedback in the first place (e.g., Dewey, 1895). For James, the bodily responses perceived as emotion were simply direct consequences of some "exciting fact." For Schachter, the interpretation (or appraisal) of the emotional situation was typically (but not always) the

genuine as well as the attributed cause of the physiological reaction. For Russell, there is no single process that can account for all the response components integrated in the emotion concept, but appraisals are not ruled out as occasional influences on some of the separate responses. Again, trying to provide any general explanation for patterned responses in emotion is a mistaken enterprise because there is no consistent patterning to explain in the first place.

However, the approaches outlined earlier in this paper suggest good theoretical reasons to expect at least some level of response coherence (at a dynamic, relational, or functional level), despite the limitations of currently available evidence (reviewed above). First, response systems impose mutual constraints and affordances on each other. The operation of each response component and its effects on the environment serves to affect the operation of other components leading to emergence of structured patterns under certain circumstances. For example, general levels of muscle tension may be visible on the face and may alter the possibilities of other facial movements. Further detection of tension by others activates responses that further constrain own reactions across various components.

A second reason for response coherence is that commonly experienced challenges and threats impose parallel functional demands on different systems. Although I agree with Russell that “components” often serve functions that are not *intrinsically* emotional (e.g., attention, energy mobilisation, signalling), each may also be implicated in a broader process of emotional engagement. Events that attract visual attention and its corresponding facial movements often also require vigilance and associated autonomic activation. Warding off an antagonist not only involves warnings communicated by the face but also often physical preparation for attack. As argued above, neither emotions nor appraisals are consistently associated with specific behaviours of either of these kinds but there may still be context-dependent patterning of responses when the practical and communicative requirements of the current transaction are

similar.

In my view, then, the central issue is not whether there is patterning of responses at any level but whether patterns are aligned with cultural emotion categories. Russell emphasises lack of coherence and lack of consistency across different classified instances of any given emotion, but the prototypic representation of the emotion still implies some level of synchronic and diachronic organisation. Are we to believe that these scripts were assembled in an entirely arbitrary way over the course of cultural evolution, or should we instead look for some grounding in the reality of “emotional” experience? My own view is that prototypical scripts for emotions are often based on directly experienced situations that provide a developmental template for adopting and communicating emotions in a culturally readable way. Thus, there are intrinsic connections between emotion categories and response patterns but these response patterns only occur in instances that are given special emphasis within a culture (i.e., *hypercognized* instances, Levy, 1973, and see above) and not across all possible cases of any given emotion.

Although the attributional approach may not provide a comprehensive account of all possible emotion processes, its distinctive contribution lies in its recognition that emotion representations should not be confused with empirical emotion processes (see also Parkinson, 1995; 1997). Further, by treating emotion representation as a topic of study in its own right, Russell (2003) rightly draws attention to the perceptual and regulatory effects that may be exerted by the imposition of emotion scripts on experience. Indeed, even if self-attributions do correspond to the nature of underlying emotion, their explicit articulation may still transform emotional enactment and expression. People can relate to the world in an emotional way without recognising the fact (e.g., Frijda, 2005), but knowing that you are emotional can bring consequences that go beyond unselfconscious, prereflective experience (cf. Lambie & Marcel, 2002). When modelling emotions, it is important to distinguish the effects of consciousness of

emotion from the effects of emotional consciousness, and to avoid treating self-report as direct evidence of emotion itself.

Communicative Approaches: Emotions Convey Relational Meanings

A final approach to the apparent association between relational meanings and emotions is to argue that one of the functions of (at least some) emotions is to communicate relational meanings to others. In this view, anger is not a response to perceiving someone else as to blame for some unwanted event, but rather an act of blaming. Indeed, there are occasions when anger may even be adopted self-consciously as a strategic move to redirect blame. However, more commonly, the angry stance develops moment-by-moment in more direct response to unfolding pressures from the interpersonal environment, and is experienced as authentic rather than dissimulated. At a more general level, becoming emotional presents appraisals about what is happening to others even when there has been no advance apprehension of the communicated relational meaning by individual presenting the emotion.

An illustration of how emotions are oriented to communicative demands independent of appraisals is provided by Parkinson's (2001b) study of anger while driving. This study was based on the idea that anger occurs relatively commonly and often intensely among drivers partly because the usual face-to-face channels for indicating disapproval of another's actions are insufficient in this context. If anger serves the function of communicating blame, then it should persist or intensify until the other person gets the message. However, on the road, the other person is usually some distance away and insulated from vocal signals both by the vehicle's shell and by the background noise from other traffic. Furthermore, given competing demands on attention, the other person may not even be looking in the right direction to pick up any transmitted visual signal. To get through to the other driver, then, it is necessary to escalate your angry presentation using other means such as honking the horn or getting so close to the other

vehicle that you can no longer be ignored. To the other driver, such acts may seem disproportionate even if the misdemeanour is acknowledged. Thus any reaction will often be more extreme than otherwise, and will face similar problems getting back to the driver who was angry in the first place. Consistent with such an account, the study showed that factors relating to the desire to communicate anger and the delay in perceived receipt of anger communication were significant predictors of anger intensity even after controlling for relevant appraisals of other-accountability, motivational relevance and motivational incongruence.

Leary, Landel, and Patton (1996) obtained analogous findings for embarrassment. In their study, participants recorded their own rendition of the cheesy ballad “Feelings.” Those given an opportunity to communicate their subsequent embarrassment to the experimenter ended up less embarrassed especially when the experimenter had clearly registered their expression of this emotion. Embarrassment seemed to become unnecessary once it had served the function of indicating to the audience that the singer was aware of the limitations of the performance.

The idea of emotion as communication also partly derives from evidence that so-called emotion expressions are typically other-oriented, and designed to display social motives to conspecifics (who are designed to register and respond to them appropriately, Fridlund, 1994). Fridlund sharply distinguishes this process of motive-communication from any notion of emotion expression, partly because he sees emotions are subjective states rather than motivating forces or modes of engagement with the environment. However, views of emotion as relational activity (e.g., Frijda, 2005) or modes of engagement with the practical and social environment (Parkinson, Fischer, & Manstead, 2005) can more easily accommodate social motives. Thus, facial movements that are attuned to actual and anticipated responses from others may be seen as part of a broader process of emotional adjustment under some circumstances (Parkinson, 2005).

Turning from the presenter to the addressee of emotional communications, research into

the phenomenon of social referencing demonstrates that posed emotional signals can regulate the behaviour of others towards objects of mutual interest (e.g., Sorce et al., 1985). Thus, expressing fear indicates that an object is dangerous whereas displaying happiness implies safety.

Many of the examples presented so far are amenable to a strategic account of emotion, whereby people use explicit verbal and nonverbal symbols as ways of presenting appraisals of what is happening to others. For example, we may pull an “angry” face or state that we are angry as a way of warning someone to back down. In these cases, addressees’ shared understanding of the prototypical representation of for anger allows them to make appropriate adjustments to their behaviour based on script-based anticipations about how the episode is likely to unfold (see Russell, 2003). In other words, actors may draw on shared understandings in order to influence others using emotion communication.

However, emotional communication may be achieved as a function of co-regulated bottom-up processes as well as strategic top-down control. In particular, the roles of presenter and addressee apply to both parties to the interaction simultaneously and their respective emotional stances develop in continuous attunement to each other. As implied by the transactional account outlined above, neither party needs to apprehend the relational meaning of an encounter or indeed the strategic implications of their emotion presentation for them to influence the other’s behaviour in an emotional mode.

If emotions serve as communications, then why are these communications delivered in the emotional mode rather than as simple unmodulated verbal statements? One answer is that emotional communication carries certain advantages over other kinds of conversation. For example, emotional communication permits messages that are dynamically attuned to events in real time (using continuous movements of the body and face). Further, emotion conveys the extent of involvement directly in terms of embodied signals (Sarbin, 1986). Finally, emotion can

address issues that are not resolvable by a simple logic of argumentation. Emotions are oriented to relational issues concerning which there is no defensible right answer: issues of taste, faith, prejudice, right and wrong, or where different social norms are brought into conflict (Averill, 1980). For example, a female participant in one of my recent studies described the following emotional incident:

One of my best friends was arguing with some of our male friends about which place in Portugal was best. It was very petty. Our male friends were winding her up by disagreeing with her. They were joking about but she took it seriously and was getting heated. She shouted at them and called them abusive names. I said to her, smiling, that there was no need and it was just a joke. She got angry and wouldn't speak to me. It was like we were 5 years old.

The emotion being described in this story is, perhaps surprisingly, guilt, whose intensity was rated by the participant at 9 on a scale running from 0 to 10. However, her rating of self-accountability was at 0. So if the experienced guilt did not relate to an appraisal of being personally responsible for her friend's suffering, how did it come about? The narrator has already described trying to placate her friend with reason, but this only induced anger. From her friend's perspective, the issue is not that the narrator is to blame for the taunting but that she appears to be siding with the male taunters rather than her as a female friend. Her apparent suffering coupled with the implied blame conveyed by the anger and the desire to put things right with this friend ultimately produces a guilty response. Thus, the guilt serves as an emergent tactic for repairing the relationship with the close friend and re-establishes their solidarity based on a shared gender identity (despite other allegiances that are operating in this complex interpersonal and intergroup situation). More generally, recent studies demonstrate that people sometimes report guilt in response to being blamed by a close other even in the absence of reported self-accountability (Parkinson & Illingworth, submitted), helping to explain some of the dissociations between appraisal and emotion described above. In Parkinson's (1995) terms, the

emotion serves to communicate an identity claim to someone else rather than simply reflecting an individual apprehension of relational meaning.

According to the communicative account, emotions and relational meanings are intrinsically associated but not because individuals need to understand the personal significance of what is happening to them in order to generate an appropriate emotion (cf. Lazarus, 1984). Relational meanings are just that: meanings that characterise the relation between people. They may or may not be registered by the person before, during or after getting emotional. Often the message is clear to others but not always. Further, the way the message is delivered is highly context-dependent and uses whatever channels are available and appropriate to the current encounter (thus explaining the lack of structural coherence of response components). In all cases, however, relations between individuals, and between individuals and objects are modified as a consequence of becoming emotional.

Communicative approaches imply that the relational meanings associated with emotions operate at a pragmatic rather than simply a semantic level. Models that depend on rule-based extraction of situational features (in the descriptive mode) do not easily capture these meaning processes that are oriented to anticipated responses of other people as much as to the shared context that gives the emotion presentation its specific significance. However, supplementing such models with dialogue systems may help to address this limitation (Gratch, 2008). Indeed, some of the complexity of emotion expression has been modelled in embodied agents capable of delivering non-verbal signals serving communicative functions (e.g., Pelachaud & Poggi, 2002), but their reliance on individually represented performative goals still restricts their simulation of the co-constructed pragmatics of ongoing emotional dialogue.

Emotion as Relation Alignment

Like the other accounts of emotional meaning outlined in this paper, the communicative

account is too restrictive to accommodate all the phenomena that are covered by our contemporary English-language lay concept of “emotion.” For example, it would need to incorporate extra principles relating to “implicit audiences” (Fridlund, 1991) in order to explain instances of private emotional reactions to impersonal events. Relatedly, a communicative account might be seen as downplaying the subjective, experiential aspects of emotion. A final limitation lies with its failure to specify how emotions or their response components become associated with communicative meanings in the first place. The answers to this latter question permit a more integrative view of emotion as relation alignment that brings together some of the approaches discussed earlier in this paper.

First, many emotions start out already having communicative meanings at least to those who respond to them. Early life involves an intense relationship in which the infant’s smallest push or pull, glance or blink, solicits direct and often exaggerated immediate feedback from the caregiver (e.g., Gergely & Watson, 1999). States of communion and breaks of contact all carry relational significance that registers in others’ responses to them, and these responses in turn regulate ongoing emotion presentation. Children too young to understand concepts of self or accountability rapidly come to engage with others in ways that bear close resemblance to more articulated appraisal-relevant emotions. A single example should suffice.

Reddy (2000) observed 3-month-old infants producing “coy smiles” as common responses to sustained attentional contact with mothers, experimenters, or themselves as reflected in a mirror. This pattern of movement involved turning away the eyes or head while a smile developed. Uninformed observers of the videotape spontaneously labelled this reaction as coyness, bashfulness or embarrassment (Draghi-Lorenz, Reddy, & Morris, 2005), and indeed the observed dynamic pattern of facial expression corresponds closely to the specifications of an adult embarrassment display outlined by Keltner (1995).

There are clearly practical as well as communicative functions to these specific movements. Turning away represents a withdrawal from attentional contact, ceasing exposure to the continuing gaze of the other which has become uncomfortable (or has increased the degree of arousal beyond a tolerable level). Furthermore, this movement is highly visible to the other person who can easily pick up the signal that attentional contact is no longer desired. Finally, the coupling of this movement with a smile communicates that withdrawal occurs in the context of an affiliative relationship which is not being abandoned during this temporary disruption in communion.

One way of reading this evidence would be to argue that infants regulate other's attention using preprogrammed displays. However, I believe it is more likely that this pattern quickly consolidates as a function of co-regulated activity between infant and caregiver. Withdrawal of attention is directly reinforced and rapidly learnt. Smiling rapidly becomes attuned to certain modes of interpersonal contact. The specific combination of these movements arises partly because of the simultaneous presence of communion and arousal-regulating needs, and partly because of sensitivity to feedback from the caregiver. The fact that coy smiles serve particular relational functions that are recurrent in this kind of relationship means that they will be consistently found in any society where relationships take this form.

Later in development, such patterns of response also take on a more abstract meaning based on cultural representations and norms. They come to stand for specific hypercognised situations in which others' attention is unwanted. In Anglo-American societies, for example, displays of this kind are considered appropriate and legitimate when some temporary faux pas has been committed or there is an unintended disruption of a performance that should have been fluid. The message transmitted to others is an elaboration or articulation of the original functional basis of the patterned activity. As well as maintaining an affiliative relationship

despite a temporary disruption of attentional exposure, it serves to communicate an acknowledgement of faulty but correctable conduct. It is at this stage that the facial response may become co-ordinated with articulated relational meaning structures and not before.

Communicating embarrassment does not necessarily involve producing the precisely timed movements associated with coy smiles. Depending on the mode of contact with the other and the channels available for communication it may involve other forms of withdrawal from public gaze or more explicit indications of emotional state using language (as used in Leary, Landel, & Patton's 1996 study for example). However, the core meaning of these relational patterns is laid down at an early age as a function of direct experience with attention-regulating alignments of relations between infants and caregivers.

The fact that adult embarrassment is encoded in terms of the more basic dynamics of affiliation and attention regulation means that people may sometimes misperceive their own reactions in terms of physical reactions that have actually not occurred. They know that they are in a relational mode corresponding to embarrassment and therefore assume that its conventionalised nonverbal signal pattern is also present (cf. Gilovich, Savitsky, & Medvec, 1988). For example, most participants in Reisenzein et al.'s (2006) study of facial expressions accompanying surprise (see above) reported showing the stereotypical surprise expression despite its actual absence (cf. Gilovich, Savitsky, & Medvec, 1998). Thus, it may be that at least part of the coherence of response patterning in emotions sometimes depends on perception (or somatovisceral illusion, Cacioppo et al., 2000) rather than reality (e.g., Barrett, 2006; Russell, 2003).

According to the relation-alignment approach, emotions can be activated as emergent patterns of pre-reflective co-regulated activity or as articulated (though often automatised) means of making identity claims or communicating appraisals. The latter kind of emotion partly derives

its form from cultural representations and its enactment is shaped by cultural norms and prescriptions, but still bears the trace of the more basic dynamics of its original form. Further, the development of articulated, culturally drenched emotion episodes does not render prereflective emotions obsolete. Adults continue to experience emotions in the prereflective mode throughout their lives.

This two-level, situated, dynamic and flexible relation-alignment perspective may present difficulties for some computational models that require abstract generative mechanisms for outputting differential emotions. The claim that emotions are distinguished by relational functions that do not map perfectly onto consistent patterns of represented situational meaning implies that simple rule-based systems for extracting emotionally relevant cues are likely to be over-restrictive. Correspondingly, on the output side, emotions cannot be fully specified as consistent patterns of response that run off irrespective of circumstances.

In a realistic emotion model, the agent needs to be more tightly embedded in a continually responsive environment and to be oriented from the outset to the relational positions of other agents (see also Gratch, 2008). Further, the emotion should be seen as part of the process of active adjustment to other agents and the environment rather than as an indirect side effect of these transactions. In principle, much of this may be achievable by implementing interlocking dynamic feedback systems at several levels, and by specifying when and how top-down monitoring and regulation need to kick in or out. The nature of this regulation may be shaped by cultural descriptions of, and prescriptions about emotional state, and is open to modification as a function of learning.

Alternatively, an extended appraisal model incorporating additional dimensions of relational meaning and conditional context-based rules specifying alternative prerequisites for similar emotions may be sufficient for certain purposes, especially if there is no requirement for

real-time responsiveness. At one level, there is no doubt that it is possible to specify emotions in terms of cues that shape their emergence and rules whereby those cues are transformed into meanings. However, it is important to acknowledge that real-world embodied emotions are often attuned to anticipated consequences in addition to unfolding and responsive dynamic feedback and that the extraction of relational meaning does not always represent the sole driving force behind the emotion process.

Conclusions: Meaning and Emotion

Although each emotion has a distinctive relational meaning, this does not imply that the individual needs to apprehend this meaning before getting emotional. Advance appraisal is simply one of the routes whereby the emotional process can be activated or modified. The evidence for this route being central and primary is mainly based on self-report studies in which participants have to account for their emotional experiences, or make them seem reasonable to the experimenter. Relational meanings may also emerge from an ongoing transaction with the practical and social environment without being integrated by either party to the exchange. Individuals may represent their experience in emotional terms in the absence of an integrated response pattern, and such a representation process can affect subsequent processes of regulation and communication in emotionally relevant ways. Finally, emotions may also be used to convey relational meanings to others.

Linking all of these ideas is the notion that emotions serve to align or realign relations with objects and other people. Anger is a struggle against some resistant force or an act of blaming an agent of some kind. Embarrassment is a means of deflecting interpersonal attention without breaking contact entirely, or a communicated acknowledgement of faulty performance. In either case, entering the mode of engagement that achieves such alignments need not involve individually apprehending the need for alignment either in advance or during the encounter.

Instead, the emotion process may respond moment-by-moment to the unfolding affordances and constraints offered by its dynamic context. People can get backed into emotional corners or pushed forward by the force of events, as well as take on emotional positions for more strategic ends.

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Figure 1:
Relational meaning and response co-ordination in a generic appraisal model

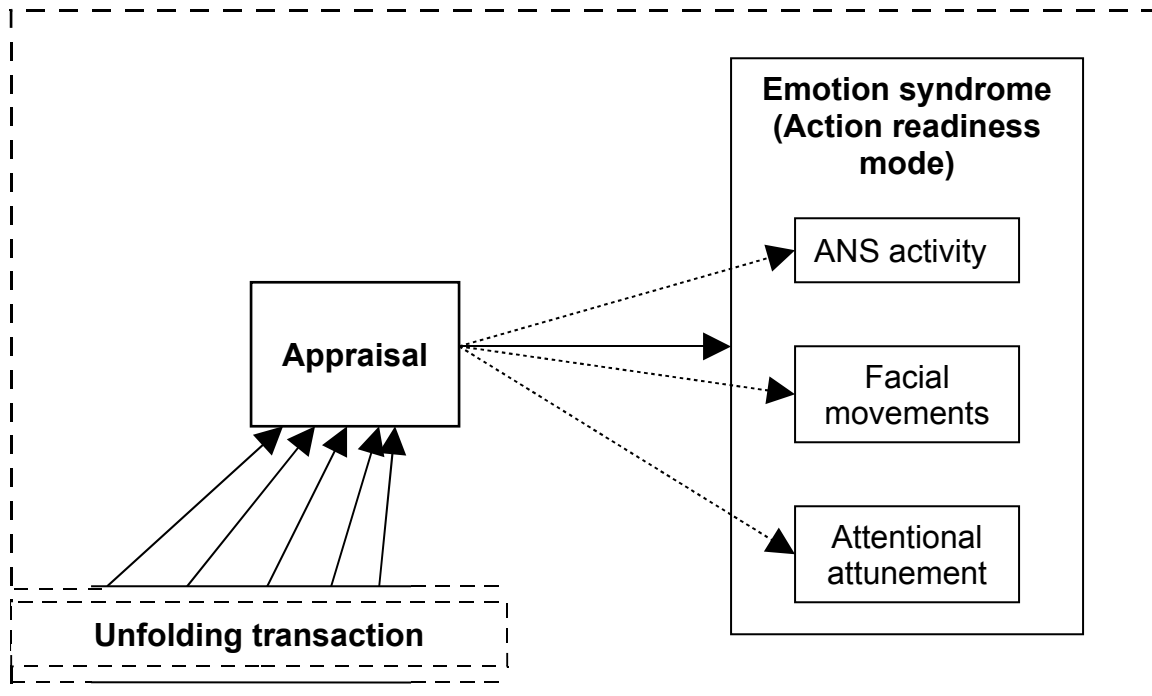


Figure 2:
Role of “response components” in attributional approach
(adapted from Russell (2003))

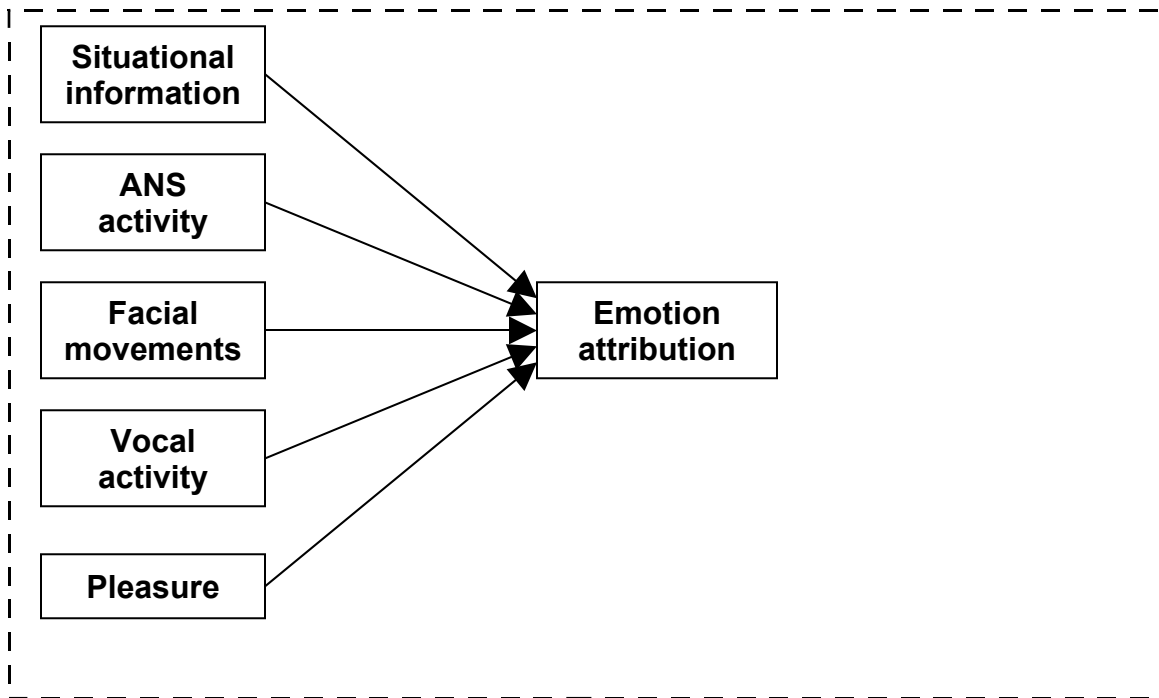


Table 1: Four approaches to emotional meaning

Approach	When is relational meaning apprehended?	Processes co-ordinating responses	Coherence of responses
<i>Appraisal</i>	Prior to emotional response	Appraisal	Yes: Regulated
<i>Transactional</i>	During emotional response	Low-level registration of stimuli or direct perception of dynamic affordances	Yes: Emergent
<i>Attributional</i>	Before, during, after, or not at all	Representational scripts guiding perception (rather than generation) of responses	Contingent: In perception not reality
<i>Communicative</i>	After emotional response if at all (by others, self, or both)	Unfolding feedback to interpersonal actions	Partial: Functional rather than structural, dynamic and relational rather than momentary and intra-individual