COGNITION AND EMOTION
2007, 21 (6), 1137–1154

Psychology Press
Taylor & Francis Group

How distinctive is affective processing? On the implications of using cognitive paradigms to study affect and emotion

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Influential theories on affect and emotion propose a fundamental differentiation between emotion and cognition, and research paradigms designed to test them focus on differences rather than similarities between affective and cognitive processes. This research orientation is increasingly challenged by the widespread and successful use of cognitive research paradigms in the study of affect and emotion—a challenge with far-reaching implications. Where and on what basis should theorists draw the line between cognition and emotion, and when is it useful to do so? Should researchers build more global, integrative models of cognition and emotion, or should they rely on local, content-specific models that draw attention to a differentiation between affective and cognitive processes? This special issue compiles different viewpoints on fundamental issues in the relationship between affect and cognition.

INTRODUCTION

Many researchers have argued that affective processing is fundamentally different from cognitive processing (e.g., LeDoux, 1998; Zajonc, 1980). However, recent research on affect and emotion relies heavily on cognitive methods and cognitive or cognitively inspired theorising: sequential priming (e.g., Fazio, Sanbonmatsu, Powell, & Kardess, 1986; Klauer & Musch, 2003)

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www.psypress.com/cogemotion DOI: 10.1080/02699930701437386

and task-switching (e.g., Dreisbach & Goschke, 2004), Simon tasks (e.g., De Houwer & Eelen, 1998) and Stroop tasks (e.g., De Houwer & Hermans, 1994; Williams, Mathews, & MacLeod, 1996), visual search tasks (e.g., Harris & Pashler, 2004; Öhman, Lundqvist, & Esteves, 2001), memory recall and recognition tasks (e.g., Bradley, Greenwald, Petry, & Lang, 1992; Eich & Metcalfe, 1989; Hamann, Ely, Grafton, & Kilts, 1999), attentional blink (e.g., Anderson, 2005; Keil & Ihssen, 2004), and startle-reflex paradigms (e.g., Bradley, Cuthbert, & Lang, 1990; Vrana, Spence, & Lang, 1988) are just a few of the many cognitive paradigms that were adapted in a strikingly successful manner to study human affect and emotion. In view of the apparent success of the cognitive approach in addressing affective phenomena one might ask how distinctive affective processing might be. Hence, how sure can we be that the mechanisms of affective processing are sufficiently unique to justify the claim of a specialised affective system on the psychological or neurophysiological level? Are cognitive paradigms appropriate for the identification of those affect-specific principles, or do they primarily uncover general information processing rules that are also applicable to affective information? How can research disentangle the possible complex blend of distinctive and general process contributions to affect and emotion? Is "hot cognition" what the term suggests: "hot" affective information processed by "cold" information principles? This special issue presents different viewpoints and state-of-the-art research addressing those questions, in an attempt to stimulate a broader discussion of the relationship between emotion and cognition.

In the following, we will briefly describe a number of reasons for why cognitive paradigms have become so popular in research on human emotion. Then we will critically examine some frequently encountered arguments for the affective distinctiveness, followed by a discussion of methodological possibilities for disentangling affect-specific and general processes.

THE RISE OF COGNITIVE PARADIGMS IN RESEARCH ON AFFECT AND EMOTION

The psychology of affect and emotion is challenged by particularly demanding complexities in its research methodologies. Affective and emotional states appear to be elusive and difficult to measure, and ethical considerations curtail the possibilities of experimental manipulation. Such difficulties have resulted in a long-time neglect of affect and emotion in psychological research during the twentieth century. In the last two decades, however, that picture has fundamentally changed. Modern research on affect and emotion is thriving with the availability of new psychophysiological and behavioural methods, and research paradigms originally developed for the investigation of cognitive processes have contributed much to this methodological advancement. What are the exact reasons for the current prevalence of cognitive paradigms in affect and emotion research?

In line with research into cognitive processes, early mainstream research into affect and emotion relied on introspective methods and self-report measures (e.g., James, 1884). Following the methodological advancements arising from Behaviourism, the reliance of emotion research on phenomenology was criticised on methodological and empirical grounds (e.g., Johnston, 1905; Rosenfeld & Baer, 1969), culminating in the tightly controlled behavioural methods that are now characteristic of modern cognitive psychology. Response latency and accuracy measurements increasingly replaced self-report and introspective observation with a consequent increase in conceptual clarification on the common ground of paradigmatic definitions. It did not take long before these new experimental procedures were applied in emotion research, and this was done for several reasons besides those arising from the standard objections against self-report and introspection (for which see Nisbett & Wilson, 1977; Schwarz, 1999).

First, self-report measures were amenable only to conscious, reportable feelings and ignored a range of affective states that are difficult to express verbally. Second, and more important for current theories of affect and emotion, self-report is not very suited to tapping automatic affective processes. This problem became particularly acute as theories on affect and emotion increasingly emphasised the importance of automatic affective processes (e.g., Robinson, 1998; Zajonc, 1980). In their search for appropriate methods, emotion researchers adapted paradigms that were developed for research into automatic cognitive processes. Third, the importance of cognitive theories of emotion evoked a need for cognitive research paradigms as a method of first choice. In *appraisal-based emotion theories*, for instance, cognitive processing stages are essential and determinative elements of emotions, and thus are of primary research interest. Moreover, every influential theory of emotion allows for some sort of interaction between emotion and cognition in its explanation of emotional behaviour. Such theoretical considerations undoubtedly influenced the move towards the use of cognitive paradigms in emotion research.

A fourth reason for the strong reliance on cognitive paradigms in affective research was the apparent success of cognitive methods in the explanation of human reasoning and behaviour. The experimental analysis of information processing enriched not only cognitive perspectives but also emotion theories (e.g., Bower, 1981; Lang, 1979; Lazarus, Averill, & Opton, 1970; Mandler, 1980). The productive cognitive approach to behaviour research occurred at a time when appropriate alternative methods for emotion psychology were lacking. The limitations of traditional methods such as self-report, and animal research were already obvious and under debate (e.g., Nisbett

& Wilson, 1977; Ristau, 1983). Similarly, the application of existing biophysiological methods was costly and inappropriate to phenomenologically oriented emotion research. The existence of successful cognitive research paradigms and concomitant lack of specific alternatives for emotion research caused many researchers in this field to resort to cognitive paradigms.

ARGUMENTS FOR AFFECTIVE DISTINCTIVENESS

Despite the growing use of cognitive paradigms in research on affect and emotion, this research was most often driven by the underlying assumption that affective processing is to a large extent qualitatively different from cognitive processing. This is, for instance, evidenced by the fact that in many studies on affective processing, not only affective but also nonaffective stimuli are used in an attempt to demonstrate that the observed effect occurred only for the affective stimuli (e.g., Murphy & Zajonc, 1993). In this section, we will review some of the arguments that have been raised in support of the idea that affective processing is distinct from cognitive processing.

Phenomenological arguments

The assumption of affective distinctiveness often rests on qualitative differences in the phenomenological surface of affect and cognition: Emotion and feelings are typically experienced very differently than thinking or reasoning, to name just a couple of "prototypical" cognitive processes. But such phenomenological arguments do not stand closer scrutiny, because different psychological "surfaces" in no way implicate differences in the operating system below the surface. For instance, reading a written word produces a very different experience than hearing that word pronounced—and, yet, the underlying mechanisms are very similar (e.g., Levelt, Roelofs, & Meyer, 1999). Moreover, affect and emotions are characterised by a wide diversity of phenomenological states, just think of a depression on the one hand and a state of elation on the other, yet, most researchers will group them together as emotional states. Based on a purely phenomenological criterion it is hard to see why sadness should be preferentially grouped with joy and not with creativity or mental effort to a single class of phenomena (i.e., emotions). Hence, unless one is equipped to argue that two of the most dissimilar affective states still feel more similar than the most similar pair of an affective and a cognitive state, phenomenology does not help us any further.

Content-related arguments

One may also consider that the type of information (affective vs. nonaffective) can serve as the key difference between affective and cognitive processing. However, there is little a priori reason why processing should differ more with respect to this than to any other distinction, such as living–nonliving, male–female, rich–poor, bright–dark, visual–auditory, etc. The variety of information that is "affectively processed" is huge and in no way bound to a simple dichotomy of emotional versus cognitive processing (Ekman, 2004). For example, some people might talk about the atrocities of the Nazi regime on some occasions in an affectionless manner, but on another occasions in an emphatically and terrified state. The engagement of affective processing is not purely stimulus driven but depends on an intricate complex of informational, contextual, and personal variables (e.g., Rusting & Larsen, 1998).

Embodiment arguments

Since its early days, research on affect and emotion has been distinguished by a strong interest in bodily influences on the generation of affective experiences (e.g., James, 1884; Schachter & Singer, 1962). In modern cognitive psychology, however, the mainstream of which was dominated by the computer metaphor with its distinction between "software" (mind) and "hardware" (body), the rediscovery of the mind was accompanied by the widespread neglect of the body, that is, of the fact that the mind is implemented in and coexists with a particular body. With those diverging research orientations emotion researchers accumulated some interesting findings on bodily influences that were particularly challenging for disembodied cognitive accounts. One such line of evidence is the demonstration that facial feedback impacts affective experiences and judgements (see McIntosh, 1996, for a review). For instance, in the well-known study of Strack, Martin, and Stepper (1988) participants rated a cartoon for funniness while holding a pen in their mouths. One group of participants was asked to hold the pen with their puckered lips, thus tacitly inhibiting muscles involved in smiling, while another group was instructed to hold the pen between their teeth, enforcing a subtle smile. The results showed that participants with a smile-facilitating pen position felt more amused with the cartoon than participants holding the pen in a smile-inhibiting position. The unobtrusive character of the smile manipulation rendered cognitive explanations in terms of self-perception processes unlikely.

Additional evidence for unique embodied affective processing appears to come from emotional states induced or altered by psychotropic substances. Drug and body effects on affective processing seriously question a simple transfer of principles derived from disembodied information-processing models. Instead, they call for distinctive affective processing rules und structures. Note, however, that the theoretical disembodiment of information processing also delimited the power of cognitive theories to account for purely cognitive phenomena. This motivated recent theories of embodied cognition that are better suited to explain body–affect interactions (e.g., Barsalou, 1999; Glenberg, 1999; Niedenthal, Barsalou, Winkielman, Krauth-Gruber, & Ric, 2005; Rumelhart, 1997). Hence, if there is a gap between cognitive theories and affective phenomena, it is, at least, strongly reduced by the emergence of theories that focus on the embodiment of cognitive psychological processes.

Functional arguments

In view of the tremendous variety of emotion elicitors and the huge variety of affective experiences, some researchers have advocated a functional differentiation between emotion and cognition. Emotional states might recruit and direct attentional resources differently, perhaps more effectively than cognition. They might highlight opportunities and dangers in the present environmental context, which may directly interrupt ongoing behaviour whenever appropriate and rapidly mobilise adaptive approach or avoidance behaviour (e.g., Lang, Bradley, & Cuthbert, 1997; Wentura & Rothermund, 2003). Note, however, that the objections to a phenomenological differentiation also apply to a functional distinction between affect and cognition. Different emotions frequently serve different functions on the psychological and behavioural level (e.g., sadness and anger), and the same emotion might be linked to different behaviours serving different purposes. A rat frightened by painful electric shocks might either show fight behaviour (e.g., Ulrich & Azrin, 1962), flight behaviour (e.g., Blanchard & Blanchard, 1968), or no activity at all (i.e., freeze behaviour; e.g., Fanselow, 1980). Accordingly, behavioural tactics like fight-or-flight-behaviour are not uniformly and rigidly linked to emotional states, and the same affective state might instigate different behavioural tendencies depending on contextual and situational variations (cf. Frijda, 2004; Scherer, 1984), perhaps reflecting the direct interplay between cognitive interpretation and affect-based motivation.

A corollary of the assumption of adaptive functionality and the existence of evolutionary old affective systems (e.g., MacLean, 1993; see next section) is the argument that evaluative processes emerge phylogenetically and ontogenetically prior to cognitive appraisal processes (Zajonc, 1980). In fear-conditioning studies, for example, rats exhibit defensive reactions that show remarkable similarities to reactions of humans on both the behavioural and physiological level (Debiec & LeDoux, 2004). The same argument is supported by observations of alleged emotional behaviour in newborns who presumably possess only rudimentary cognitive abilities (Meltzoff & Moore, 1977). The remarkable continuity between adult emotional responses and behaviours of infants and animals suggests the involvement of simple, perhaps "pre-cognitive" processing principles. Note, however, that the inference of affective processing in animals and babies relies exclusively on observable behaviour (e.g., Camras et al., 2002), so that we do not know whether those subjects do indeed experience states that human adults would consider "emotions". Moreover, even the successful demonstration of affective and emotional behaviour in animals and toddlers in no way rules out contributions from cognitive processes. For example, a recent study of Désiré, Veissier, Despré, and Boissy (2004) showed that the occurrence of a startle or orientation reaction in lambs (*Ovis aries*) depends critically on their appraisal of the suddenness and novelty of the relevant event. Empirical studies argue against an arbitrary exclusion of cognitive processes in animals and toddlers on theoretical grounds that draw too heavily on a modelling of cognition in terms of conscious and rational thinking (cf. Clore & Ortony, 2000; Lazarus, 1982).

In an attempt to attach the functional argument closer to evolutionary theory some emotion theorists have pointed out that even the most diverse emotional behaviours are serving the paramount goals of survival and general well-being (e.g., Tooby & Cosmides, 1990). However, the same adaptivity reasoning applies to cognitive processes. Perception–action systems are tuned to significant environmental affordances in the service of the selection of (adaptive) actions, but they are still considered to subserve cognitive functioning (e.g., Gibson, 1979; Milner & Goodale, 1995; Tucker & Ellis, 1998). Indeed, it is difficult to see why automatic response preparation triggered by the valence of masked or unmasked stimuli (e.g., Chen & Bargh, 1999; Murphy & Zajonc, 1993; but see also Rotteveel & Phaf, 2004) is taken to support the assumption of particularly adaptive, precognitive functions of affective processing even though nonaffective stimulus dimensions like spatial location or shape have exactly the same effect on behaviour (e.g., Eimer, 1995; Eimer & Schlaghecken, 1998; Neumann & Klotz, 1994). Likewise, the enhanced localisation of an angry or threatening face intermixed with an array of neutral facial expressions (e.g., Hansen & Hansen, 1988; Öhman et al., 2001; but see also Lipp, Derakshan, Waters, & Logies, 2004; Purcell, Steward, & Skov, 1996) is functionally very similar to the preferred attentional orientation to novel, unexpected nonaffective items within a visual array of familiar items (e.g., Johnston, Hawley, Plewe, & Elliott, 1990). On closer inspection many functional analogies can be drawn between "specific" emotional and general cognitive processing effects, which render isolated demonstrations of the "adaptive" functions of affective processing uninformative. Moreover, functional diversity not only divides cognition and emotion (if it does at all) but it also characterises the relationship between functions within cognition (e.g., Milner & Goodale, 1995) and within emotion (e.g., Frijda, 2004). In other words, the functional difference between some cognitive processes may be no smaller than between some cognitive and affective functions. Accordingly, unless it can be demonstrated that some basic characteristics are still shared by *all* affective but *no* cognitive functions, the functional argument does not support the distinction between cognition and emotion but, if anything, tends to eliminate it.

Neuroanatomical arguments

As mentioned above, some researchers have suggested the existence of a phylogenetically old neural system underlying affective and emotional behaviour. In the pioneering work of Papez (1937) and MacLean (1949) this neural network was identified as a *limbic system* that comprised a set of subcortical structures. Although some key structures turned out to be less involved than originally thought (e.g., the hippocampus), the limbic-system theory survived and became popular as the neural circuit mediating emotions (LeDoux, 2000). The last two decades have seen an explosion of research on emotional brain circuits, many studies showing the amygdala to be an important hub in the processing of danger- and fear-related stimuli (see Davis & Whalen, 2001, for a review). For instance, functional imaging studies have shown that the amygdaloid complex is more sensitive to fearful and angry faces than to happy ones (Breiter et al., 1996), and damage to the amygdala is known to impair recognition of fear expressions (Vuilleumier, 2005).

Important for the present discussion is the finding that the amygdala is not only activated by projections from the sensory areas in the neocortex but also by a more direct pathway from the thalamus, a subcortical region that was previously assumed to relay crude sensory information to neocortical sensory areas only (LeDoux, 1998). As a result, the direct thalamo–amygdala pathway might enable full-blown affective reactions, even though it bypasses the neocortex, which is supposed to be necessary for cognitive appraisals. Based on those findings LeDoux (1998) concluded that "emotion and cognition are best thought of as separate but interacting mental functions mediated by separate but interacting brain systems" (p. 69). He specifies this belief with the proposal of several dissociations between emotional and cognitive functions. For instance, the evaluative significance of an object is assumed to be processed separately from, and potentially faster than, its perceptual and semantic attributes (but see Mandler & Shebo, 1983). Furthermore, LeDoux proposed that emotional appraisals performed in the amygdala system are intimately connected to response control networks that narrow down the possible response options. Certain emotional appraisals are thereby connected to particular, evolutionarily functional, response patterns that involve specific bodily adaptations, explaining, for example, a quick withdrawal response in a fear reaction to a snake. Cognitive processing, on the contrary, allows for flexibility of action, and LeDoux assumed that mere thoughts were typically not associated with bodily sensations.

This sketch of a self-contained, highly specialised emotional brain system suggests a comparable degree of specialisation and self-containment on the psychological level. Although emotional and cognitive processes ordinarily go hand in hand, they may thus be fundamentally different because they arise in different brain networks and may frequently serve different and even conflicting goals. Note, however, that the compartmentalisation of the brain in emotional and cognitive networks depends critically on the localisation of clearly defined mental functions in the brain. If new neuroscientific evidence questions the exclusiveness of the functional localisation, the derived distinctiveness will also be in question. Moreover, even though the available data from neuroscientific studies are consistent with the claim that *particular* emotions (fear, in the case of LeDoux's work) are associated with brain areas that are not shared by *particular* cognitive processes, they in no way justify the claim that emotion-related processes are more similar to each other than are emotion-related and cognition-related processes. In other words, the dissimilarities between some affective mechanisms may be greater than between some affective and some cognitive processes—which would undermine, rather than support, a general distinction between cognition and emotion.

DISENTANGLING AFFECTIVE AND COGNITIVE MECHANISMS

The question of whether affective and cognitive processing are distinctive can be reduced to the question of whether evidence can be found for effects that are driven exclusively by the affective properties of stimuli or participants and that cannot be reduced to the operation of more general cognitive processes. Such evidence conclusive to the status of distinctiveness requires a special experimental setup that goes beyond the typical research designs employed in affect and emotion research. In the latter paradigms task performance in critical trials with affectively charged stimuli (e.g., threat words) is most commonly contrasted to a comparison performance in trials with affectively neutral, but in all other aspects matched stimuli (e.g., transport-related words). An emotional effect will be inferred if the task performance under affective stimulus conditions differs significantly from the task performance in the nonaffective comparison condition. Note, however, that emotional effects obtained in this way do not reveal anything about the distinctiveness of the processes driving them, because such paradigms do not test the possibility that the effects are driven by the specific stimulus configuration or by the processing goals implemented through the task setting. For example, there is the possibility that a faster detection of threat stimuli embedded in an array of affectively neutral stimuli depends more on the input configuration in the specific task setting (e.g., the popping out of distinct information as a figure before the background of an otherwise homogenous stimulus array) rather than on the informational value of the input itself (e.g., the threatening information). Consequently, additional experimental controls are needed if one wants to make the point that a selective orienting response to threatening information is independent of the specific stimulus configuration in the task setting.

One way to implement those additional controls involves a cross-referencing of affective and nonaffective stimulus conditions to affect-sensitive and affect-insensitive measures. In the case of affective distinctiveness the processing of affective information should impact only affect-sensitive but not affect-insensitive measures, whereas the processing of comparable neutral information should have exclusive impact (if any) on affect-insensitive measures. Consequently, this experimental design establishes a nonaffective task setting as a control task that is comparable to the affective processing task. Klauer and Musch (2002) fully realised such an experimental design in a series of experiments that examined the distinctiveness of processing principles underlying affective priming effects. In four experiments, participants were asked to classify evaluatively polarised target words that systematically varied on a second, nonaffective dimension (e.g., target colour). Each participant performed an additional control task comprising blocked gender decisions on first names, which also varied on the second dimension. In consequence, the gender-decision task paralleled the evaluative-decision task in all procedural details.

The results of all four experiments were unequivocal. Priming of only task-relevant dimensions was found, with no significant priming of task-irrelevant dimensions. For instance, when the task was to evaluate the targets as good or bad, responses were faster when the prime and target had the same valence than when this differed whereas the match between the colour of the prime and target had no effect. When the task was to name the colour of the target, the match between the valence of the prime and target had no effect but the match with regard to colour did. Most important for the present discussion was the fact that task-relevant priming was evidenced for all different types of classification tasks in comparable strength. In a sequential priming paradigm, an evaluative feature overlap had no different implications for classification performance than for a gender or location match and mismatch. The authors concluded that affective priming mechanisms involved the same general response competition principles suggested from previous work on sequential priming (e.g., Eriksen & Eriksen, 1974).

In a further series of experiments, Klauer and Musch (2002) examined the distinctiveness of another type of affective-priming mechanism, which was assumed to operate independently of response competition. This mechanism is called the affective-matching mechanism and is assumed to bias affirmative responses like "yes" decisions through feelings of plausibility engendered by a valence match, and "no" decisions through implausibility feelings produced by a valence mismatch. In this second set of studies, the evaluative decision task was replaced by a same–different judgement task (i.e., are prime and target similar with regard to a certain feature), and the same two-dimensional stimuli served as stimuli as in the experiments described above. The results of all four experiments pointed out a distinctiveness of the affective-matching mechanism. First, an evaluative stimulus match biased the same–different judgements regardless of the task-relevance of the evaluative dimension. Second, a biasing influence of the consistency relation was absent in the gender task, which lacked affectively charged stimuli. Taking all experiments together, Klauer and Musch's results pointed to the joint operation of a distinctive affective-matching mechanism and a general response-competition mechanism in affective priming (see also De Houwer, Hermans, Rothermund, & Wentura, 2002; Wentura, 2000).

The systematic cross-referencing of affective states and measures is a method of choice for a variety of behavioural paradigms, but not the only type of arrangement that allows for discrimination between distinctive and common processing mechanisms. Another research approach, which potentiates conclusions as to the distinctiveness of affective processing principles, employs psychophysiological methods. These methods revealed several physiological "markers" distinctive of affective and emotional processing, which ranged from peripheral measures such as the activation of smile muscles (zygomaticus major) and frown muscles (corrugator supercilium) up to the activation of central cerebral measures like the amygdaloid structures (see Cacioppo, Berntson, Larsen, Poehlmann, & Ito, 2000, for a recent overview). Such physiological markers will allow inferences about affective states, if their presence is systematically and meaningfully related to performance variations in a well-designed experimental task. Winkielman and Cacioppo (2001), for example, tested the hypothesis that processing ease is linked to positive affect, by means of facial EMG measurements. They recorded higher activity over the zygomaticus region during the viewing of easy-to-process stimuli even in an evaluatively ambiguous judgement situation (see also Harmon-Jones & Allen, 2001). This finding strongly argues for the involvement of positive affect in mere exposure effects (Zajonc, 1968), and challenges cognitive accounts that assign affective states no special status in the attribution of fluency differences (e.g., Bornstein & D'Agostino, 1994). Note, however, that the inference of hedonicity on the basis of a temporal covariation between smile muscle activation and processing ease still depends on certain theoretical assumptions, and does not imply causality. Moreover, the conclusiveness of psychophysiological evidence is fully determined by the soundness of the experimental design, in which the psychophysiological measurement is embedded (Cacioppo et al. 2003). In consequence, psychophysiological measurements combined with a systematic manipulation of affective states and measures are particularly conclusive to the experimental isolation of affective operating characteristics on the psychological and physiological level.

Another method frequently used in identifying emotional processes involves a differential approach to strong affective states such as emotional disturbances. In those paradigms the task performance of emotionally disturbed participants is compared to a baseline performance of normal participants within the very same task. Observed performance differences between both groups are then attributed to the operation of processing principles attributable to the emotional disturbance. Studies employing emotional Stroop tasks were particularly successful in the implementation of such research designs because of their strong clinical interest in attentional operating characteristics of panic and depression disorders (Williams et al., 1996). In the pioneering study of Mathews and MacLeod (1985), for example, participants with an anxiety disorder and a normal control group were asked to name the colour of threatening and nonthreatening words. Colour naming of threatening words was delayed only in the patient group, and there was a relationship between the type of threat word that most disrupted colour naming and the type of worries that predominated in the patient. Converging findings from many other studies corroborated the claim that emotional processes distinguish certain clinical populations.

Note, however, that such evidence is typically not conclusive of affective distinctiveness. The differential approach to the study of emotional states does not ensure tight control of other (possibly nonaffective) variables which might be associated with specific emotional disturbances. In consequence, the looming danger of confounding prevents unequivocal claims of affective distinctiveness. Furthermore, a simple generalisation of the processing principles derived from clinical studies of emotional disorders to everyday emotional processing is inherently problematic. The very nature of the interacting effect between emotionally disturbed and normal populations militates against a one-to-one transfer of the principles to the latter group. Despite the fact that processing characteristics observed in clinical populations are heuristically invaluable to emotion psychology, with the emotional Stroop effect serving as a prime example (e.g., Pratto & John, 1991), the mere demonstration of their existence is no solid argument for the application of these same principles to everyday emotional behaviour.

In conclusion, the experimental search for distinctive and general principles operating on affect and emotion is important but methodologically demanding. Available methods for the disentanglement of distinctive and general processes are critically reliant on experimental manipulations of the stimulus conditions and the dependent measures. An experimental design that systematically relates affective and nonaffective stimulus conditions and measures to each other is proposed as a promising approach for the disentanglement of affective and cognitive processes. Such an experimental approach could be enriched by psychophysiological measures capable of providing converging evidence on the physiological level. Clinical studies of emotional disorders frequently ascribe emotion psychology to the possible distinctive contributions of emotional processes; taken in isolation, however, they do not provide unequivocal evidence for affective distinctiveness. Such positive proof hinges critically on the active manipulation of affective states and measures.

THIS SPECIAL ISSUE

Cognitive psychologists have successfully applied an information-processing analysis to human reasoning and behaviour. The tracking of information processing through the system from stimuli to response (or vice versa, see Hommel, Müsseler, Aschersleben, & Prinz, 2001), and the segmentation of the processing stream have furthered our insight into the most diverse phenomena, ranging from sensory processes involved in shape perception to elaborate attributional processes in moral judgements (Massaro & Cowan, 1993; Neisser, 1967; Palmer & Kimchi, 1986). Though neglected for a long time, the analysis of emotional and affective phenomena is no exception to this success story. The formal concept of *information* treats different types of environmental inputs equivalently, much as a computer represents information derived from different peripheral input devices in equally meaningless bits and bytes (Shannon, 1948). From such a computational perspective it is not obvious why the processing of affective information should differ in a fundamental manner from the processing of nonaffective information (but see Simon, 1967). Should it really make a difference, in the processing principles engaged, whether someone recalls the death of a significant other or the shopping list in the mall? Might the snake lurking in the grass elicit a motor response in a substantially different way than the red stop signal at the crossroad? Many researchers seem to think so. As we have pointed out above, some of the reasons for this belief do not stand deeper analysis, suggesting that the necessity or use of separating affective from cognitive processes is questionable. How should we deal with this situation? Consider novel arguments pro or against the distinction? Give it up and build more integrative models? Or give it up to build more local, content-specific models that emphasise distinctions among cognitive processes and among affective processes? The present special issue intends to raise, or at least emphasise, these questions and stimulate their discussion, rather than closing the case in one way or another. Accordingly, we have compiled a broad selection of diverging viewpoints that covers the possible range of answers as widely as possible.

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