

‘Skinner’s Mistake’ - Discuss the claim that emotion and cognition are intrinsically linked and should be studied together.

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Introduction

Experimental psychology has historically neglected the consideration of emotion. The difficulty of mathematically and computationally modelling such ambiguous bio-chemical, socially situated, subjective qualia, has not been the only reason for this avoidance. A view of emotion as irrelevant to cognition or as an epiphenomenon of behaviour, predates the cognitive revolution. In B.F Skinner's book 'Science and Human Behavior,' a chapter on emotion begins "The 'Emotions' are excellent examples of the fictional causes to which we commonly attribute behavior" (Skinner, 1953). Cognitive psychologists, although less absolutist, have frequently been similarly dismissive – 'People's choices may occasionally stem from affective judgments that preclude a thorough evaluation of the options'. (Shafir et al, 1993, cited in Lichtenstein & Slovic, 2006).

In studying the "particular pattern of responses of glands and smooth muscles" elicited by arousal (Skinner, 1953), and finding no ambiguous specification of emotion, Skinner was falling prey to an illusion of methodological rigor. In fact such distinguishing behavioral markers do exist; contemporary evolutionary psychologists have categorised a wide variety of emotions identifiable by members of all human cultures (Pinker, 2002). One researcher has even constructed a taxic of the muscular movements or 'action units', underlying the expression of human emotion (Eckman, 1978, cited in Gladwell, 2006). Additionally, the underlying autonomic and central nervous system circuits at work in a variety of emotions are now known to differ (Lerner & Keltner, 2000).

Although recent years have seen a renaissance in the study of 'hot cognition' (Thalgard, 2006), in examining the effect and utility of emotion on the decision making process, researchers, restricted by ethical and methodological difficulties, often focus not on emotion per say, but affect, a 'faint whisper of emotion' (Slovic & Peters, 2006). This essay will examine current research into affective cognition, and pose the question – in ignoring the gamut of emotions experienced in everyday life, by treating emotion as synonymous with affect, are contemporary psychologists repeating Skinners mistake?

Emotion and Cognition

William James was amongst the first scientists to attempt to rigorously define emotion. James intuited emotion as "necessarily and invariably accompanied by...bodily feelings," prefiguring contemporary embodied, situationist accounts (Damasio, 1994), stating the impossibility of "an individual who shall have emotions in a body in which ...complete paralysis will have prevented their expression." To James, emotions were reactions to "special sorts of objects of perception" (James, 1890) - objects equivalent to contemporary concepts of thin slices of behavioural information (Ambady et al, 2001), or evolutionary adaptive mechanisms (Buss, 2004); "modifiable to a certain extent by experience", paired through "extensive associative power" with new "sensory or motor partners" (James, 1890). James' model became known as the James-Lange theory of emotion, a system in which bodily reactions gave rise to the impression of emotion, rather than emotions leading to somatic responses. The opposing view, that stimuli directly elicit emotions, which in turn create somatic reactions and behaviour, was articulated by the psychologists Walter Canon and Philip Bard, whose Canon-Bard model theorised that somatic changes did not occur fast enough to influence emotions (Dalglish, 2004).

Research in Cognitive Psychology measures the capacities and functioning of human perception, memory, problem solving, and a variety of other domains; through the use of an information processing or computational metaphor, under the banner of 'cognition' (Neisser, 1967, cited in Gardener, 1985). Traditional top down cognitive models conceptualise emotion as a product of a high level interpretative process. Such models view human rationality as bounded both by external resource and temporal limits (Marsh et al, 2004), and internal capacities - cognitive limits like Millers 7 ± 2 working memory (Miller, 1967, cited in Gobet et al, 2001); and see decisions as satisfied by good enough problem solving.

Hebbsian associationist / connectionist models like SPAARS (Power and Dalglish, 1997), in which feelings are initially conditioned by an associative system linking stimuli with the products of a semantic system, also view emotion in this top down manner.

Bower's Network theory posits emotional states as nodes or patterns of activation in a semantic network, connected associatively to perceptual, behavioural and cognitive patterns (Bower, 1992, cited in Eysenck and Keane). Such models help to account for experimental observations of affect primed recall (like those of Eysenck et al, 1987, cited in Eysenck & Keane, 2002), but do little to explain the adaptive utility of emotion, and imply a mediation of emotional reactions by cognitive systems.

The Cognitive Neuropsychology of Emotion

Neuropsychological models of emotion, like leDoux's two-circuit model (Phelps & LeDoux, 2005) or Damasio's somatic marker hypothesis (Damasio, 1994), are derived in part from studies imaging the circuitry underlying emotion. LeDoux's research uncovered two distinct emotional systems in the brain, an automatic system specific to fear conditioning, centred around the amygdala, and a higher level system connecting the amygdala and hypothalamus (inputs of the autonomic system) to the prefrontal cortex; involved in the perception and production of emotional communication, such as facial expression and prosody (LeDoux, cited in Kolb and Whishaw, 2004). Damasio's Somatic Marker Hypothesis focuses on the ventromedial prefrontal cortex, hypothesising that it acts as a storehouse for sensory representations, linked to somatic states - provoking both conscious affective, bodily feelings, and pre-conscious subcortical influences on decision making - such as the 'mere exposure' preference to previously displayed stimuli (Harmon-Jones & Allen, 2001), or the racial prejudices uncovered by implicit attitude testing (Greenwald & Schwartz, 1998). One patient of Damasio's, 'Elliot', exhibited an inability to rationally choose between generated alternatives, associated with detachment and flat affect – despite intact cognitive abilities, abstract social reasoning, and comprehension of social norms and scripts (Damasio, 1994); indicating a disassociation between normative cognition, and the application of affective reasoning required for the navigation of everyday problems.

Research using the Iowa Gambling Task, in which subjects must implicitly discriminate between advantageous and disadvantageous decks, provides support for Damasio's hypothesis (Naqvi et al, 2006). Subjects with damage to the vmPFC are unable to pare

the probabilistic punishments they receive from disadvantaged cards with avoidance, although GSR tests indicate that they are experiencing changes in arousal. Such subjects possess intact emotion and cognition, but are unable to combine the two to learn effectively (Naqvi et al, 2006).

Risk, Decision Making and Emotion

Judgement and decision making (JDM) research studies the effect of varying degrees of knowledge and outcome uncertainty on decisions under a variety of conditions.

Traditional normative models of cognition both in economics and psychology, posited a utility maximising, probabilistically rational decision maker (Kahneman, 2003). Research into bounded rationality has challenged this perspective (Anderson, 2000), demonstrating a wide variety of departures from normative rationality, which are seen by some theorists as artifacts of adaptive evolutionary mechanisms (Daly & Wilson, 2001). More recently JDM researchers have assessed the impact of emotion on choice and decision making, often focusing on affect 'a momentary emotion that is a variable fluctuating phenomena' (Shrier et al, 2004). JDM research has proposed four functions for affect; as information, as a method of more easily evaluating complex decisions, as a means of directing cognition to decision relevant data, and as a motivator of cognition and behaviour (Peters et al, 2006).

Dual Processing Models & The Affect Heuristic

Robert Zajonc was amongst the first cognitive psychologists to posit a pre-cognitive affect, viewing cognition and affect as 'separate and partially independent' systems (Zajonc, 1980). Zajonc's Affective Primacy Hypothesis (Murphy & Zajonc, 1993), a dual process account, theorised that affective stimuli were processed differently (namely faster, and more automatically) than neutral stimuli. To Zajonc, affective judgements of pre-conscious stimuli guided the focus of information processing (Zajonc, 1980, cited in Slovic et al, 2004). This contrasts with top down accounts that suggest cognitive

appraisal occurs prior to emotion, differentiating emotional states (Lazarus, 1982 cited in Smith and Lazarus, 1993). Contemporary dual systems or processing models, posit two distinct systems of reasoning - a normative, rational, slow, and conscious System II; and an automaticised, rapid, and affective System I. Both reliant to some extent on biased heuristics (Kahneman & Frederick, 2001). System II is rooted in a rule based, serial, universal Turing machine metaphor, while System I more closely resembles associationist neural network models.

As with SPAARS - the 'experiential' System I (Epstein, 1994) has a conditioned link to an imagery pool with affective weight - an idea rooted in Mowrer's Two-Factor theory of learning, in which reaction and response were governed significantly by conditioned emotional reactions (Mower, 1960, cited in Slovic et al, 2004) - an affective heuristic consulted during decision making.

The Affect Heuristic proposed by Slovic et al, 2004, developed out of Damasio's Somatic Marker Hypothesis, and Pratkanis' Attitude Heuristic (Pratkanis 1989, cited in Slovic et al, 2004) posits that representations, experiences, individuals and objects in the environment are all conditioned to evoke affective perceptual and symbolic imagery, weighted by the degree of evocativeness - known as evaluability, allowing choice comparison between stimuli. Slovic et al, 2004, support this theory with reference to research indicating the affective weight of imagery associated with cities as predictive of expressed preferences in holiday behaviour (Denver et al, 1991 cited in Slovic et al, 2004).

Affect and Uncertain Decisions

Affect, defined in narrow valence terms, has been identified as one method of perceiving risk (Slovic et al, 2003). Interventions improving affect appear to decrease the perception of risk (Finucane et al, 2000, cited in Slovic et al, 2003), while even expert judgement is influenced more by the presentation of risk information in frequentist terms than in terms of probability (Hsee & Rottenstreich, 2004), due to the affective weight of counterfactual imagery generated by frequency data (Slovic et al, 2000, cited in Slovic et al, 2003).

When people enjoy activities they reverse the normative judgement that risk and reward are most often inversely correlated, leading to the assumption that highly desirable outcomes are associated with low risk (Fishhoff et al, 1978 cited in Slovic et al 2003). Caruso & Shafir, 2006 carried out four studies examining the effect of merely considering mood on decision making under conditions of uncertainty. They found that simply asking participants to imagine being in a given mood was sufficient to alter their expressed preferences (Caruso & Shafir, 2006) – an example of the impact of choice framing (Kahneman, 2003b). It should however be remembered that expressed attitudes and preferences are not always indicative of implicit attitudes or domain specific behaviour. While one of the four experiments carried out by Caruso & Shafir concerned an actual choice, neither of the brief audio recordings offered were likely to represent a significant utility or hedonic value. Additionally all of the descriptions of dramas featured as choices in Caruso & Shafir's experiments emphasised the 'melancholy' and 'anguish' featured in the media, potentially creating a conflict not between normatively preferred and mood improving / maintaining choices, but between regret aversion and mild utility. Regret aversion, a potentially maladaptive desire to avoid buyers remorse (Schwartz et al, 2002), may represent a separate and more mood directed phenomena than choice framing.

Visceral Factors

Loewenstein, 1996, posits a richer model of affect than many other theorists, describing emotion as one of a wider set of adaptive visceral factors (including hunger and sexual desire), motivating departures from self-interested rationality, altering choice valuation (for example leading to hyperbolic discounting of future costs), motivating or diminishing altruism, and affecting decision making and behaviour directly, and past the point of salience (Loewenstein, 1996). Loewenstein is critical of accounts placing rational cognition antecedent to affect, pointing out for example, that electrical activity associated with movement initiates prior to the intentional decision to move (Libet et al, cited in Loewenstein, 1996).

The Risk as Feelings Model

Peters et al, 2006, describe a distinction between integral affect - decision salient emotions; and incidental affect - objectively irrelevant subjective emotions - directly (e.g.: affect heuristic), and indirectly (e.g.: mood congruent recall) mediating cognition (Peters et al, 2006) (Lerner & Keltner, 2000).

Loewenstein et al, 2001, distinguish between anticipated (predicted as decision outcomes) and anticipatory (concurrent with decision making) emotions, and critique other models of the effect of affect on decision as primarily anticipated, and consequentialist (assuming the consideration of outcome as the primarily element of the decision making process). By contrast Loewenstein et al's, 2001, Risk as Feelings Hypothesis, posits that incidental affective state experienced during risky decision making can influence behaviour, both directly (without cognitive mediation) and by interacting with normative cognitive risk assessments and additional visceral factors to produce emotions and cognitive evaluations (Loewenstein et al, 2001). Loewenstein et al, 2001, point to the disjunction between maladaptive behaviours and cognitions (Barlow et al, 1998, cited in Loewenstein et al, 2001), and state that emotions and cognitions influenced by distinct factors (in the case of affect - prior experience, conditioning and the ease of generating counterfactual outcomes) can generate contradictory behaviours, supporting Damasio's disassociation between knowing the right thing, and doing it (Damasio, 1994).

Appraisal Tendency Theory

Mere valence does not necessarily indicate affective impact on choice and probabilistic judgement - Cognitive Appraisal Theories (Smith & Ellsworth, 1985, cited in Lerner & Keltner, 2000) predict that 6 central cognitive appraisal dimensions underlie the variety of emotions. Emotions are triggered and given meaning by the cognitive estimation of factors such as exogenous or endogenous responsibility for events. Lerner & Keltner's functionalist top down Appraisal Tendency Theory, posits a role for (momentary and dispositional) emotions in coordinating physiological and behavioural responses, and in

focusing attention, triggering memories and stimulating judgement - appraising future events appraised based on the cognitive criteria underling the associated emotion (Lerner & Keltner, 2000).

One of Appraisal Tendency Theory's predictions, that fear increases the estimation of risk, while anger diminishes it, was examined by Lerner et al, 2003. Emotions experienced shortly after the September 11th attacks predicted subject estimation of risk several weeks later - anxiety increased generalised risk estimation (distorting risk beliefs far outside probabilistic danger), while anger reduced it. Additionally, subjects conditioned to feel anger, supported retributive policies more strongly, while those exposed to fear elicitation increased support for conciliatory policies (Lerner et al, 2003). One implication of this research is that studying valence is not enough, as specific emotions of the same valence can have different impacts on attitude; this is further evidenced by later research by Lerner & Tiedens, evidencing anger specific behaviour and information processing (Lerner & Tiedens, cited in Peters et al, 2006).

Conclusion

Current models of the interaction of emotion and cognition differ as to the source of emotion, whether top down via an initial cognitive interpretation (Smith & Ellsworth, 1985, cited in Lerner & Keltner, 2000), or directly from somatic cues (Loewenstein, 2001) (Damasio, 1994). Some theories detailing the interaction of emotion and cognition, do indeed seem to replicate Skinners mistake, ignoring the impact of emotion in favour of the more easily studied affect (Slovic et al, 2005), although others focus on the development of richer models of emotion and other visceral factors (Loewenstein, 1996) (Lerner & Keltner, 2000).

Consolidating theories of affect on decision making will require a more thorough ontology of emotion. Researchers must distinguish between the valence of affect and the variety of emotions as experienced and physiologically expressed. Existing models of emotion like Risk as Feelings (Loewenstein et al, 2001) are shallow and descriptive, failing to distinguish between attitudes, moods and emotions. Researchers need to

overcome the ethical difficulties associated with research into the visceral impact on emotions in everyday life, ideally making use of situated, ecologically valid observation. Lerner et al's investigation of Appraisal Tendency Theory, provides one prototype for such research (Lerner et al, 2003).

Findings regarding the interaction of affect and cognition have implications for public policy, raising questions about how to communicate the risks attendant in national decision making (e.g.: energy policy) to an affectively reasoning public – how to address for example the massive over estimation of risk of terrorist attack faced by ordinary citizens (Lerner et al, 2003); how to take on board affective public concerns (Baron, 1997); and how to measure the gap between implicit and expressed attitudes and values (Fischhoff, 2000), without falling into the trap of manufacturing consent (Herman & Chomsky, 2002).

While the study of cognition alone may produce useful models of choice (Kahneman & Tversky, 1979, cited in Kahneman, 2003), and problem solving (Newell & Simon, 1972, cited in Eysenck & Keane, 2002); the many interactions of cognition and emotion detailed here, evidence the necessity of considering both emotional and cognitive elements in assessments of uncertain choice (Slovic et al, 2003) (Caruso & Shafir, 2006), decision making (Slovic et al, 2004), and behavior (Loewenstein, 1996).

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