Brands, emotions and the neural basis of financial risk-taking

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To date, the role of emotions in decision-making is not well understood. This project will investigate whether emotions triggered by human faces and commercial brands influence risk-taking in financial decision-making, and identify their role in modulating activity of neural regions that support the decision-making processes. The investigation will be based on a brain-imaging study, investigating subjects' neural activity during a financial decision-making task following exposure to different sets of human faces and commercial brands. The project will advance understanding of the role of ubiquitous human and commercial stimuli on decision-making, a fundamental human activity. Successful completion of this project will provide a unique interdisciplinary advance in the application of finance, economic, marketing and neuroscience theory.

Aims, Significance and Methdology

A growing body of research shows that human decision-making is meaningfully shaped by affect. Affect impacts on valuation and on choice of goods and services to the extent that fundamental principles of behavioural economics such as the endowment effect may be violated (e.g. Lerner, Small & Loewenstein, 2004). The relationship between motivational properties of emotions and choice behaviour is further evidenced by research demonstrating goal-driven behavioural effects following sub-awareness exposure to consumer brands (Fitzsimons, Chartrand & Fitzsimons, 2008). Although in its infancy, research exploring links between consumer decision-making and affective properties of consumer brands has been proposed as a key direction for decision-making research in view of the ubiquitous role of consumer brands in contemporary culture, and the enormous investment devoted to brands by both commercial and non-profit organisations.

According to the classical economic framework, individuals seek to maximise the expected utility of rewards by choosing an optimum combination of reward and risk over time. While temporal discounting effects result in the assignment of greater subjective value to immediate rewards over those available in the future (e.g. McClure, Laibson, Loewenstein, and Cohen, 2004), risk discounting results in the assignment of greater subjective value to lower-risk rewards by risk-averse decision-makers (e.g. Tobler, Christopoulos, O'Doherty, Dolan, and Schultz, 2009). Recent research strongly suggests a mediating role of affect in decision-making (e.g. Knutson, Wimmer, Kuhnen, and Winkielman, 2008). At the same time, theoretical approaches emphasise affective processes in consumer decision-making (e.g. Han, Lerner & Keltner, 2007). Thus, research in both behavioural economics and consumer behaviour converge in a current interest in this research topic.

We recently showed that sub-awareness exposure to consumer brands during a temporal discounting task results in an increase of the subjective value assigned to immediate rewards over those available at a delay, that is, in an increase in discount rates of delayed rewards (Harris and Murawski, 2009). Delayed rewards, however, are inherently risky and thus the question arises to what extent the assignment of lower subjective values of future rewards is driven by temporal discounting as opposed to risk discounting. We conjecture that temporal discounting is in part driven by uncertainty about future rewards and thus believe that temporal and risk discounting are interrelated and need to be analysed in unison.

Neuroimaging research provides a unique opportunity to resolve processes underlying the assignment of subjective value. Drawing on these insights in a consumer behaviour context, it would be predicted that goal-congruent brands activate subcortical and cortical regions including the ventral striatum

associated with risk and reward valuation. Furthermore, activation of these regions would be predicted to mediate the influence of goal-congruent brands in biasing decision-making towards higher-risk rewards despite risk-aversion of decision-makers.

The overarching aims of this project are to:

1. **establish whether goal-directed stimuli act as either reward cues or risk cues that influence risk-taking;**
2. **establish the relation between time preferences and risk preferences, two major sets of preferences affecting financial decision-making;**
3. **identify neural circuitry that mediates the influence of goal-driven stimuli as risk and reward cues on risk-taking.**

The project will advance understanding of the status of goal-driven stimuli including ubiquitous commercial stimuli as risk and reward cues, and their impact on financial decision-making. Increasingly, marketing, financial and economic theory draw on insights gained from neuroimaging research, yet the role of goal-driven stimuli including humans and brands as risk and reward cues and their role in modulating activity of neural regions that support financial decision-making processes has not been established. Successful completion of this project will provide a unique interdisciplinary advance in the application of economic, finance, marketing and neuroscience theory. Furthermore, as management of commercial brands attracts considerable commercial research investment, it is anticipated that successful completion of this project will attract significant interest from commercial organisations and provide high potential for cooperative funding partnerships.

In view of the multidisciplinary nature of this project, relevant sources of expertise will be sought where required. The investigators have successfully cooperated with neuroscientists at the Howard Florey Institute and are founding members of the new Social Neuroscience and Neuroeconomics Research Hub at the Howard Florey Institute comprising neuroscientists, psychologists and economists from the School of Behavioural Sciences and the Faculty of Economics and Commerce at the University as well as from the Howard Florey Institute. The aim of the research hub is to investigate judgement and decision-making at the intersection of neuroscience and economics, a fast-growing area of research. The investigators hope that this project will further existing interdisciplinary research partnerships between neuroscientists and economists in Melbourne.

Research Plan, Methods and Techniques

The research will recruit 20 normal right-handed individuals (approx 50/50 male/female) aged 18-30 for participation in fMRI trials. All subjects will be scanned on a 3T Siemens MRI scanner at the Royal Children's Hospital (Parkville). During MRI scanning, participants will be presented with human faces and brand logos followed by a choice between a certain (immediate) reward and a risky (delayed) reward. Aspirational or goal-congruent brands and human faces are hypothesised to prime limbic reward systems and bias choices towards risky rewards. During the first part of each trial, participants will be presented one of four images: a brand targeted towards the participants' age-group (i.e. an aspirational or goal-congruent brand); a logo for a brand that is targeted away from the participants' age-group (i.e. a non-aspirational brand for which the participant is not part of the target market), human faces and a neutral object not associated with aspirations or brands. The faces and brand logos will be presented subliminally (17ms), pre- and post-masked. This brief presentation duration will prevent participants' attaining awareness of face and brand presentation or identity. Participants will then make a binary choice using a button box between a (immediate) certain reward and an (delayed) uncertain reward. To promote goal-directed behaviour during the decision-making task, participants will receive a certain percentage of their gains during the decision-making task in cash immediately after the scanning session. After scanning, participants will rate each face and brand on a range of emotional dimensions in order to establish explicit ratings of aspirational and goal-congruent value of each face and brand.

Expected outcomes

The research will provide a deeper understanding of the role of human faces and brands in fundamental thought processes underlying decision-making. Successful completion of this project will identify neural regions associated with financial decision-making in response to risk and reward states evoked by human faces and goal congruent brands, and provide a basis to link behavioural economic theory with marketing theory. Previous fMRI research has identified increases in ventral striatal activation prior to financial choices emphasising reward following presentation of reward cues. It is anticipated that ventral striatal and/or lateral prefrontal cortex regions will be similarly engaged in response to presentation of goal congruent brands, and that one or both of these regions will mediate the influence of brand goal-congruence on risk-taking. It is expected that this project will result in a minimum of two peer-reviewed publications. In addition, it is expected that this project will help the investigators increase visibility of neuroeconomic research in both the public and the private sector in Australia and promote future research partnerships. More specifically, the investigators hope that project will help identify potential academic partners for an ARC Linkage grant application in 2011 and other forms of research partnerships.