Introduction

Evolutionary psychologists interpret many complex human behaviors as the results of adaptations. Their treatment has been helpful in understanding why certain behaviors seem so natural and yet irrational. Some evolutionary psychologists have extended their research to include emotions. Muramatsu and Hanoch (2005) and others (e.g. Tooby and Cosmides 2000; Ohman and Mineka 2001) argue that emotions can be understood as mechanisms for bounded rationality. While the goal of incorporating emotions into bounded rationality is welcome, the discussions often suffer from several problems: their use of evolution seems too fast and too frugal; they do not pay enough attention to how the social aspects of emotion influence behavior; and they do not say enough about how emotions and the control of emotions are developed.

For evolutionary psychologists the regulation and development of emotions is not seen as much of a problem because their account of human emotions treats complex emotional behavior as specific adaptations which correspond to specific neural components. Such accounts draw their strength from their ability to account for fairly common, but seemingly irrational human behavior (Muramatsu and Hanoch 2005). However, these accounts often ignore the way in which the regulation of behavior occurs in real time, and they do not spend much time considering the communicative properties of emotion.

Many emotions inform more than the subject that suffers them---the audience around the organism is also informed. Since the audience also reacts to the emotion, the display of emotions may matter to the subject. If this is true, then controlling and fine tuning such a display should be important to an individual's survival. Such an account is incompatible with a purely adaptationist explanation because (for reasons that will be argued for later) the emerging behavior would not be explainable at the level of adaptation. Instead, one must consider not just

the components that a behavior received from natural selection, but also the individual's development, learning, and current situation. I argue that emotions can help us understand bounded rationality, but that explanations of emotional behavior must include more than natural selection.

In order to understand the evolutionary significance of emotions I find it necessary to consider the emotions of non-human organisms as well as the development of emotions in human infants. These considerations inform how emotions occur evolutionarily, and they also shed light on the importance of social and developmental contexts. Panksepp, Damasio, Hendriks-Jansen and Gross (among others) have shown that both human and nonhuman subjects who are either missing certain emotions, or who are unable to interpret emotions, fair poorly. Problems linked to emotions may arise for very different reasons: physical injury, abnormal development, or unusual environments. The different situations in which problems arise inform researchers of the dynamics involved in emotional behavior.

While I do not have space to develop a full account of emotions, I do suggest what such an account might look like. I first summarize what I take to be the most important aspects of the view espoused by adaptationist account. Specifically I will consider Muramatsu and Hanoch's discussion of emotion and its influence on decision making. Next I consider how emotions may have evolved, distinguishing between basic (inbuilt) emotions, and more complex (developed) emotions. Finally I consider the role of development and environment on the regulation of emotion. From these sections a picture of emotions should emerge that fits well with evolutionary biology, developmental psychology, and neuroscience.