The Impact of Induced Emotion and Clinical Depression on Economic Decisions
Katia M. Harlé, Alan G. Sanfey, and John J.B. Allen
Psychology Department, University of Arizona, Tucson, AZ

BACKGROUND
Recent dual models of decision-making suggest that emotion plays an important role in the way we make economic decisions. The impact of incidental emotions (i.e., emotions unrelated to the immediate situation) on decision-making, however, remains poorly explored. In addition, specific emotional states have been shown to influence people’s attitudes, framing, confidence levels, and, ultimately, their goals. Therefore, assessing the potential modulating effects of induced emotions on decision-making is an important research question with obvious clinical implications.

METHOD
Decision-making performance was assessed by subjects’ average acceptance rates in the Ultimatum Game (UG). Subjects played the UG as “responders”, with 24 “virtual” partners. Offer types ranged in fairness levels, including unfair ($1-$3) and “fair” ($4-$5) offers. Subjects were paid with real money upon completion of the task, based on a proportion of their actual accumulated earnings. Within both studies, all subjects saw the same set of offers, and were thoroughly instructed as to how to play the Ultimatum Game.

Study 1: A total of 119 psychology undergraduate students from the University of Arizona were randomly assigned to either of two emotional state conditions or a neutral state control group (about 40 subjects per condition), following which they played the UG. To induce discrete emotions, we used short movie clips (3-5 min long). We piloted 20 clips, some of which had already been tested and used in previous research (Gross & Levenson, 1995). Two induced emotions (amusement and sadness) were chosen for this study in order to have variability in valence and matched arousal states.

Study 2: A total of 45 subjects (about 20 normal controls and 15 clinically depressed, e.g., BDI >15), initially selected from the pool of psychology undergraduate students from the University of Arizona, volunteered to participate in this study. Psycho-physiological measures (including baseline heart rate variability and EEG) and various questionnaire data (BDI, BIS/BAS) were collected prior to the UG task.

RESULTS – Study 1
In the Ultimatum Game, subjects received a series of offers in which they had to accept or reject money from different “proposers” who decide to split an amount of $10 between the two. We used a computerized version of the Ultimatum Game, where subjects saw the name and face of their partner for that round on the screen. For each offer, subjects first saw the picture of the proposer (6s), followed by the offer. They then had a maximum of 12 s to make their decision to either accept or reject the offer.

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RESULTS – Study 2
Acceptance Rates by Offer Amount (Normal vs Depressed)

Fig. 3 The depressed group showed significantly higher acceptance rates of unfair offers ($1-$3) in comparison to the non-depressed control group.

Participants’ Emotional Response to Unfair Offers

CONCLUSIONS

• Induced sadness resulted in lower acceptance rates of unfair offers ($1-$3) in comparison neutral and amusement conditions, demonstrating that transient and subtle mood states may bias decision-making.
• Clinically depressed individuals showed an opposite pattern, with depression resulting in higher acceptance rates across a wider range of unfair offers ($1-$4). However, their emotional reaction to unfair offers was significantly more negative than normal controls, showing a similar pattern than healthy individuals in a sad mood (see study 1).
• These findings suggest that a sad mood may have different cognitive and behavioral consequences, whether it is experienced as a transient mood state in healthy participants or as a continuous background emotion in clinically depressed individuals.
• We now need to identify the underlying neural and physiological mechanisms that may bias such decisions in an induced sadness state and in depression.

An fMRI investigation of the impact of induced emotions on UG performance is underway to address this question. Additionally, we will look at how baseline heart rate variability and EEG asymmetry may mediate or moderate such decisions.