

# The Effects of Sadness on Economic Decision Making

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## Defining sadness

Sadness is something we have all felt and can identify with relative ease, but there is a surprising difficulty in trying to describe it. Trying to describe an emotion shares many similarities to trying to describe a color; it is extremely challenging to describe a single color without referencing another while still managing to provide helpful and illuminating information. For example, one could describe the color red as an electromagnetic wave with a frequency of 400-484 Terahertz, but this is not particularly helpful to anyone who wants to visualize what the color red looks like. Similarly one could describe sadness as an increase in brain activity in the prefrontal cortex, thalamus, the anterior, middle, and posterior temporal cortexes, the lateral cerebellum, cerebellar vermis, midbrain, putamen and caudate (Lane, 1997), but again this is not helpful to anyone who wants to know how sadness feels. Anna Wierzbicka, a linguist at the Australian National University, states that any emotion “can be defined in terms of universal semantic primitives<sup>1</sup> such as ‘good’, ‘bad’, ‘do’, ‘happen’, ‘know’, and ‘want’.” (Weirzbicka, 1992) and that in these terms sadness is defined as follows.



“Sad (e.g., X feels sad):  
X feels something  
Sometimes a person thinks something like this:  
Something bad happened  
I would want: this didn’t happen [i.e., I wish it hadn’t happened]  
If I could, I would want to do something; because of this I can’t do anything  
Because of this, this person feels something bad  
X feels like this” (Weirzbicka, 1992)

As we can see defining an emotion in an academic sense can be quite a tricky task. To help explain this lets imagine a sad scenario. Imagine that you are walking your dog alongside a busy highway. You are distracted, and not holding the leash particularly tightly. A squirrel runs by, and your dog gives chase

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<sup>1</sup> A semantic prime is a concept in language that is innately understood and cannot be defined in simpler terms – words or phrases that are learned through practice but cannot be concretely defined. They are the basis upon which all other definitions can be built.

right on to the highway where it is hit by a car and dies (something bad happens). You wish that your dog had not run on the highway and died (I would want: this didn't happen). There are several things that you wish you had done or could do, you might wish that you had held the leash tighter, or that there had been a fence built between the walkway and the highway, or that you were able to perform lifesaving roadside surgery on your dog, but because your dog is dead you either cannot do those things or it would be ineffective to do that thing at this point (If I could, I would do something; because of this I can't do anything). Because your dog died you feel sad (because of this, this person feels something bad).

These definitions may help someone who has never felt sadness before, but in my opinion they do not fully capture the feeling of sadness. Most people will have felt sad at some point, so most of us will be best served by referring to the Oxford English dictionary definition. Sadness, noun – The condition of being sad.

### Methods of inducing sadness in a laboratory setting

The first recorded use of emotional induction in a research setting was in 1924. Carney Landis, a graduate student in psychology at the University of Minnesota, was researching whether certain emotions had characteristic facial expressions. To elicit emotions from his subjects Landis used a variety of methods, including having them decapitate live rats, placing firecrackers under the participants' chairs, and making them place their hands in to buckets full of frogs (Bartolini, 2011, Landis, 1924). Thankfully, over time methods have become less extreme.

There are several methods that modern researchers use to induce emotion in modern research, the most common of which are the following.

## Films

Exposing participants to film clips is a method of inducing a desired emotion. Typically participants will be seated in front of a blank screen for 1-3 minutes and asked to relax. After this they are exposed to a 2- minute film clip that has been shown either in pretesting or in another study to elicit the desired response (Quigley, n.d). For example, to elicit sadness participants will often watch a clip from *The Champ* where a child is loudly crying because his father has just died (Xing, 2014).

## Images

Researchers can use the International Affective Picture System (IAPS) to evoke a desired emotion, as the pictures have been normalized for affect across both younger and older participants. In a typical study that uses pictures to elicit emotion participants will be shown a series of images for 2-7 seconds each, with a 50 millisecond or more gap between images. To induce a sustained specific emotion, participants will be shown a series of images from the same class (Quigley, n.d). The IAPS pictures are not released for general use, so unfortunately I cannot provide examples. To obtain the IAPS pictures you must fill out an IAPS request form on the website for the center for the study of emotion and attention at the University of Florida. The pictures are only provided “for use in academic, not-for-profit research at recognized degree-granting educational institutions.”(Bradley, n.d)

## Sounds/Voices

Researchers can use the International Affective Digitized Sounds (IADS) to elicit specific emotions, as they have been rated in terms of their ability to evoke certain emotions. Sounds can induce emotions through both their acoustic properties (pitch, variation) and through their content (sound of bees buzzing, sirens, a voice). Participants will silently listen to sounds through either headphones or speakers. The IADS are not released for general use so unfortunately I cannot provide examples. To

obtain the IADS you must fill out an IADS request form on the website for the center for the study of emotion and attention at the University of Florida. The pictures are only provided “for use in academic, not-for-profit research at recognized degree-granting educational institutions.”(Bradley, n.d)

### Imagery and Recall

Imagery and recall refers to the practice of either having a participant remember (recall) a specific incident in their past that evoked a specific emotion, or asking them to imagine themselves in a scenario (imagery) that is designed to evoke a certain emotion. Scenario induction has the advantage of being able to induce an extremely wide variety of emotions (Quigley, n.d). An example of a scenario designed to induce sadness is “Imagine that [you are] returning home in response to a call regarding a serious ailment afflicting [your] mother. [Your] mother then unexpectedly died for inexplicable reasons” (Raghunathan, 1999).

### Music

Music is most often used alongside another form of induction, although it can be used alone. An advantage of using music is that it can be continuously played throughout the experiment, allowing the participant to perform the task simultaneously to listening extending the induced state. However, music tends to be relatively ineffective at producing specific emotions due to many peoples’ unique associations with certain songs, which is why it is often used in conjunction with other techniques (Quigley, n.d).

### Body Movements and Posture

In this form of emotional induction researchers will have participants move specific muscles in their bodies to imitate a posture or facial expression consistent with the emotion they are attempting to induce (Quigley, n.d). For example, to induce sadness a participant might be asked to pull the corners of

their mouth downwards, raise their eyebrows up and together, squint their eyes slightly, and hold that position for 10 seconds.

The majority of experiments that this paper will review and critique used film clips to induce sadness and other emotions in their participants, although one used imagery and recall. All of the experiments showed the participants their emotion inducing material before each stage of the experiment.

## The Effects of Sadness on Economic Decision Making

There are several studies that investigate the effects of sadness on our decision making process, and the results are quite conclusive, whether or not we are sad at the time we make a decision has a significant effect on the way in which we make that decision. The hypotheses in these studies are based around the theory of mood maintenance/repair, which is that people will make decisions that are most likely to either maintain their current positive mood, or repair their current negative mood. The first paper to examine sadness as a specific emotion was Raghunathan and Pham's 1999 paper "All Negative Moods Are Not Equal: Motivational Influences of Anxiety and Sadness on Decision Making". Before this, studies that wanted to see whether emotions affected decision making focused on whether the emotion was of a positive or negative valence<sup>2</sup>, grouping a wide range of emotions in to one category. Raghunathan decided to test the effects of two emotions of the same valence, sadness and anxiety. These moods were induced using the method of imagery and recall. After completing the mood induction task participants were asked to choose between two gambles, one with high risk and high reward and one with low risk and low reward, but both with the same expected payout. Sad participants chose the riskier gamble at a much higher rate than the control group, while the anxious participants chose the less risky gamble at a higher rate than the control group. Raghunathan hypothesized that this was due

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<sup>2</sup> Valence in psychology terms refers to the attractiveness or aversiveness of an event, object, or situation. For example, joy, contentedness, and excitement are all positive valence emotions, while sadness, anger, and nervousness are all negative valence emotions.

to the anxious group wanting to reduce their uncertainty, as high uncertainty is often a source of anxiety, while the sad group wanted to gain a larger reward, as sadness often stems from a lack of reward, and larger rewards being associated with a larger improvement of mood, so both groups were trying to repair their mood. The experiment was then repeated with a different framing<sup>3</sup>, a low security, high salary job or a high security, average salary job. The results were replicated, with the anxious participants preferring the low risk option, and sad participants preferring the high reward option.

(Raghunathan, 1999)

A significant amount of research in to the effects of sadness on decision making have been done by Jennifer Lerner, a professor of public policy and management at the Harvard Kennedy School of government and co-founder of the Harvard Decision Science Laboratory. Her 2004 paper discusses the results of an experiment that tested the effects of sadness and disgust against a control group on the prices that participants would be willing to sell or buy a pack of highlighters. These moods were induced using film. After completing the induction task, the participants were separated in to a sell group and an acquire group. Participants in the sell group were already in possession of a pack of highlighters, and were asked how much they would need to be paid to give up the highlighters. Participants in the acquire group were asked to how much cash they would need to be given in order to forgo receiving the highlighters. The neutral group displayed an endowment effect, which means that those already in possession of the highlighters (the sell group) valued them more highly than those not yet in possession of the highlighters (the acquire group). The disgust group had significantly lower prices than the neutral group for both selling and buying. But the sadness group showed a reverse endowment effect, those who already owned the object valued it far lower than those who did not yet own it. This result is again

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<sup>3</sup> Framing is the way in which we present a situation. For example, if we have a cancer treatment and 4 out of 10 people who use the treatment are cured, but the other 6 were not cured and subsequently died from cancer we frame these results in two ways. We can state that 4 out of 10 people who underwent the treatment were cured of cancer, or we can state that 6 out of 10 people who underwent the treatment died of cancer. These two statements describe the exact same outcome, but people react to them in very different ways.

tied to mood maintenance and repair. Those who are disgusted want to expel what they currently have and do not want to take on anything new, while those who are sad want to change their circumstances, and as such will be more open to getting rid of what they currently have and would also be more inclined to acquire new things (Lerner, 2004). This result is particularly interesting in regards to the effects of sadness, as the effect of the induced mood was so great that it actually completely reversed the endowment effect. This would seem to imply that those who are sad may have a higher tendency to consume, which leads us in to Lerner's 2013 paper on the effects of sadness on consumption.

In her 2013 paper Lerner wanted to examine how sadness affected consumption. Sadness was induced through imagery and recall. After completing the induction task, participants were then asked to rate a series of statements. There was also a large bowl of M&M's next to each participant for the participant to eat while they completed the task. The sad participants ate far more M&M's than the control group. This is interesting as sadness drives over consumption, which alleviated their sadness in the short run, but in the long run many reevaluated their choices and felt sad that they had over consumed. This could very easily become a vicious cycle (Lerner, 2013). This would seem to be a choice error and I will address this further later in the paper. This result may lead one to believe that when people are sad they have either low levels of self-empathy, or a very high discount rate. This issue was looked at in Lerner's 2012 paper on the financial costs of sadness.

This study examined the effects of sadness and disgust on a consumer's discount rate. The emotions were induced using film. After completing the induction exercise the participants were asked to make choices between receiving a smaller amount of cash now, or a larger amount in the future. There was no difference between the control group and the disgusted group, but the sad participants turned out to be far more impatient, with the median sad participant requiring \$37 to forgo receiving \$85 in 3 months, while the median neutral participant needed \$56. However in another experiment in the study, it was

found that this higher discount rate disappeared when choosing between two amounts both to be received at a future date. Therefore we can conclude that sadness only increases our desire to receive something immediately, not just sooner (Lerner, 2012).

These findings come in to direct contact with the second axiom of choice theory, which states that we have a unique bundle of rankings which cannot be affected by our emotions. As we have seen, our rankings are most definitely affected by whether or not we are sad and there is a significant amount of research that finds that other emotions also affect our preferences.

So what does this tell us about the decision making abilities of those who are experiencing sadness?

Examining these choices from a neutral point of view may lead us to believe that sad people are making snap decisions, or operating with incomplete information. However Cai Xing's 2014 paper which examines the decision making processes of sad and angry people finds the opposite. In this study people were induced in to either a sad, angry, or neutral state using film. Participants were then shown several slides which contained both factual cues and heuristic cues. A heuristic cue is a type of cognitive shortcut that allows us to make a decision without all of the factual information, for example voting for your party's representative rather than researching the positions of both candidates and making a decision based on that. It was found that people who were sad spent far longer looking at the factual cues than both the angry group and the neutral group, and made their decisions at the same speed as the neutral group but slower than the angry group. (Xing, 2014)

This means that people who are sad are not making decisions based on partial information or diminished mental capacity, and as such are making decisions that are rational to them at the time of choice. But are they making choice errors<sup>4</sup>? If someone is acting according to choice theory a choice

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<sup>4</sup> A choice error is when you make a choice in one state of mind that you later regret in another state of mind. For example, the next morning you regret the choices you made while drunk or you regret what you said to someone while you were angry with them after you have calmed down.

error is impossible, as one's ranking of bundles never change, and as such you will always choose your top ranked bundle no matter if you are emotional or not, and this top ranked bundle will be the same between all emotional and non emotional states. However we have already seen that it is not true that you hold the same rankings through all emotional states, and as such your top ranked bundle in one state may not be your top ranked bundle in another state and you may regret choosing that bundle. As we saw from Lerner's research, sadness has a dramatic effect on our discount rate, making us value things which we receive in the present far more highly than things that we would have to wait for to receive. In the short run this is clearly the best choice, as you alleviate your sadness, but in the long run when you are no longer sad you very well may end up regretting the choices you made while sad. This is what we saw in the conclusions to Lerner's 2012 paper, where people ended up regretting the amount of M&M's they ate while sad. For some this choice error was so severe that it led them to become sad again because they so strongly regretted their choice. Whether or not the choices made while sad were a choice error would seem to me to depend upon comparing the magnitude of the difference between the choice you made while sad and the choice you would have made in a non emotional state, and the amount that you value no longer being sad. If you value no longer being sad more than you value the difference in value between your sad choice and non sad choice, you have made a choice error, if not you did make a choice error. This may be hard to determine in a lot of cases, but from the research it would definitively say that sadness leads at least some people to make choice errors some of the time.

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