Journal of Economic Psychology 31 (2010) 634–642

Contents lists available at ScienceDirect

Journal of Economic Psychology

journal homepage: www.elsevier.com/locate/joep

Regret now, take it now: On the role of experienced regret on intertemporal choice

Daniela Raeva [a,*], Luigi Mittone [b], Jens Schwarzbach [c]

[a] Sant' Anna School of Advanced Studies, Laboratory of Economics and Management, Piazza Martiri della Libertà, 33-56127 Pisa, Italy
[b] University of Trento, Computable and Experimental Economics Laboratory, Via Inama, 5-38100 Trento, Italy
[c] University of Trento, Center for Mind/Brain Science, Via delle Regole, 101-38060 Mattarello, Italy

ARTICLE INFO

Article history:
Received 4 July 2009
Received in revised form 20 April 2010
Accepted 22 April 2010
Available online 5 May 2010

JEL classification:
A12
C91
D91

PsycINFO classification:
2260
2360

Keywords:
Experimental economics
Emotions
Decision-making
Regret theory
Intertemporal choice

ABSTRACT

We present an experiment designed to test whether experienced regret and rejoicing evoked in a risk choice have an impact on subsequent intertemporal choice. We found that regret and rejoicing experienced prior to an intertemporal choice influenced considerably the way people relate to future: when regret was experienced participants preferred not to wait, whereas when rejoicing was experienced, participants were willing to wait longer. We show that in the framework of the discounted utility model experienced regret lowered and experienced rejoicing increased the discount factor.

1. Introduction

Most of the decisions we make entail consequences that extend across time: we make trade-offs between costs and benefits that occur at different points in time (i.e., *intertemporal choices*). Decisions about spending, investments, savings, mortgages, relationships and education all contain intertemporal trade-offs. Despite the important ramifications of these decisions on our life, people often make choices "in the heat of the moment" that they would not have intended to make. Previous research has shown that emotions experienced at the moment of choice (i.e., *immediate emotions*) play an important role in intertemporal choice (Loewenstein, 1996, 1999, 2000).

In this paper, the immediate emotions we focus on are experienced regret and rejoicing. We experience regret when we discover that the outcome we could have obtained if chosen differently would have been better. When we discover that we

* Corresponding author. Present address: Leiden University, Pieter de la Court Gebouw, Wassenaarseweg 52, 2333 AK, Leiden, The Netherlands. Tel.: +31 (0)71 5273824; fax: +31 (0)71 5273619.
E-mail addresses: d.raeva@sssup.it, raevad@fsw.leidenuniv.nl (D. Raeva).

0167-4870/$ - see front matter © 2010 Elsevier B.V. All rights reserved.
doi:10.1016/j.joep.2010.04.006

have obtained a better outcome compared to a foregone one, we experience rejoicing (Bell, 1982; Loomes & Sugden, 1982). Bell (1982) and Loomes and Sugden (1982) integrated these emotions into a decision theory called *regret theory*. Regret theory quantifies experienced regret and rejoicing by the difference between the obtained outcome and the outcome that could have been obtained, had we chosen differently: when the difference is unfavorable regret is experienced, whereas when the difference is favorable then rejoicing is experienced. The experience of regret and of rejoicing, therefore, are on large part conditional on the knowledge of the outcome of the foregone option: one should receive feedback both on the chosen and on a foregone alternative (*complete feedback*) in order to experience either regret or rejoicing. If there is feedback only on the chosen alternative (*partial feedback*) it is unlikely to experience these emotions: when we are uncertain about the outcome of a foregone alternative, we are less likely to think about what could have been if chosen differently, and therefore less likely to feel regret (Van Dijk & Zeelenberg, 2005).

Regret has attracted much attention in research on individual decision-making over the past few decades. Previous research has shown that regret is a common human experience with powerful influence on decision behavior and with overreaching implications to subsequent decision behavior (for a review, see Zeelenberg & Pieters (2007)). An extreme example of the implication of experienced regret is the man who in April 1995 decided to end his life after discovering that the set of numbers he always played were drawn to win £2 million in the national lottery, but he forgotten to renew his ticket for this drawing. His experience of regret was so intense that it impacted eminently his perception of value of life.

In this paper, our goal is to examine whether in experimental settings we could find that the prior experienced regret and rejoicing have an impact on subsequent intertemporal choice. To our knowledge, this would be the first attempt to interconnect the findings on experienced regret and rejoicing with the field of intertemporal choice.

The analysis of intertemporal choice has been normatively dominated by the discounted utility model (Samuelson, 1937; Koopmans, 1960). The common perception that a present outcome is worth more than a deferred one delineates the construct of the discounted utility model. The model has two underlying components. The first component is the *instantaneous utility*. This is the present utility of the option at hand, which is assumed to be stable over time. The second component is the *discount function*. This is a function of time delay (how we feel about the outcomes removed to later points in time), which is assumed to be independent from the instantaneous utility. We use this two-component discounted utility model approach as a framework to examine the role of experienced regret and rejoicing on subsequent intertemporal choice.

As a first step, we outline the findings from previous research on the influence of experienced regret on post-choice utility evaluation. We extend these findings to the context of intertemporal choice by applying them to the instantaneous utility evaluation. Next, in an experimental study, we examine the role of experienced regret on the second component of the discounted utility model. In the experiment, we induce regret and rejoicing by providing feedback on risk decision prior to a two-period intertemporal choice. We present and interpret the results through a qualitative analysis, which suggests that the time discount function is influenced as well by the regret experienced prior to making the intertemporal choice and that this influence is in the same direction as it is for the instantaneous utility.

2. The role of experienced regret on utility

Regret theory assumes that experienced regret leads to reducing, and experienced rejoicing to increasing, the psychological experience of satisfaction from the obtained outcome (Bell, 1982; Loomes & Sugden, 1982). Several empirical studies have provided support to these assumptions. In Inman, Dyer, and Jia (1997) participants were asked to make choices between lottery pairs. After making their choices, the participants were provided with outcome feedback on the chosen lottery as well as on the foregone lottery and their subjective evaluation of the choices were assessed. The analysis of the results revealed that the information about the forgone alternative had a significant influence on the participants' evaluation of their choices. Regret feedback resulted in a decrease, and rejoicing feedback in an increase, of the satisfaction level. Similar results were reported in Mellers, Schwartz, and Ritov (1999, Experiment 1). In this study, participants were presented with series of choices between two gambles. Participants always learned the outcome of the chosen gamble. In some of the trials, they also observed the outcome of the foregone gamble. After each choice, their subjective emotion evaluation of the choice was assessed. The results revealed participants felt better for their own outcome when the outcome of the other gamble was worse, and they felt worse for their own outcome when the other gamble resulted in a better outcome. Inspired by the experimental paradigm used in Mellers et al. (1999), Camille et al. (2004) provided confirmation of the subjective emotion evaluation ratings of the outcomes with the physiological index of emotional reactivity collected using skin conductance response (SCR). The results revealed enhanced SCR during viewing both the outcome of the chosen gamble and outcome of the foregone gamble compared to viewing only the outcome of the chosen gamble. Following the same experimental paradigm, Coricelli et al. (2005) measured brain activity using functional magnetic resonance imaging while participants were presented with a series of choices between two gambles. The results showed that the neural activity in response to experiencing regret and rejoicing is distinct from the activity detected during only the chosen outcome evaluation. The neural activity in the OFC, dorsal anterior cingulate cortex and anterior hippocampus discriminated between better and worse outcome on the foregone gamble (i.e., greater activity for the negative outcomes and greater deactivation for the positive outcomes when feedback on the foregone gamble was provided). The findings reported in the studies described above provided strong psychological, physiological and neurophysiological evidences of the influence of experienced regret and rejoicing on utility evaluation.