

Time is Money?the Impact of Time Pressure and Monetary Reward Amplitude on Risk Decision-making Among College Students

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Abstract: Money and time have many similar properties,but there is little research comparing whether the two play a consistent role in framing effects.Based on this,this study explored the effects of time pressure and monetary reward amplitude on risk decision-making through two experiments.The results showed that time pressure and reward amplitude enhanced the framing effect.In the loss framework,individuals have a higher preference for decision-making risk under time pressure compared to those without time pressure;In the benefit framework,individuals have lower decision-making risk preferences when the reward amplitude is large compared to those with smaller reward amplitudes.

Keywords: Risk Decision-making;Framework Effect;Time Pressure;Reward Amplitude

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1. Literature review

Kahneman and Tversky(1984)found in the"Asian Disease Problem"that when describing decision-making problems in a positive way(benefit framework),people tend to avoid risks in their choices,while when describing decision-making problems in a negative way(loss framework),people tend to seek risks in their choices^[3].This phenomenon is known as the"framing effect". Time is often regarded as an important variable affecting decision-making when exploring its impact on people's decision-making behavior.Some studies have found that time pressure plays a weakening role in the framing effect(Kocher&Sutter,2006)^[5]. But other studies have found opposite results to the above(Song Zhijie et al.,2015)^[9].The dual process model proposes that people's decision-making process often involves two ways of thinking processing,namely intuitive heuristic thinking and rational analytical thinking(Rozin&Nemeroff,2002)^[8].When there is time pressure,people tend to use heuristic thinking for decision-making.

We also have the saying'time is money',but few researchers have compared whether the two play a consistent role in framing effects.Van et al.(2006)found in the Iowa gambling task that participants were less likely to choose losing cards when the difference in reward amplitude decreased,and more likely to choose losing cards when the difference in reward amplitude increased,resulting in greater financial losses^[10].Regret theory proposes that individuals pay more attention to the pleasant experience brought about by gains in a small range of monetary rewards,and tend to overestimate the negative emotions brought about by losses in a larger range of monetary rewards,thus showing a tendency of"Risk aversion"(Larry&Richard,1993)^[6].

This study proposes hypotheses based on the above research and relevant theories:

Hypothesis 1:Compared with no time pressure,subjects under time pressure have less risk preference in decision making under the benefit framework and more risk preference in decision making under the loss framework.

Hypothesis 2:Compared with a small monetary reward,subjects have a greater risk appetite when the monetary reward is larger.

2. Method

2.1 Study 1

2.1.1 Participants

Randomly select 86 college students to participate in this experiment(38 men,average age:19.78±1.59),44 people(20 males)under no time pressure conditions,and 42 people(18 males)under time pressure conditions.

2.1.2 Materials

Risk Decision Task Materials:This study selected four questions adapted from the"Asian Disease Problem"as risk decision task materials.Each decision problem has two descriptive methods:a benefit framework and a loss framework.Each problem scenario has conservative and risky options,but only one can be selected.

Time Stress Scale:This scale consists of 8 questions,and the participants'time stress perception is measured by assessing whether the description of the questions in the scale is consistent with their own feelings.

2.1.3 Procedure

This experiment adopts the time pressure setting method commonly used by previous researchers.Firstly,without time constraints,the average time and standard deviation required for participants to complete all decision-making tasks are determined,and then a time value less than one standard deviation of the average time is used as the pressure time for decision-making tasks.

The subjects were randomly assigned to either the time pressure group or the no time pressure group.Firstly,conduct an experiment without time pressure group,and calculate the pressure time to be determined as 10 seconds.Then,conduct an experiment with time pressure group.Both groups of participants were required to complete the time pressure scale after the experiment ended.

2.1.4 Results

The statistical results of the time pressure scale scores are shown in the table below.The results showed that the scale scores of participants under no time pressure were significantly lower than those under time pressure,with $F(1,84)=160.73,p<0.001,\eta_p^2=0.66$. This result indicates that the manipulation of time pressure in this study is effective.

Descriptive statistics of time pressure			
	N	M	SD
No time pressure	44	1.98	0.52
time pressure	42	3.22	0.42

To test the effect of time pressure,repeated measures of ANOVA showed that the main effect of time pressure was not significant,with $F(1,84)=1.38,p=0.24$.The main effect of task framework was significant,with $F(1,84)=10.40,p<0.01,\eta_p^2=0.11$,the risk preference of the participants in the benefit framework($M=0.51,SD=0.27$)was significantly lower than that in the loss framework($M=0.63,SD=0.29$)The interaction between time pressure and task framework is significant, $F(1,84)=5.57,p=0.02,\eta_p^2=0.06$,see Figure 1.

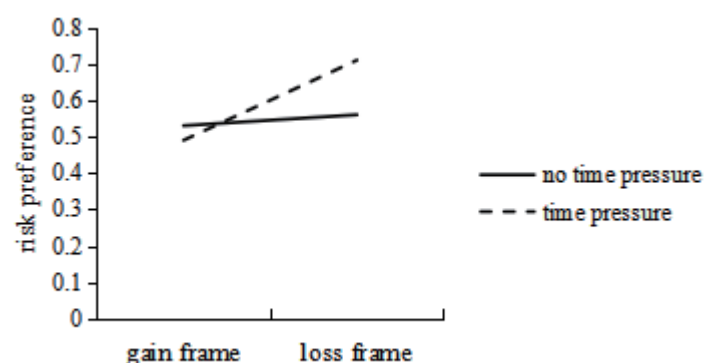


Figure 1 The interaction between time pressure and task framework

Further simple effect analysis found that in the benefit framework,there was no significant difference in risk preference between those under time pressure($M=0.49$)and those without time pressure($M=0.53$),with $F(1,84)=0.49,p=0.49$;In the loss framework,the risk preference under the condition of no time pressure($M=0.56$)is significantly lower than that under the condition of time pressure ($M=0.71$), $F(1,84)=5.58,p=0.02,\eta_p^2=0.06$.The results of this study partially validate hypothesis 1.

2.2 Study 2

2.2.1 Participants

Randomly select 54 college students to participate in this experiment(21 men,average age:20.54±2.13).

2.2.2 Materials

The difference from the risk decision-making material in Experiment 1 is that there are two problem scenarios with reward ranges of 6000 yuan and 3000 yuan under each of the two frameworks.

2.2.3 Results

The repeated measurement analysis of variance results showed that the main effect of reward amplitude was not significant, $F(1,53)=2.28,p=0.14$,the main effect of task framework was significant, $F(1,53)=23.98,p<0.001,\eta_p^2=0.31$,the interaction between reward amplitude and task framework is significant, $F(1,53)=4.08,p=0.05,\eta_p^2=0.07$,see Figure 2.

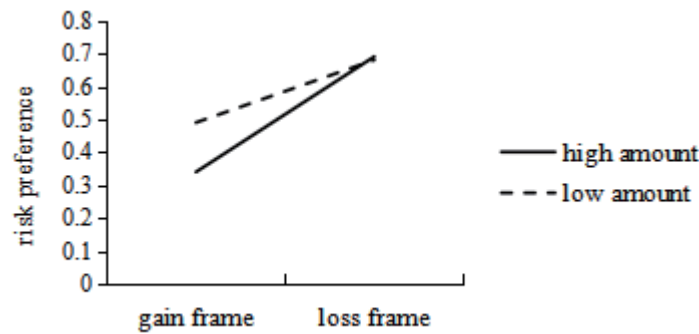


Figure 2 The interaction between reward amplitude and task framework

Further simple effect analysis found that in the benefit framework,the risk preference for rewards with large amplitude($M=0.34$) was significantly lower than that for rewards with small amplitude($M=0.49$), $F(1,53)=7.13,p=0.01,\eta_p^2=0.12$;In the loss framework,there is no significant difference in risk preference between high reward amplitude($M=0.69$)and low reward amplitude($M=0.68$), $F(1,53)=0.09,p=0.77$.The results of this study partially validate hypothesis 2.

3. Discussion

Experiment 1 found that there were significant differences in the impact of time pressure on people's decision-making risk preferences among different types of frameworks.When participants face decision-making tasks with time pressure in the loss framework,their risk preference level for decision-making is significantly higher.This result may be due to the fact that in the loss framework,participants rely more on heuristic thinking processing strategies for making choices in time constrained decision-making situations(Kerstholt,1995) [4].Further,emotional experiences can change people's thinking patterns and lead to consistent cognitive judgments(Isen&Patrick,1983) [2].Under time pressure,negative emotions such as anxiety and tension are more likely to occur,and participants may make more risky decision-making behaviors to alleviate negative emotions.

In Experiment 2,when participants face a larger reward range within the benefit framework,their decision-making risk preference level is significantly lower.This discovery is consistent with the hypothesis of regret theory.According to regret theory,Individuals tend to overestimate the negative emotions such as regret and disappointment brought about by losses under a large monetary reward range,thus showing a tendency of "risk aversion"(Larry&Richard,1993) [6].In addition,the risk sensitivity theory suggests that people's risk preference for decision-making is determined by the size of their own needs,and the greater the demand,the more obvious the risk preference for decision-making(Mishra et al.,2014) [7].Therefore,the needs of the participants may be another reason for the experimental results.

In this study,it was found that although time pressure and reward amplitude both enhance the framing effect,their directions of action are different.This may be caused by the subject's perception of Scarcity.Scarcity perception can hinder the cognitive process of decision-makers and also trigger negative emotions(Aslan et al.,2017) [1].

4. Conclusion

4.1The way a problem is described can affect people's decision-making risk preferences,which means there is a framing effect.

4.2Time pressure and monetary reward amplitude enhance the framing effect.

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