OTTO-VON-GUERICKE-UNIVERSITY MAGDEBURG
FACULTY OF ECONOMICS AND MANAGEMENT

Attraction to Chance in Germany and Australia
An experimental study of cultural differences

Eike B. Kroll · Bodo Vogt

FEMM Working Paper No. 6, March 2008

F E M M
Faculty of Economics and Management Magdeburg

Working Paper Series

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Abstract

This paper explores cultural differences in risky choices between Australian and German students. The focus is not on risk itself, but on tension which is a positive attribute of risky choices. Furthermore, the effects of real versus hypothetical payoffs are analysed. The experiment of this paper shows that in a given set of tension creating choices, Australians do choose tension more often than Germans, while Germans prefer higher tension. Additionally it is shown that real payoffs do make a difference in the data, but the real payoff even increases the effect.

Introduction

Risk preferences describe the behaviour of subjects when they decide between prospects. Albers et al (2000) discover that not all decisions can be explained this way. They attribute deviations to the timing of decision processes and label it attraction to chance or tension. Tension explains why persons choose risky options they would not choose according to their risk preferences, as shown in Albers et al (2000). In this paper cultural difference concerning the attitude of individuals towards tension is examined.

It is important to note, that tension is only relevant during the pre-outcome period. It is anticipated as a positive feeling before the decision is made. Therefore, the individual is trading off positive feelings of tension and negative feelings of loss between two different times. That means subjects make trade-offs between the payoffs and the risk and uncertainty during the pre-decision period. Because tension arises in the pre-outcome period it is a different attribute of the lottery and is anticipated before the decision is made.

Researchers and practitioners would agree that people tend to be risk averse in individual decision making. A large variety of financial products are available on the global market, where investors can choose between products with differing risks and payoffs. For institutions it is important to provide investors with products that reflect their personal risk preferences. The true risk preference is blurred by the effect of tension in many settings, which is why tension effects need to be analysed. Setting up new companies or participate in trading single certificates at the stock exchange is considered very risky for the private individual. These activities are, however, observed in the real world. Following the classical and behavioural models these activities can only be explained by unjustified high expectations. Another explanation is tension seeking behaviour.

Because national differences in these kinds of decisions can be observed it is not sufficient to analyse tension itself. Cultural influences in this kind of decisions need to be analysed. While Australia has an increasing number of new businesses especially for small enterprises with low turnover and low numbers of employees (Australian Bureau of Statistics 2006), the number of ventures started is declining in Germany (IHK 2007). There even exists a subsidy form the German Government to encourage unemployed workers to start their own small enterprise to escape dependence on social benefits. In Australia on the other hand the non-employing enterprises are 2/3 of the total number of businesses (Australian Bureau of Statistics 2007).

The effect of tension cannot only be observed in business settings that tend to be rather complex and difficult to analyze with respect to single influences. Also in the domain of lotteries and gambling, the revenue of the German gaming industry is declining gradually (DHS 2004), while in Australia the industry is growing steadily and reached an expenditure for gambling of AUS$ 996 per head (Australian Bureau of Statistics 2004). Also, in Australia a wider variety of gambling opportunities can be found and is encouraged by the states (Pinto and Wilson 1900). Therefore, the question arises why Australians enjoy games where risky choices with money stakes are made. Therefore, it seems that the effect does not lie in the complexity of business related decision making, but is closely connected to personal characteristics.

Since the perception of risk is influenced by the individual willingness to accept risk (Williams and Narendran 1999), one might assume that the evaluation of a lottery differs if a person perceives the situation more as a game, where tension is sought, or as a risky choice that is part of a portfolio to balance risk and payoff. In that case, the utility of the lottery is influenced by tension, which occurs within the time after the decision was made and before the actual outcome of the game is known. This period is called pre-outcome period (Albers et al 2000). While individuals try to avoid losses (Tversky and Kahneman 1991) and dislike the fact that after a risky decision was made the possible positive outcome did not occur (Loomes and Sugden 1986), the anticipation of an event leading to possible losses creates tension, which is valued positively by the decision makers.

Especially managers see strict distinctions between taking risks and gambling (March and Shapira 1987). Since risk-taking seems to be connected to personality (Zinkhan and Karande 1991), while perception of risk differs on both, the individual and collective level (Dake 1991), one would think that the perception of a lottery determines whether positive feelings are connected to tension. Also, in professional settings decision making of management executives is biased by the managers' home cultures (Tse et al 1988). Even the technical assessment of risk interacts with cultural processes and is assessed on both, the individual and social level (Kasperson et al 1988). Since tension is imminent in this kind of risky choice, the individual decision in the task should be influenced by the culture they live in.

Although most researcher in the domain of decision theory make the assumption that all people use the same mechanisms to come to a decision, experimental results show that culture heavily influences behaviour (Henrich 2000). Differences in socioeconomic factors seem to play an important role in decision making (Theil and Ferguson 2003). Also, the fact that

subjects tend to be more empathetic with the social group they are surrounded with (Boisjoly 2006) shows the influence the background of participants has on opinions.

The cultural frame of reference seems to be a critical factor when it comes to decision making in groups and the efficiency of outcomes is closely connected to groups, being able to find a shared frame of reference in those settings (Auer-Rizzi and Berry 2000). In the domain of risk research two perspectives are competing. One is the psychometric paradigm which neglects cultural influences (Rippl 2002) and the other is the cultural theory which explores differences in perception of risk among different cultural frames (Douglas and Wildavsky 1982).

Studies of cultural differences often use language as an indicator. A study of German and American proverbs found that language indicates higher risk-taking advice in German than in American with a higher applicability to financial risks (Weber et al 1998). Parameters of the conjoint expected risk model also show differences between American and Chinese participants (Bontempo et al 1997). It has to be noted that Germany is similar to the United States of America in its socioeconomic similarity, but in its social safety-net and cultural collectivism it is comparable to China (Weber et al 1998).

The largest differences in risk perception emerge when activities are considered that have a moral dimension (Rohrmann and Chen 1999). While in Germany gambling is highly regulated by the government to ensure responsible behaviour by casino staff towards addicted gamblers (Hayer and Meyer 2004), Australia has a reputation of being a "nation of gamblers" (Pinto and Wilson 1990). Considering those cultural factors in the countries this paper examines, one could assume that Australians connect more positive feelings to gambling than Germans. This positive feeling is what is termed tension in this paper. In the case of gambling another behavioural aspect can be observed that departs from economic theory. A gambling addiction cannot be explained by economic models. Since the behaviour in risky decisions of everyday life does not change for addicted gamblers, the risk taken in games rises to a point that destroys the individual financially and personally. This behaviour seems to be hard to explain by current research on risk attitudes and is more like to be connected to tension.

Hypotheses

The effect of attraction to chance in this experiment can be determined by two values. That is the difference between the highest and lowest outcome of a lottery (range) and the frequency of choosing to play within a given set of risky choices. Following the findings of Albers et al

(2000), it has to be assumed that the participants have differing motives to choose between options and determining the range of a lottery. When it comes to gambling, for example, Chinese players seem to gain more happiness from taking risks than English players (Lau and Reynard 2005). However, there is not sufficient empirical data available to predict the influence of place of origin on gambling behavior (Grey 2004). But if the "uncertainty avoidance index" from Hofstede's "Cultural Dimensions" as indicator (Hofstede 2003) is compared, Australians should take more risks than Germans. Therefore, it is hypothesized that

Hypothesis 1: Australian students choose the risky alternative more often than the German students within a fixed set of choices.

and

Hypothesis 2: Australian students choose a larger range for presented lotteries than the German students.

In Australia gambling is considered a form of entertainment (Pinto and Wilson 1990). While in Germany the focus of public discussion seems to be mainly on the negative effects of gambling (Hayer and Meyer 2004), the Australian Government encouraged a wide range of legal gambling opportunities (Pinto and Wilson 1990). Thus, if culture does have an impact on tension and the evaluation of a lottery, one would think, that Australians consider the gamble more positive than the German participants. This would lead to the conclusion that Australians to play more frequently as they enjoy the game. Also, if the enjoyment of tension is higher than in Germany, Australians would choose a larger range for the lottery once the decision to in favour of the lottery and against a sure payoff was made.

Hypothesis 3: If it is given that a participant chooses a risky option over a sure payoff, Australians choose larger ranges for the lottery.

Although there are significant differences to be expected in the data, the underlying effect that is observed needs to be the same, if an interpretation with reference to culture is made. That is, the effect of tension on the evaluation of lotteries in its core stays the same between groups of different places of origin. Exploratory experiments during the preparation of this paper showed, that the effect of tension shows three different types of respondents. The types are defined in the analysis section of this paper and it is proposed, that these identified types show distinct patterns in which the effect of tension occurs. Therefore, there cannot be significant differences in the distribution between the types.

Hypothesis 4: There is no difference in the distribution of categories within the effect of tension.

The decision in this experiment seems not only to be dependent on the risk preferences of the subjects, but is also driven by another motive that can be termed as tension seeking. Especially when it comes to choices between different alternatives with a number of attributes, the weighting of the attributes is crucial for choices on the individual level (Stevenson, Busemeyer and Naylor 1990). Since tension determined by two attributes, the range of the lottery and the expected value, the differences should be observed within those variables.

Students share the same frame of reference, which is that business requires risk-taking behavior (Auer-Rizzi and Berry 2000). However, economic decisions and economic reasoning my be heavily influenced by cultural differences (Henrich 2000). The major observed differences seem to be determined by how risk is perceived in different cultures (Weber and Hsee 1998). Specifically, socially accepted and supported behavior determines outcomes of decision-making processes (Williams and Narendran 1999). Chinese for example show a higher degree of risk-taking in gambling than English subjects (Lau and Reynard 2005). But there is not enough empirical data available to predict how culture determines gambling behavior (Gray 2004). However, considering Hofstede's "Cultural Dimensions" as indicator (Hofstede 2003), Australian would choose more tension than Germans.

Hypothesis 5: Subjects choose lower levels of tension when the experiment has real payoffs.

Experimental results show that participants underestimate their own risk aversion when decisions are hypothetical, these differences decrease the smaller the stakes are (Holt and Laury 2002). Since this paper does not explore risk attitude, but the behaviour in games where tension is sought, the differences between the real and hypothetical group should be small. Participants only choose to play the game if the positive feelings connected to tension are of more value for them than the negative feelings of the risk in the lottery. Furthermore, the stakes are chosen by the participants and are likely to be very small. However, since the negative feelings of risk are underestimated in the hypothetical group, participants are likely to choose lower levels of tension when payoffs are real.

Subjects and Procedure

The hypotheses are tested using a data set from two experiments. The first experiment consists of hypothetical choices to explore the cultural effects in risky choices that create tension. The second experiment controls for the influence of real payoffs on those decisions.

Experiment 1

All participants were students of management and economics. One group consisted of 25 students in their first and second year of management and economics studies at the Otto-von-Guericke Universität Magdeburg, Germany. The second group consisted of 25 students in their second year of the Bachelor program at The University of Queensland Brisbane, Australia. All students visited courses on decision theory and business statistics, but did not have any experience in prospect theory. All decisions were hypothetical.

Both groups participated in the experiments in a classroom environment in the middle of the semester. Assuming that most of the tension in the life of students is determined by their studies, one can conclude that the background tension should not have a significant influence on the differences between the groups.

Experiment 1 consisted of two games. In the first game the subjects were asked to determine their security equivalents for lotteries.

Please choose one of alternative (A) or (B), if you are indifferent indicate (I) and which option is chosen for you by chance:

Option A: A fair coin is flipped. If it turns out
       - heads, you get 0
       - tails, you get 10.000

Option B: You get S for sure.

The money values for S were 5, 50, 500, 5.000 and 50.000 Euros in the German questionnaire and 10, 100, 1.000, 10.000 and 100.000 Australian Dollars in the Australian questionnaire.

Table 1: Elicitation of Certainty Equivalents

In the second game the subjects were asked to make seven independent decisions.

Please choose one of alternative (A) or (B), if you are indifferent indicate (I) and which option is chosen for you by chance:

Option A: S AUS$ for sure

Option B: S AUS$ for sure + participation in a roulette lottery with
            if ball stops on red, you receive X AUS$
            if ball stops on black, you pay X AUS$
            if ball stops on zero, the game is repeated.
          the size of X is your choice.

The money values for the safe payment S varied between 0, 5, 50, 500, 5.000, 50.000 and 500.000 Euros in the German questionnaire and 0, 10, 100, 1.000, 10.000, 100.000 and 1.000.000 Australian Dollars in the Australian questionnaire

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Table 2: Choice of Tension

Since the purchasing power of the Euro in Germany and Australia is approximately the same and the exchange rate of the Australian Dollar at the time was 0,58 Euro, the values of the questionnaires can be seen as equivalents.

Experiment 2

The participants were 23 students in the Master program of the Business School at The University of Queensland, Australia, taking a course in online marketing. In Experiment 2 the

same questions were used as in Experiment 1, but with a maximum S of 100.000 AUS$ for the gambling task. Furthermore, a second step was implemented which determined whether or not the decisions of an individual were paid by real money with the maximum of one real payoff per participant. The experimenters placed 125 AUS$ on the number 19 on an American Roulette table at a casino for each participant. If the bet won one of the decisions of that individual was paid in real money. Which of the decisions was paid was determined randomly with the block for eliciting the certainty equivalent (first game) having the same probability than each of the decisions in the second game. This procedure was chosen since the experimenters did not have enough money to pay even a single decision. Therefore, the same payment procedure as in Albers et al (2000) was used.

Results

The hypothetical questionnaire in Germany and Australia is analysed for differences in the frequency with which participants chose $X > 0$. Therefore in each group of students, participants were grouped by the frequency of games in which they chose to play the lottery. The groups were low frequency (0, 1, 2 times), medium frequency (3, 4 times) and high frequency (5, 6, 7 times), while it has to be noted that in both groups none of the participants chose to play none of the lotteries.

Frequency of choosing $X > 0$	0,1,2	3,4	5,6,7
No. of participants (Germany hyp.)	11	9	5
No. of participants (Australia hyp.)	5	10	10

Table 3: Frequency of choosing tension

Checking **hypothesis 1**, a chi-squared-test was applied and the frequency of choosing $X > 0$ was significantly higher (on the 7%-level) in the Australian group. Since the frequency of playing the game is only one way of creating tension, it is also checked whether the size of the X differs between the groups. A median-test was applied on the size of the X, given an individual decided to play the game. A difference was found between the groups (significant on the 1%-level), however, the difference was opposite than was expected in **hypothesis 2**.

While Australians played the game more frequently, Germans chose, once they decided to play the game, higher amounts for X.

	> Median	≤ Median
Germany (hypothetical)	60	19
Australia (hypothetical)	30	71

Table 4: Comparison between German and Australian group (hypothetical)

A closer look at the data shows that these differences do not appear for small S ($0 \leq S \leq 50$ €). In these cases there is not a significance differences between the two groups. Not for all reference points of S **hypothesis 3** can be confirmed. While there were significant differences on the 10%-level (one-sided) for S = 5, 50, and 50.000 between the hypothetical group, there were no significant differences for other S. Also there were differences found (significant on the 7%-level, one-sided) between the hypothetical and real Australian groups for S = 0, 5, 5.000, and 50.000. The hypothetical group of German students differed from the Australian real group for S = 0 and 5 on the 7%-level, one-sided).

The participants of the experiment can be subdivided into three types. Type A chooses alternative B at least once while X/S decreases with increasing S. Type B shows the same behaviour, with the exception, that X/S increased with increasing S at one point. Furthermore, there seem to be people who also choose alternative B at least once in the experiment, but after that decrease and increase X/S at different levels of S at least twice, but sometimes even more often. Therefore, it is proposed, that these identified types show distinct patterns in which the effect of tension occurs.

The analysis of the distribution over types of players as noted above shows that in both groups most players were of type A and only very few were of type C. The χ^2-test with a significance level of 5% showed that a difference between the distributions of types between the groups was not observed. Therefore **hypothesis 4** can be confirmed.

	Germany	Australia	Total
Type A	15 (60%)	16 (64%)	**34 (62%)**
Type B	8 (32%)	8 (32%)	**14 (32%)**
Type C	2 (8%)	1 (4%)	**2 (6%)**
	25	25	50

Table 5: Types of tension seeking behavior

In Experiment 2 the effect of real vs. hypothetical payoffs was controlled. Therefore the analysis of frequencies of X > 0 and amounts of X were compared between the hypothetical questionnaire and a real payoff experiment in Australia. Furthermore, it was checked for differences between the hypothetical questionnaire in Germany and the real payoff experiment in Australia.

Frequency of choosing X > 0	**0,1,2**	**3,4**	**5,6,7**
No. of participants (Australia hyp.)	5	10	10
No. of participants (Australia real)	11	6	6

Table 6: Frequency of choosing tension

	> Median	**≤ Median**
Australia (hypothetical)	36	65
Australia (real)	56	13

Table 7: Comparison between real and hypothetical payoffs (Australia)

Comparing the results between the group with hypothetical and real payoffs brought about unexpected results. The amounts for X chosen by the real-payoff-group were significantly higher than in the group with hypothetical payoffs.

	> Median	≤ Median
Germany (hypothetical)	60	19
Australia (real)	56	13

Table 8: Comparison of hypothetical payoffs (Germany) and real payoffs (Australia)

Additionally it is checked for differences between the hypothetical German group and the real-payoff Australian group, but no significant differences were found there. Furthermore it has to be noted that the types of behaviour as defined in this paper are similar in both groups of real and hypothetical experiments.

	Germany	**Australia**	**Total**
Type A	16 (64%)	14 (66%)	**30 (62%)**
Type B	8 (32%)	4 (19%)	**12 (32%)**
Type C	1 (4%)	3 (14%)	**4 (6%)**
	25	**21**	**46**

Table 9: Types of tension seeking behavior

The analysis shows that **hypothesis 5** cannot be confirmed. Once the questions asked in the experiment are about real money, the effect of tension is even larger. Therefore, a close connection of tension to real stakes in the decision can be assumed. The experiment suggests that not only risk aversion is underestimated when decisions are made hypothetically. The positive feeling of tension is also underestimated.

Conclusion

Since most financial decisions are similar to lottery choices the cultural effect observed in this paper has an impact. Especially in cases where the choices are far more complex than in the example of lotteries, the presentation of those options to customers needs to be considered carefully. Because of the tension seeking behaviour for the pre-outcome period, the risk preferences are not determined in these choices. That can lead to dissatisfied customers once the actual returns of their investment are made.

Cultural influences on individual behaviour are multifaceted and culture can be defined as information saved in people's minds that can be transferred between individuals. Following this definition, it can be concluded that people tend to copy the behaviour which is common

within their group or shown by celebrities (Henrich et al 1999), which can influence the evaluation of tension. Using this explanation for culture, both similarities and differences can be interpreted. Both groups were business students, but are far away from each other geographically. Therefore, the groups can have something in common since both have the same access to information and the international exchange of research results, which is why their education is similar. Students might also know the same personalities in their field, be it research or business. On the other hand, the groups live in different cultures and face different economic and socio-cultural realities.

The effect of tension on the evaluation of lotteries occurs in both groups independently. Therefore, it is not a cultural phenomenon. Furthermore, the general characteristics of the effect are the same for both groups. Despite these commonalities, differences between the groups were observed. While Australians chose the risky option more often than the Germans, they chose lower ranges for the lotteries when favoured over the sure payoff.

The data set shows significant differences in the results between the groups. Because behaviour is influenced by culture, it has to be noted, that the effect of tension depends on the social affiliation. There were, however, similarities between the groups, which is why it cannot be clearly determined which the exact influences on the tension of lotteries are.

While Australians chose to play the lottery provided more often, Germans chose ranges for the lotteries. Both decisions increase the tension within the game, so there is no clear statement about which group values tension higher. The groups do differ in the way of creating positive tension in the games but both like tension in this type of game.

Additionally the data shows that differences occur between hypothetical and real payoffs contrary than was expected. The positive feeling of tension is underestimated in the hypothetical experiment which leads to even higher levels of chosen tension once the payoffs are real. This result supports that tension is connected to the stakes involved in a lottery choice.

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