Judgment and Decision Making, Vol. 4, No. 7, December 2009, pp. 534-542

Prefer a cash slap in your face over credit for halva

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Abstract

We investigated how frequency and amount of punishment affect the decision making of Iranian subjects. In our first experiment, performing a computer-based Persian version of the Iowa Gambling Task (IGT), our subjects scored remarkably lower than their Western counterparts. Moreover, our subjects chose more frequently and more rapidly from decks that had less frequent but larger amounts of punishments in comparison to decks that had more frequent punishments with smaller amounts. In our second experiment, subjects did not differentiate between decks with the same frequency of punishment but with different punishment amounts. However, among decks with the same amount but different frequency of punishment, a significant preference was apparent towards decks with less frequency of punishment. Our results differ from previous studies, indicating a different strategy in risky decision making among healthy adult Iranian subjects, as they show low attention to the amount of punishment and are more concerned with the frequency of punishment.

Keywords: risky decision making, Iowa Gambling Task, cross cultural.

1 Introduction

Risky decision making (RDM) is defined as a cognitive process in which an individual chooses from available options according to her assessment of the value of reward and/or punishment associated with choices. This assessment is based on the individual's previous experiences and obtained information about the possible outcomes of options. Factors such as the amount and frequency of reward and punishment, the probability of their occurrence and the delay in their presentation, influence the more favorable choice for the subject (Kahneman & Tversky, 2000). Various studies have shown that decision making is also affected by the emotional valence assigned to each option based on previous experiences (Bechara, Damasio & Damasio, 2000). When making a choice, a decision maker recognizes the current situation as analogous to some previous experience and draws inferences from her previous choices (Markman & Medin, 2002). Options with a history of yielding larger, more frequent and more probable rewards have more favorable effect on our reward and emotional processing systems and therefore are more likely to be chosen. In fact, our subjective intuitions may bias us to make decisions not necessarily rational but emotionally favorable.

Research on decision making, and in general psychology, can suffer greatly from focusing solely on subject populations from the same culture. Due to the need to move from single population based models (Cole, 1996) and also because of the rapid globalization of commerce, the influence of culture on decision making has become a topic of interest for both psychologists and economists. The influence of culture on probability judgments, risk perception and risk preference have been extensively explored by researchers in different fields (see Weber & Hsee 2000 for a review). Hsee and Weber (1997, 1999) report that subjects from collectivist cultures, such as East Asian cultures, are more risk-seeking because they have a larger social cushion to fall back on in case of losses. In addition, they have found that these differences are not due to differences in attitudes towards risk, rather it is something about how risk is perceived and construed.

Social and cultural causes are known to leave traces and are reflected by a variety of cultural products, such as the proverbs in that cultural (Weber & Hsee, 1998). An Iranian proverb, providing advice when choosing between short term and long term benefits, reads, "A cash slap in the face is worth more than credit for halva." This

*We thank Joan Chiao, Amber Bloomfield, Emmett Tomai, Scott Friedman, Matthew Klenk and Doug Medin for comments on this paper. This study was financially supported by Iranian National Center for Addiction Studies (INCAS) and also by a grant from Vice Chancellor for Research, Tehran University of Medical Sciences (TUMS). Address: Hamed Ekhtiari, 669 South Karegar Ave, Tehran, Iran 13366-16357. Email: h_ekhtiari@razi.tums.ac.ir.

proverb recommends people to prefer an instant gratification even if it is a slap in the face, over a sweeter payoff paid sometime in the future. Cultural products created over generations, responsible for storing and transmitting cultural wisdom (Weber, Hsee & Sokolowska, 1998), as well as the current economic or political status of a nation affect different aspects of people's judgment and decision making. We believe the halva proverb, and many others with similar messages, highlight the influence of social-economic causes, such years of war and instability in the social-political atmosphere, on the Iranian culture.

There have not been rigorous cross-cultural experiments focusing on decision making in middle-eastern cultures. In this paper, we report on cross cultural differences in RDM by comparing the results of Iranian subjects to the results of the same RDM assessment test performed in Western cultures. Due to factors such as religious restrictions for gambling, multiple regime changes and years of war, we expect Iranians to perform somewhat differently from their Western counterparts. Moreover, we investigate the effect of frequency in contrast to amount of reward and/or punishment in RDM among Iranians. We close with a discussion about some potential reasons for some of these differences.

1.1 Iowa Gambling Task

The Iowa Gambling Task (IGT) is a well established experimental paradigm designed to mimic real life decision-making by including uncertainty, lack of comprehensive information, reward and punishment (see Bechara et al. 1994, 1996, 1999 for details). A key feature of this task is that subjects have to forego short-term benefit for long-term profit. The IGT was originally introduced to shed light on decision making deficits in bilateral ventromedial prefrontal (VMPFC) patients. Recently various studies have been conducted to examine individual variability within the IGT. For example, sex-related differences, where men generally outperform women on the task, have been reported by different studies (e.g. Reavis & Overman 2001, Bolla et al. 2004). Moreover, neuroticism has been reported to be negatively associated with IGT performance among males (Hopper et al. 2008). Evans, Kemish and Turnbull (2004) report a paradoxical effect of education on the IGT, where more educated subjects are outperformed by less educated subjects. Different studies report on the effects of age on the IGT. Denburg et al. (2001) show that some older adults (55+) fail to develop risk aversion over trials. Wood et al. (2005) report that both young adults and older adults perform equally well on the task, but relay on different decision making strategies. Children between ages of 7 and 12 perform like adults with VMPFC: They choose from decks that result in immediate high gain, despite future losses (Crone & Van der Molen, 2004).

In the original ABCD version of the task, subjects make a series of 100 choices from four decks of cards. Two of the decks are advantageous (decks C and D) and two of them are disadvantageous (decks A and B). The subject's goal is to maximize her net score across trials. The two disadvantageous decks lead to relatively high gains ($100) but also to occasional large losses ($125), which result in an average loss of −$25 per trial. The two advantageous decks lead to lower gains each time ($50) but produce smaller losses, resulting in an average gain of +$25 per trial. Decks A and C have more frequent punishments in comparison with decks B and D, which have low frequency but high amount punishments. The performance of the subject in the task is defined as difference of number of cards selected from good decks minus cards selected from bad decks (net score: (C+D) – (A+B)). We refer to this measure as the main IGT score throughout this paper.

2 Experiments

We first use the ABCD version of the IGT to compare the main IGT score of Iranian subjects to other published results. In order to conduct the IGT experiment among Persian speakers we translated and back-translated the IGT and its instructions from English to Persian (with help and supervision of independent translators who were not familiar with the task and its instruction). Figure 1 illustrates a screenshot of the Persian IGT. We conducted a Persian computerized version of the task using the equivalent amounts of rewards and punishments in Iranian monetary currency (Toman; where 1000 Tomans is approximately equivalent to $1). In the first experiment all four decks were used. In the second experiment, done one month later with the same subjects, we made the task easier: we designed two simpler versions of the task, each using only two decks instead of four.

The time elapsed between the selections (in milliseconds) was also recorded. After each card selection, subjects were informed about the reward with or without the punishment associated with their choice. Also, the total amount of win and loss and the net result up to that point were updated on the screen. After completing 100 card selections, the subjects were informed that the experiment was finished, and the net amount of their win or loss was displayed.

The rational hypothesis is that people in general tend to favor long term benefits over short term losses; however, given the social cues and cultural products salient in the Iranian culture, our hypothesis was that our subjects will tend to pick choices which minimize the frequency of punishment and prefer short term small benefits over

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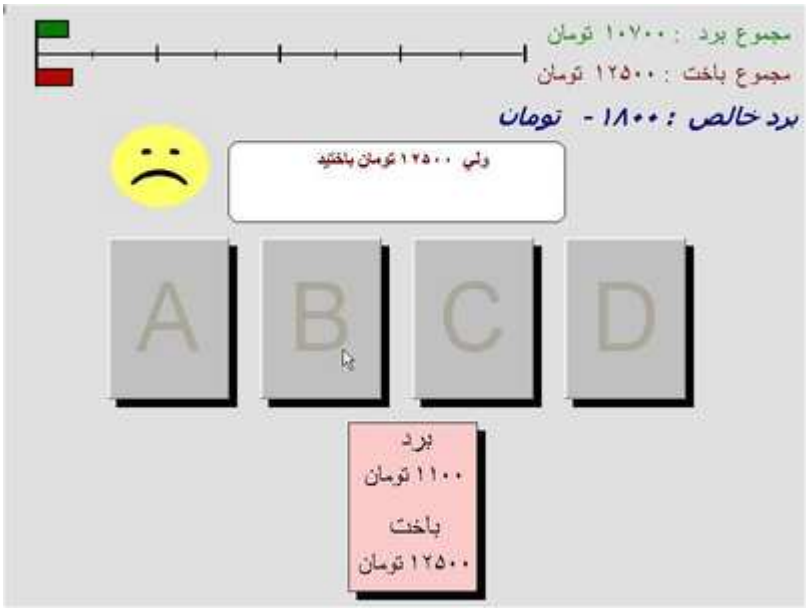

Figure 1: A screenshot of the Persian IGT.

long term larger gains. We did not have any prior hypothesis about the overall score nor the mean selection time of different decks.

2.1 Experiment 1

In the first experiment, we measured the *main* IGT score defined as the difference between total number of selections from the advantageous decks and from disadvantageous decks, (C+D) – (A+B). We compared the main score of our subjects to the main IGT score of healthy Western adults taking the normal version of the IGT. For this reason, we surveyed the IGT literature for studies done in Western countries where the authors reported at least the mean and the standard deviation for the main IGT score. We reviewed the articles listed in the first 10 pages of Google Scholar search. Out of the papers reviewed, the following papers met our criteria: Bolla et al. (2005), Bolla et al. (2003), Bowman and Turnbull (2004), Bowman and Turnbull (2003), Clark et al. (2003), DeDonno and Demaree (2008), Grant, Contoregg and London (2000), Haaland and Landrø (2007), Jollant et al. (2005), Kim, Lee and Kim (2006) and Shurman, Horan and Nuechterlein (2005). The subject populations used in these studies are fairly varied in their characteristics, yet the overall reported results are quite consistent.

Also, in order to investigate the role of frequency of punishment, we measured an *alternative* score, defined as the difference between total number of selections from decks with less frequent losses and decks with more frequent losses, (B+D) – (A+C) (Ekhtiari & Behzadi, 2001). As selecting from any deck would result in some amount of win, it was not possible to define a score reflecting a possible tendency towards decks with more frequent wins.

2.1.1 Subjects

One-hundred twenty-one Iranian subjects in Tehran between the ages of 18–42 (mean = 26.3) with average education of 13.01 years were selected for participating in the study. All subjects were paid 5000 Toomans (about $5) for their participation in the study. They were also told that at the end of the experiment, the results would be individually presented to them, and a prize would be given to ten subjects with the highest amount of net win.

2.1.2 Method

Prior to starting the task, subjects were instructed that the game requires them to choose cards from any one of the four decks until told to stop. The program required each subject to make 100 selections. The subjects were explicitly told that they could switch between decks whenever they wished. It was explained to them that the goal of the game was to win as much money as possible and to avoid losing money as far as possible. Subjects were also told that they would find some decks worse than others and that to do well they needed to stay away from the bad decks. Each card choice led to either a variable financial reward or a combination of a variable financial reward and penalty. The rewards and punishments on the decks

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Table 1: The comparison between our results and 11 other published IGT results.

	N	Age	Education	Mean	SD	t	p
Our result	121	26.3	13.01	3.53	22.56	—	—
Bolla et al. (2005)	11	31	13	26.50	15.40	−4.52	< 0.01
Bolla et al. (2003)	13	30	13.02	14.30	23.90	−1.55	0.11
Bowman et al. (2004)	40	20.4	N/A	14.90	12.20	−4.03	< 0.01
Bowman et al. (2003)	17	19.3	N/A	20.12	20.50	−3.08	< 0.01
Clark et al. (2003)	21	50.7	N/A	23.60	25.00	−3.44	< 0.01
DeDonno et al. (2008)	82	N/A	N/A	22.49	30.53	−4.80	< 0.01
Grant et al. (2000)	24	31	14.4	25.96	5.30	−9.67	< 0.01
Haaland et. al. (2007)	15	22.7	14.2	31.50	30.50	−3.43	< 0.01
Jollant et al. (2005)	82	38.8	13.10	17.60	30.20	−3.59	< 0.01
Kim et al. (2006)	30	39.1	14	16.40	4.50	−5.82	< 0.01
Shurman et al. (2005)	10	32.10	15.50	31.60	19.40	−4.33	< 0.01

had been fixed by the experimenter and unknown to subjects. Four decks were displayed on the monitor screen, and the subjects chose a card from one of the decks by a mouse. At the beginning of the task, each subject received a loan equivalent to $2000. There were 60 cards available in each deck. Upon finishing each deck, subjects had to continue choosing from other decks.

Each card from decks A and B paid an average of $100, and each card from decks C and D paid an average of $50. On some cards subjects both won and lost money. Specifically, deck A included losses on 50% of the first 10 cards from that deck, with a 10% increase in frequency for each subsequent set of 10 cards from that deck (e.g., 6 losses from cards 11–20 selected from deck A, ...). Losses on deck A were moderate in amount, ranging between −$150 and −$350. Deck B included losses on 10% of all the cards chosen form that deck. Although infrequent, losses were relatively large beginning at −$1250 and incremented by −$250 with each subsequent loss (e.g., the second loss was −$1,500, ...). For both of these decks, losses outweighed gains and, therefore, these decks were considered as disadvantageous. The frequency of losses was the same for decks C and A, but the amount of the losses was considerably smaller for C, ranging between −$25 and −$75. Similarly, the frequency of losses was the same for decks D and B, but the amounts of the losses were considerably smaller for D, starting at −$275 and incremented by −$25 with each subsequent loss. For both decks C and D, the gains outweighed losses and, therefore, these decks were considered advantageous. Thus, although considering only the gains for the decks would lead one to prefer decks A and B, decks C and D were in the subjects' long term best interest when the associated losses are taken into account.

2.1.3 Results

We performed a series of comparisons using means, standard deviations and numbers of subjects reported in the papers listed previously. The main IGT score of our subjects (3.53 ± 22.56)[1] was found to be remarkably low compared to the control healthy Western (and Korean) subjects taking the normal version of the IGT in previous studies.[2] The results of these comparisons are summarized in Table 1.

Details of the result of our first experiment are summarized in Table 2. In this experiment, the mean number of selections from deck A was significantly lower than number of selections from deck B ($t(240) = 7.23$, $p < 0.001$). Also, the mean number of selection from deck C was lower than D ($t(240) = 8.10$, $p < 0.001$). But, there were no significant differences between the number of selections from decks B and deck D ($t(240) = 0.74$, $p = 0.47$) and between number of selections from decks A and C ($t(240) = 1.56$, $p = 0.11$). The mean of both main and alternative scores increased through the 10-selection blocks (average for each 10 picks) (Figure 2), but the slope of increase for the alternative score throughout the task (0.285) was significantly ($t(53) = 2.12$, $p = 0.021$) steeper than the main score's (0.169).

The mean selection time (MST) for deck B was significantly shorter than for deck A ($t(240) = 5.61$, $p < 0.001$). Also, the MST for deck D was less than for deck C ($t(240) = 1.88$, $p = 0.06$) and the MST for deck A was larger than

[1] The main score correlated with age ($r = 0.16$, $p < 0.1$) and education ($r = 0.15$, $p < 0.1$), but the alternative score did not.

[2] We also compared the results of the 11 studies with each other. This comparison revealed that the difference between the main IGT scores of the studies reached significance only where one study used American subjects and the other used non-American subjects.

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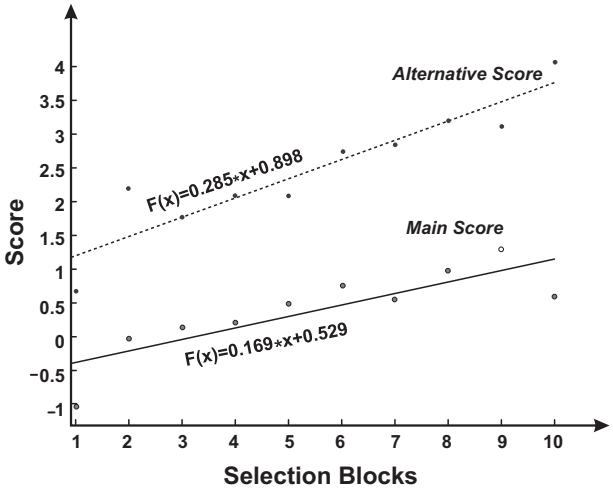

Figure 2: Main scores vs. Alternative scores through the 10-selection blocks (averaged for each 10 picks), fitted to linear curves. Alternative score shows significant better improvement through the task.

for deck C ($t(240) = 2.99$, $p = 0.003$). But, the MST for deck B was not different from deck D ($t(240) = 0.167$, $p = 0.868$).

2.1.4 Discussion

The main IGT score of our subjects was surprisingly lower than the results of studies done in the West (and Korea). Moreover, among the studies we surveyed, significant differences occurred only when the two compared papers used subjects of different cultures, with Americans scoring higher than other cultures. We would like to note that the major difference between our subjects and the subjects used in other studies is their culture. The majority of our subjects either had high school level education or were enrolled in college. The same holds with the other studies: some used students and some community samples. Our result was lower than all these studies no matter what the level of the education or age of the subjects were.

In this experiment our subjects showed a significant bias towards decks with less frequent losses (B and D), which resulted in a difference of 24 between number of selections from these two decks and number of selections from decks with more frequent losses (A and C). Crucially, this effect is seen regardless of the "net" amount of win or loss upon selecting more from decks B or D. That is, although choosing from deck D would be much more in the subjects' long term interest, there was little difference between the number of selections from these two decks which both had equal frequency of loss. Therefore, it seems that small but frequent amounts of losses had more negative effect on our subjects' decisions, than did large but infrequent losses, regardless of how this would affect the subject's final net amount of win or loss. This preference is quite clear comparing the number of selections from deck A with B, and C with D; in both cases the only differentiating factor is the frequency of loss. Comparing within decks with equal frequency of loss, it seems that there is a trend to favor deck C to deck A, and deck D to B, although neither were highly significant ($p = 0.36$ and $p = 0.06$ respectively).

We also compared the time elapsed (in millisecond) before each card selection. As stated before, we did not have any a priori hypothesis regarding the deliberation time for different decks. However, the results showed that our subjects chose significantly faster from decks B and D, compared to decks A and C. Our subjects may have chosen more easily and confidently from decks with less negative punishments.

Others have reported similar preference of decks B and D to decks A and C when the IGT was taken by adolescents (Crone & Van der Molen, 2004), or by unhealthy adults (e.g., Wilder, Weinberger & Goldberg 1998; O'Carroll & Papps 2003; Ritter, Meador-Woodruff & Dalack 2004). However, none of these results are for healthy adults taking the normal version of the IGT. Crone et al. (2005) explain that this preference in children may be due to the fact that children " 'forget' the negative consequences more quickly when punishment is infrequent and switch back to disadvantageous choices" (p. 15). Similarly, it has been claimed that adults with certain disorders fail to develop the intuition necessary to discriminate between the decks. However, as the subjects in our experiment consisted of healthy adults, other explanations are required for their unusual preference and their poor performance on the task. We believe that these might be indications of a different decision making strategy among our subjects.

2.2 Experiment 2

Due to our subjects' unfamiliarity with gambling concepts, we considered that the reason for their poor performance may be that they could not fully adapt to the task procedure or could not develop the hunch necessary to get biased towards the advantageous decks. Therefore, we proceeded to use two simpler variants of the original IGT. The results of these simpler variants confirmed the results of the previous experiment and our hypothesis that our subjects favor punishment avoidance over utility maximization.

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Table 2: Results of the first experiment.

	Deck	Minimum	Maximum	Mean	SD
Count of Selection	A	4	60	19.71	7.45
	B	9	60	28.76	11.57
	C	3	38	20.45	8.78
	D	5	60	31.07	11.42
Main Score (C+D) – (A+B)		−74	58	3.06	26
Alternative Score (B+D) – (A+C)		−36	86	19.67	21.28
Net Win		−$57.55	$26.86	−$10.91	$21.28
Mean Selection Time (ms)	A	466.78	7916.4	3547.67	2046.85
	B	323.07	9086.16	2273.46	1429.65
	C	447.53	10176.46	2769.61	1980.44
	D	381.33	7917.93	2308.72	1835.07

2.2.1 Subjects

One month after running Experiment 1, the same subjects were used for the second experiment. Subjects were randomly divided into two groups (n = 45 and n = 48) for the two variant gambling tasks.

2.2.2 Method

We used two simple IGT variants: The first consisted of decks B and D from the original task, which had equal frequency of loss in each block of 10 selections, but significantly different in the net amount of loss (the first being advantageous). The second variant consisted of decks C and D from the original task, which resulted in equal net amount of loss in each ten-selection block, but had different frequencies of win and loss.

2.2.3 Results

The results from the second experiment are summarized in Table 3. The second phase showed no significant difference between numbers of selection from decks B and D in BD variant ($t(94) = 1.39$, $p = 0.166$), but a significant difference between numbers of selection from decks C and D in CD variant ($t(88) = 11.32$, $p < 0.001$). Also, the difference between mean selection times for decks B and D did not reach significance ($t(94) = 1.59$, $p = 0.115$), but the mean selection time from deck D, was significantly shorter than from deck C ($t(88) = 2.24$, $p = 0.027$).

2.2.4 Discussion

In order to make the RDM task less complex for our subjects, we used two simpler variants of the IGT. However, the results of this experiment confirmed the results of the first experiment: in the BD variant, the subjects did not get biased toward any of the decks with equal frequency of loss, but in the CD variant, they chose significantly more from deck D that had less frequent losses. In summary, the main strategy used by our subjects was again punishment avoidance rather than utility maximization.

3 General Discussion

As stated by Wood et al. (2005) one of the main assumptions of the IGT is that "with experience, cognitively healthy individuals learn to choose from the good decks and maximize gains" (p. 1). In other words, the initial trials of the IGT involve a degree of uncertainty, but with repeated trials subjects are expected to learn the mechanism for generating more rewarding outcomes. However, our experiments illustrate that the dominant RDM strategy among our subjects was not necessarily to maximize gains, but it was to avoid frequent punishments regardless of the net amount of the outcome. Moreover, although our subjects' performance improved throughout the task, their tendency toward decks with less frequent punishments increased even more steeply.

Similar results have been reported with children between ages 7 and 12 (Crone & Van der Molen, 2004) and with patients with bilateral lesions of the ventromedial

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Table 3: Results of the Second Experiment

		Deck	Minimum	Maximum	Mean	SD
BD variant	Number of selection	B	7	44	23.96	7.32
		D	6	43	26.04	
	Mean selection Time (ms)	B	525.04	3428.88	1463.2	604.43
		D	439.85	3788.3	1253.45	685.88
CD variant	Number of selection	C	4	29	17.96	5.79
		D	21	46	31.89	
	Mean selection Time (ms)	C	593.7	5184.61	1952.4	1140.78
		D	389.53	4596.92	1518.13	591.40

prefrontal cortex (Bechara et al., 1994). We propose two explanations for the poor performance of our healthy subjects and the similarity of their decision making strategy to the above populations.

First, ambiguity of gambling concepts, due to religious limitations for gambling in Islamic law, may play an important role in frequency-based valuation of our subjects. The fact that most Iranians do not have extensive knowledge about general gambling concepts may have affected their overall performance on the IGT. More generally, religiosity has been reported to be correlated with risk aversion (Bartke & Schwarze 2008, Miller 2000). Performing a cross-cultural analysis between Christian, Muslim, Buddhist and Hindu societies, Miller (2000) reports a significant positive correlation between religiosity and risk-averse preference within monotheistic societies. However, he reports that this relationship does not hold among Buddhists and Hindus. Bartke and Schwarze (2008) argue that "individuals with a religious affiliation are significantly less risk-tolerant than atheists" (p. 14), with risk-aversion being highest among Muslims.

The second explanation concerns possible historical-social influences: The late development of the bourgeoisie class, due in part to the newly found concept of landownership/work-ownership by workers in Iran, has had cultural influences on people's methods of decision making. Compared to Western countries, until recently the workers in Iran did not own the land or trade they worked on and therefore were not responsible for making long term decisions (Afary, 1996). This could potentially have impaired people in making decisions that mainly have long term advantages. This impairment, along with distrust in land/trade owners and later the government, may have hindered the development of the spirit of entrepreneurship. Also, years of war, multiple regime changes and instability in the social-political atmosphere have caused a great deal of uncertainty in the perceived future. All these factors have created biases toward preference for instant gratification over long term higher benefits. In other words, our subjects' performance may have been affected by their lack of tolerance for delayed gratification.

Dastmalchian, Javadian and Alam (2001) report on the results of a large-scale study of societal culture dimensions within Iran conducted as part of the GLOBE (House, Javadian & Dorfman, 2001) research program using data from 300 Iranian managers. Some of the studied dimensions include future orientation, power distance and performance orientation. Future orientation is defined by House, Javidian and Dorfman (2002) as "the degree to which individuals in organizations or societies engage in future-oriented behaviors such as planning, investing in the future, and delaying gratification". In this study, future orientation within Iranians received a surprisingly low value compared to studies done in other countries (41^{st} out of 61 countries) emphasizing the fact that future oriented behaviors and delaying gratification are not highly emphasized values in the Iranian culture. Moreover, Iranian managers reported quite high levels of power distance (14^{th} out of 61). Along the same line of explanation discussed above, Javadian and Dastmalchian (2003) provide the following explanation for this result: "The tendency toward a short-term orientation is probably related to the lack of rule orientation and strong power distance. The lack of emphasis on regulations and procedures reduces one's ability to plan for and have confidence in the future, and high power distance means that those in positions of power may change the rules to suit their own interests."

As discussed in the introduction, many proverbs in the Iranian culture encourage taking any instant gratification, even if it's a slap in the face, over long term benefits, even if they are as sweet as halva. An examination of Islamic and Iranian literature reveals repeated instances of such

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advises. In Islam, having long-term materialistic hopes is looked down upon and utilizing present occasions is recommended. For example there is an Islamic religious teaching that reads, "The most honorable wealth is the abandonment of long term materialistic hopes." Also, one of the most important concepts frequently used in Iranian literature is the concept of *breath* which is used to refer to "this very moment". Using this phrase, people are recommended to focus solely on this breath rather than feeling remorse for the past or being worried about the uncertain future. Given that these teaching and advises are taught to children from an early age, it is not implausible to think that they deeply imprint the memory of the people of the culture and affect their decision making.

These explanations are post-hoc, and further research is necessary to clarify whether the above justifications are sufficient for explaining our subjects' performance. Others have also reported significant differences between the main IGT score of their subjects and those performed in the U.S. (e.g., Cavedini et al., 2002). These differences along with the results of this paper indicate that cross-cultural differences in RDM are evident in the IGT, and more research is necessary to explain these differences.

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