Relationships between individual preferences and organizational designs: An experiment

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Dedication

My first thesis in English

is dedicated to

the memory of my soul mate Yi Lu (Kobia).

I'm here with you, now and forever.

Abstract

Most of managerial theories are based on the assumption of Homo Economicus which announces human nature is selfish. In contrast with this assumption, more and more behavior researches suggest that substantial fraction of human beings exhibit heterogeneity of individual preferences rather than "just selfish". The inaccurate assumption of individual preferences may lead to ineffective organizational design. The objective of this paper is seeking to understand how the individual preferences (selfishness, trusting, trustworthiness and interpersonal sensitivity) influence the performances under different organizational designs (by two dimensions: communications and incentives). Focusing on empirical data the paper finds that less selfishness plays a significant role in increasing others members' performances. Also, interpersonal sensitivity has a tiny negative relationship with performance increased when the organizational design changes from non-communication to communication, as well as controlling the incentive as individual-based pay. When the incentives are changed from individual-based pay to group-based pay, holding the communication environment fixed, the association between individual preferences and performances is complicated; the empirical findings do not support strong statements concerning the effects of incentives on performance.

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1   Introduction

After Adam Smith, the assumption of Homo Economicus prevailed in sciences related to human beings, and later was adopted by managerial researchers. But in the real world, human behaviors are not as selfish as predicted. Take a look at Japan, fifty engineers were still working at Fukushima Power Plant to prevent the possible nuclear meltdowns after nuclear explosion caused by earthquake and tsunami. They were the real heroes who sacrificed their own health and lives to save other people. This news touched us in March 2011. The similar scene happened in Chernobyl Nuclear Disaster 1986. Estimated more than 500,000 people participated in rescuing. Also, they sacrificed their own health, even lives. It seems that classic economics assumption doesn't work at those scenarios. People didn't show as much selfish as what economists predicted. In contrary, they considered other people, sometimes much more than themselves. They valued the organizational goal (such as prevention nuclear meltdowns) higher than themselves too.

When we look closer to the human nature in the organization, we can find a lot of literatures about how "just selfish"---the classic economic assumption---failed when it tried to predict human behavior in real world. Human nature which influences organization design is much more complex than "just selfish" (Hodge, Anthony and Gales, 2003). Also, the new institutional economists announced that the motivations of individual behavior in the organization are multiple rather than "just selfish". People

have limited rational, and they consider love, cooperation, expectation of by-product from other's behavior, even the psychological satisfaction before they take the actions (Williamson, 1985, 2000). Traditional organizational theory developed on the assumptions of Homo Economicus. However, Ghoshal (2005) pointed out that bad assumptions about individual preferences had influences on dysfunctional design.

Experimental economists explored human nature and individual preferences by dictator game and trust game (Elizabeth et al 1994, Forsythe et al 1994, Bolton et al 1998, Berg et al 1995, and Ben-Ner 2009), the results of which offer evidence against the Homo Economicus concept of economic behavior. Although many literatures discussed about dictator game, trust game and what were the factors affected the outcomes of these games, few of them further discussed the relationship between individual preferences and organizational designs.

Individual preference which is personal-oriented and organizational design which is organizational-oriented are two of the important concepts in human resources management. According to Google Ngram Viewer analysis, both of them are popular topics in the past ten years. How do individual preferences influence the performances under different organizational designs? In this paper, I use empirical data to compare the performances of individuals who have different preferences under different organizational designs.

The paper proceeds as follows. Section 2 discusses the concepts of individual

preferences and organizational design. Section 3 discusses the theoretical framework and predictions. In Section 4, I explain how I design the experiment. Section 5 discusses my findings and Section 6 concludes the paper.

2   Individual preferences and organizational designs

Individual Preferences

Ben-Ner and Putterman (1998) characterized individuals in terms of three classes of preferences: self-regarding, other-regarding and process-regarding. Self-regarding and other-regarding which on the x-axis have either-or relationship, they won't overlap with each other. On the y-axis is the process-regarding which represents another dimension of individual preferences. Please note that there is no negative part of y-axis in this chart because the opposite of trusting and trustworthiness is not destroy (negative value of y) but non-trusting and non-trustworthiness ($y = 0$) if the discussion is limited on normal people (people with abnormal psychology such as crazy murder are out of this frame).

Figure 1: Ben-Ner's two-dimension model of individual preferences
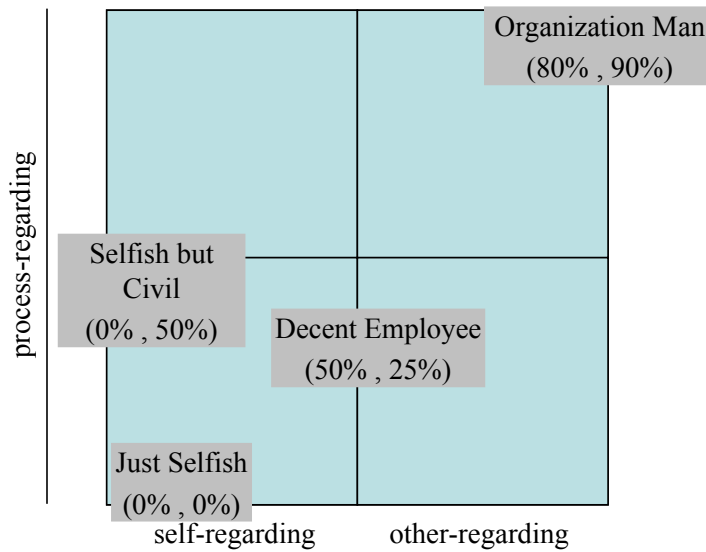
Self-regarding and other-regarding are estimated by Dictator Game. In the Dictator Game, sender decides how much money he'll send to the receiver while receiver is absolute passive. The average amount of money that sender keeps is 78%(x). The other part of money which sender sent to others represent he was considering others(y). x + y = 100%. (Ben-Ner *et al*, 2009, Engel, 2010)

Process-regarding, including trusting and trustworthiness, is estimated by Trust Game. In the Trust Game, trusting is characterized by the amount of money (k%) which sender send and then 3 times of the money will reach to receiver. Trustworthiness is characterized by the money (g%) which receiver return to the sender(Ben-Ner, 2010).

Although this two-dimension model refers to the main characters of individual preferences, it isn't MECE which represents mutually exclusive and collectively

exhaustive. Mutual exclusivity avoids the risk of double counting information and collective exhaustion avoids the risk of overlooking information. Take a look at two individuals who are both Decent Employees in the two-dimension model. They share the same levels of self-regarding and process-regarding by sitting at the same spot in the coordinate system. However, individual A has strict standards to select the people who he'd love to associate. For example, individual A dislikes short and bad-looking people, especially when they don't have religious beliefs. But individual B doesn't care these factors at all. Individual A and B may have different behaviors which would lead to different performances in the organization. These factors which are not included in self-regarding/other-regarding and process-regarding could be called as interpersonal sensitivity. Interpersonal sensitivity refers to the multi-criteria we set to decide whether to associate with other people.

To complement Ben-Ner's individual preferences two-dimension model, I expand it to three dimensions in this paper. Construct the three-dimensional map of individual preferences. Call the first dimension the extent of self-regarding. At the low extreme, subject keeps most of money for him/herself and sends few to others, which means subject is self-regarding. At the high extreme, subject sends most of the money to others while keep few for his/herself, which means subject is other-regarding.

The second dimension represents the extent of process-regarding, including trusting and trustworthiness among co-workers. At the low extreme, subject is not likely

to trust each other and has lower level process-regarding, which registered as sending and returning less money to each other in the trust game. At the high extreme, subjects are more likely to trust each other by sending and returning more money.

The third dimension represents the salience of interpersonal sensitivity. I look at the most important things that subjects looked for in people with whom he/she associate, asking to what extent subject cares about the features such as "what they eat", "their family", "their nationalities" and so on. At the low extreme, these features are not important to the subject in the decision of associating with others. At the high extreme, some of, or most of the features are very important when the subject chooses who he/she wants to associate with.

Figure 2: Three-dimension model of individual preferences

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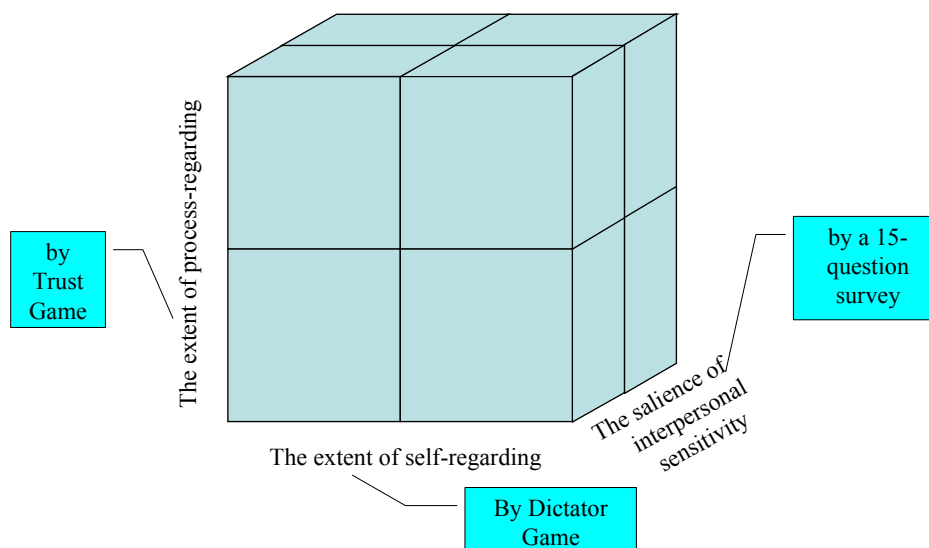
Organizational Design

Ben-Ner (2010) focused on three key organizational practices: decision-making allocation, incentive and monitoring. These three parts build the cubic model of organizational design (Burton, Obel and Hunter. 1998). Decision-making allocation, incentives and monitoring composed the main parts of organizational design in real business world. They support or complement of each other. (Beatty and Zajac, 1994)

Who makes the decision, supervisor or the employees, will influence the final output of task. The centralization of decision-making, like a double-blade sword, can decrease the agency problem, as well as the pro-active of employees. Moreover, the autonomous of decision-making can make employees involved in, as well as the agency problem out of control. Ben-Ner, Kong and Lluis (2010) pointed out that "decision-making plays a central role in organization design, with other elements of organization design playing a support or accommodating role".

Different types of incentive such as pay-for-performance, efficiency wages (Katz, 1986), tournaments (Lazear and Rosen, 1981) and pay based on group (London and Oldham, 1977) effect task output. To optimize the performance, mangers should pick the appropriate incentive methods.

Monitoring acts on both procedures and results, which usually done by supervisors or peers (Brewer, 1995, Larson and Callahan, 1990). In the cubic model of

organizational design, monitoring has strong association with decision-making (Ben-Ner, Kong and Lluis, 2010). Communication plays an important role in monitoring, and can be used as the simplified monitoring in observation of performances. (Chen, Wang and Ou, 2003)

In real business world, changing of decision-making allocation is a tough and costly project for the organizations. It is strategically related to the organizational architecture (centralization or decentralization), information flow, and employee empowerment. In comparison with decision-making, the other two dimensions --- incentives and monitoring --- are more technical to the organizations which could be developed relative easily. Also due to the limitation of cost and time in this experiment, I regret to skip the decision-making part and focus only on (1) incentives which are basically classified by individual-based pay and group-based pay, and (2) communication which is considered as the simplified form of monitoring.

3   Theoretical framework and predictions

3.1 Set-up

In all treatments, an independent set of actors play as a three-player game. A, B and C play as the group members with same power.

3.2 The task process

I consider three organizational designs which are individual-based pay without communication (OD1), individual-based pay with communication (OD2) and group-based pay with communication (OD3). To avoid the specialty, one math and one verbal tasks are implemented under each design.

OD1 (individual-based pay without communication)

The basic property of OD1 is that subject A finishes the tasks by his/herself and gets payments only based on his/her own performances due to lacking of interactions with others. Subject B and C face the same situation.

OD2 (individual-based pay with communication)

In OD2, Subject A, B and C can communicate and help others to finish the tasks if they would like to. Both communication with others and further contributions on others' performances are voluntary. Neither of these actions credits the individual payment. But help on solutions of the tasks from others may increase the individual payment.

OD3 (group-based pay with communication)

Distinguish from what it is in OD2, the payment in OD3 is based on group

performances, i.e. A, B and C receive equal payments which is one-third of the group payments no matter how much each of them contributes.

Labelling. Six tasks are referred as Mi, Vi, Mic, Vic, Mgc and Vgc where M and V denote Math and Verbal tasks, i denotes "individual-based pay", g denotes "group-based pay" and c denotes "communication".

3.3 Individual preferences measurement

Selfishness

Selfishness is measured by dictator game. The subjects are asked to divide E10 (Experimental Dollars, E1 = 0.1) between him/herself and another subject who is anonymous to and randomly paired with him/her. The more Experimental Dollars send by subject in the dictator game, the less selfish the subject is.

Trusting and Trustworthiness

Trusting and trustworthiness are measured by trust game. Each subject is anonymous to and randomly paired with another subject. The subject in role A has an opportunity to send any amount, or none, up to E10 to the subject in role B. The experimenter *tripled* this amount, so the amount that B receives is always *three times* the

amount that A sent. B has an opportunity to send back to A some, all, or none of the amount received. B always kept his or her original E\$10. The subjects are asked play as A and B separately. The more sent by the subject in role A, the more trusting the subject has. The more sent back by the subject in role B, the more trustworthiness the subject has.

Interpersonal sensitivity

Interpersonal sensitivity is measured by a 15-questions survey. The subjects are asked about their genders, ages, nationalities, religions, and what do they value in people with whom they associated.

3.4 Theoretical predictions

I begin by considering whether individual performs differently in complex tasks environment if the organizational design changed. Then I consider how preferences (both individual and other group members') influence the change of performance outcomes.

H0. Impact of organizational design

In complex tasks environment, communication increases the performance outcomes. Group-based pay can further increase the performances.

H1. Selfishness

Individual with less selfishness contributes more to others' performances in the design with communications.

H2. Trusting

Individual with more trusting can be benefited from communication design.

H3. Trustworthiness

Individual with more trustworthiness can increase his/her own performances in communication design.

H4. Interpersonal sensitivity

Interpersonal sensitivity reduces the intention of cooperation, and then reduces the performances.

4 Experimental Design

Subjects were the first-year MA-HRIR students in Carlson Business School, University of Minnesota. In the 4-part experiment, every 3 subjects were allocated in one group by vertical line in the classroom to decrease the effects of close friendship on

team cooperation. To eliminate the learning effects among each part of experiment, subjects were not notified about results of any parts during the experiment. 61 subjects were invited and data of 53 subjects (87%) is valid. The payment range is from $5 to $25 including $5 show-up fee. The average of payment is $16.05.

Part 1 measured the individual performances and group performances in 3 different organizational designs (OD) by the 3-round tasks of sample GRE questions. Each round task contained one quantitative (Problem Solving) and one verbal (Analogy) GRE sample questions which were both randomly selected from ETS official website. The first round task was conducted in OD1 (no communication with individual pay), which was considered as the cognitive ability task. The second round task was conducted in OD2 (communication with individual pay). The subjects were allowed to consult their group members about the answers and paid individually. The third round task was conducted in OD3 (communication with group pay). Communication with group members was allowed. Each subject was paid by one-third of the entire group performance no matter how much he/she contributed. To decrease the effects of cognitive abilities on performances, the increased performances from OD1 to OD2, and then to OD3 were used as the responses in the statistical analysis.

Part 2 measured the scales of selfishness by dictator game. The subjects were asked to divide E10 (Experimental Dollars, E1 = $0.1) between him/herself and another subject who was anonymous to and randomly paired with him/her. The more

Experimental Dollars send by subject in the dictator game, the less selfish the subject is.

Part 3 measured trusting and trustworthiness by trust game. Subjects assigned roles A and B were each credited with ten "experimental dollars" (E$), which converted to real dollars at the rate E$ 1= US$ 0.1 at the end of the experiment. Subject A was ask to choose a whole number of E$, E$ Xa $\in$ (0,1,…,10), to send to subject B with understanding that B would receive triple the amount send and could return any part of that (this restricted to the sixths of amount of received, 0, 1/6, 1/3, etc.), including nothing. Thus A would earn with certainty any part of the E$10 she/he kept and could additionally earn an amount between 0 and E$30, depending on her/his own and B's choices, while B would earn between E$10 and E$40. Sum up all the earnings of B's choices which responses to each possibility A sends to represent the trustworthiness.

In Part 4, the subjects were asked about their genders, ages, nationalities, religions, and what did they value in people with whom they associated to measure their interpersonal sensitivities.

5 Results

GRE questions are used to select the qualified candidates for graduate school, thus it could be classified as complex tasks. According the asymmetric information which created by the task complexity in the workforce places (Ben-Ner, 2007), interaction would be helpful in completing the complex tasks as GRE questions. The

task in OG1 can be considered as cognitive ability task because each subject finishes the task by his/herself and is paid by his/her own performances. The performance in Mi is close to the real GRE outcome. However, the performance of Vi is lower than the real GRE level. The possible explanation for this phenomenon is Analogy questions in Vi test the subject's ability to recognize the relationship between the words in a word pair and to recognize when two word pairs display parallel relationships. The basic skill to succeed in this part is recognizing the uncommon words which are difficult to subjects if lacking of practices. On the contrary, succeeding in Mi part usually requires only simple computations or manipulations which are common skills of the subjects.

Table 1: Comparison of results of task and GRE

	Range	Math mean	Percentage of the range	Verbal mean	Percentage of the range
GRE	200-800	590	65%	456	42.6%
Task in OG1	0-2	1.358	67.9%	0.604	30.2%

Model the relationship between individual preferences and task performances as the equation: (Regression analysis is in the Appendix 2)

Changed Performance = $\beta_0 + \beta_1 S + \beta_2 So + \beta_3 Tv + \beta_4 Tvo + \beta_5 Tw + \beta_6 Two + \beta_7 I + \beta_8 Io + \varepsilon$

S: Selfishness

So: Other two group members' selfishness

Tv: Trusting

Tvo: Other two group members' trusting

Tw: Trustworthiness

Two: Other two group members' trustworthiness

I: Interpersonal sensitivity

Io: Other two group members' interpersonal sensitivity

Table 2: Scales of variables

	0 1 2 3 4 5 6 7 8 9 10	
Most selfishness	← →	Least selfishness
Least trusting	← →	Most trusting
Least trustworthiness	← →	Most trustworthiness
Least sensitivity	← →	Most sensitivity

Table 3: Correlation of variables

|	D	Do	Tv	Tvo	Tw	Two	I	Io
D	1							
Do	0.163	1						
Tv	0.192	-0.028	1					
Tvo	-0.010	0.196	-0.411	1				
Tw	0.316	0.176	0.425	-0.169	1			
Two	0.185	0.430	-0.198	0.362	-0.041	1		
I	-0.069	0.340	-0.011	-0.139	0.146	-0.072	1	
Io	0.355	0.160	-0.089	-0.069	-0.074	0.074	0.161	1

To decrease the effects of cognitive abilities on performances, I analyzed the changed performances in lieu of the absolute performances under different organizational designs. Regression analysis was launched to try to understand how the typical value of the 'changed performance' changes when any one of the independent variables (preferences) is varied, while the other independent variables are held fixed.

H0. Impact of organizational design

As predicted, communication environment contributes to increase the performances. Group-based pay has better effects than individual-based pay in the communication environment. Specifically, switching the organizational design from non-communication to communication (from OD1 to OD2), the performance increases by 11% in math and 56% in verbal. Furthermore, based on communication environment, replacing group-based pay for individual-based pay (from OD2 to OD3) induces additional performances increased of 10% in math and 4% in verbal.

Figure 3: Average performances of 3 tasks
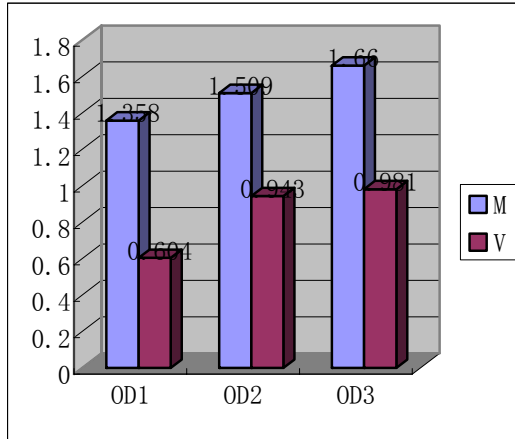
Table 4: Descriptive analysis of task performances

Varibales	Mi	Vi	Mic	Vic	Mgc	Vgc	Mic-Mi	Vic-Vi	Mgc-Mic	Vgc-Vic
minimum	0.000	0.000	0.000	0.000	0.000	0.000	-2.000	-2.000	-2.000	-2.000
maximum	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
mean	1.358	0.604	1.509	0.943	1.660	0.981	0.151	0.340	0.151	0.038
SD	0.942	0.927	0.869	1.008	0.758	1.009	1.026	1.224	1.167	1.493

H1. Selfishness

The average amount sent in dictator game is 3.698 with standard deviation of 2.679 which is higher than the outcomes of previous experiments that mean is 3.08 with standard deviation of 2.52 (Ben-Ner, Kramer & Levi, 2008). The possible explanation is the experiment was implemented in the face-to-face classroom instead of computer-based anonymous environment. The classmates are more familiar with each other and more generous to others than anonymous subjects.

In the change environment from OD1 to OD2, less selfishness plays a significant positive role in verbal tasks which shows up in regression analysis. It could be explained that subjects with less selfishness level (send more money in dictator game) are inclined to cooperate with and contribute to others in the communication environment more than the subjects who are more selfish. However, from OD2 to OD3, when the incentive focused on group instead of individual, less selfishness plays a negative role in verbal tasks which is opposite to the hypothesis. Subjects with less selfishness were supposed to have more incentives to contribute in group-based pay than in individual-based pay environment. This phenomena needs to be further studied.

Table 5: Regression analysis of selfishness

			from OD1 to OD2		from OD2 to OD3	
			Mic-Mi	Vic-Vi	Mgc-Mic	Vgc-Vic
Regression analysis	individual selfishness	coefficient	0.037	-0.012	-0.003	-0.035
		p-value	0.256	0.743	0.940	0.454
	the other two group members' selfishness	coefficient	0.002	**0.072**	0.019	**-0.053**
		p-value	0.914	**0.006**	0.447	**0.110**

H2. Trusting

The average amount sent by role A in trust game is 6.170 with standard deviation of 3.501 which is a little bit higher than the outcomes of previous experiments

that mean is 5.47 with standard deviation of 3.16 (Ben-Ner and Putterman, 2009). The possible explanation is the experiment was implemented in the face-to-face classroom instead of computer-based anonymous environment. The classmates are more familiar with each other and more generous to others than anonymous subjects.

In this experiment, trusting doesn't show much influences on the performance changes from OD1 to OD2. However, with the payment method changed from individual-based pay to group-based pay, trusting shows negative relationship with performance in math and no significant relationships in verbal. Individual with more trusting neither get benefit from communication design, nor group-pay design. The negative relationship could possibly be explained that group members who consider their own earnings may force the subject to choose a specific answer, while the subject who has more trusting would like to trust others and obey the group decision.

Table 6: Regression analysis of trusting

			from OD1 to OD2		from OD2 to OD3	
			Mic-Mi	Vic-Vi	Mgc-Mic	Vgc-Vic
Regression analysis	individual trusting	coefficient	0.024	-0.009	**-0.055**	-0.010
		p-value	0.338	0.742	**0.051**	0.782
	the other two group members' trusting	coefficient	0.014	-0.008	-0.013	-0.007
		p-value	0.475	0.729	0.558	0.819

H3. Trustworthiness

By running regression analysis, the result shows that trustworthiness doesn't have significant influences on performance in this experiment.

Differed from the previous experiment, I calculate the trustworthiness by adding up all the possibilities B returns that response to the amount A sends instead of observing the real return by B which match the specific amount A sends. This may lead to deviation from the real value.

**Table 7: Regression analysis of trustworthiness**

			from OD1 to OD2		from OD2 to OD3	
			Mic-Mi	Vic-Vi	Mgc-Mic	Vgc-Vic
Regression analysis	individual trustworthiness	coefficient	0.013	0.040	-0.041	0.096
		p-value	0.745	0.377	0.358	0.100
	the other two group members' trustworthiness	coefficient	-0.007	-0.006	-0.003	-0.001
		p-value	0.811	0.850	0.931	0.973

H4. Interpersonal sensitivity

Interpersonal sensitivity consists of 15 questions about what are the most important things the subject looks for in people with whom he/she associate. The scale 1-6 represents less to most important. I calculate how subjects care about these factors by adding up each of their choices.

The specific analysis show that the most important factor to the subjects is "who are their friends" (mean is 4.000 with standard deviation of 1.286). Family is the second top cares (mean is 2.868 with standard deviation of 1.557). In the opposite side, their height, the place they were born and their nationality are the top 3 least cares. It indicates that people are inclined to care more interactive factors than immanent factors.

Figure 4: Average values of interpersonal sensitivity
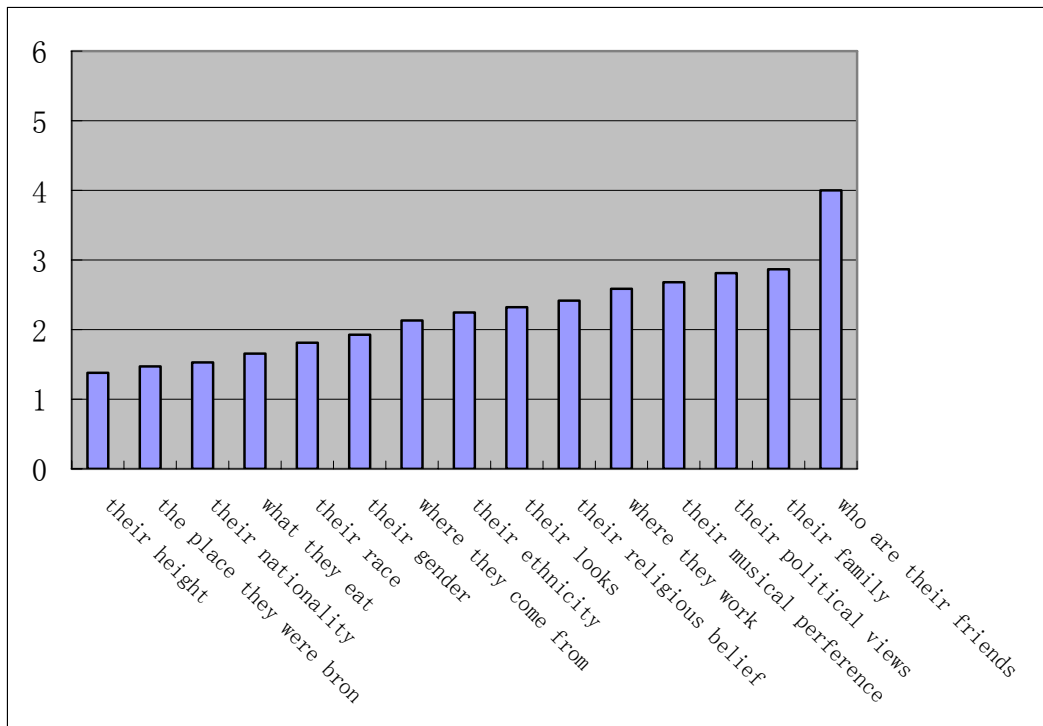
As predicted, Interpersonal sensitivity of subjects have negative relationships with his/her own performances from OD1 to OD2 in this experiment. But the relationship is not as strong as expected. However, it doesn't show significant effects from OD2 to OD3. The possible explanation is in OD3, subjects may consider free-rider

influences. Some of them provide consistent cooperation, but others limit the contribution to others to avoid being taken advantages by others. The more they care about these factors, the more limitations they face when they associate with other people. This may reduce the intention to cooperate with and benefit from others.

Table 8: Regression analysis of interpersonal sensitivity

			from OD1 to OD2		from OD2 to OD3	
			Mic-Mi	Vic-Vi	Mgc-Mic	Vgc-Vic
Regression analysis	individual interpersonal sensitivity	coefficient	-0.007	**-0.020**	0.006	0.010
		p-value	0.314	**0.014**	0.431	0.300
	the other two group members' interpersonal sensitivities	coefficient	0.004	0.001	-0.006	0.003
		p-value	0.409	0.852	0.220	0.692

6   Conclusions

From individual preferences perspective, the most interesting finding of this paper is the less selfish the subject is, the more increased performance will occur in the process of opening communication. It is opposed to the traditional management prediction which based on assumption of Homo Economicus: human beings are selfish. Ben-Ner (2010) pointed out that if the organizational design based on, and only on, the assumption of "just selfish" employees, it would result inefficiency.

In real business, managers usually try to regulate the employees' conducts by rules and policies for coordination and functioning within the organization. But if managers insist on the just selfish assumption and rule out the heterogeneity in the realm of individual preferences, they will fail in designing the organization and further improving the performances. To apply this finding in reality, managers are suggested to adopt managerial skills and tools with discretion. In small groups, classifying the employees by the extent of their self-regarding and treating them by different organizational design may lead to better performances.

Both trusting and trustworthiness do not show significant influence on the performance when the organizational design changed to communication environment. However, trusting shows a weird negative relationship with performance in the change of incentive to group-based pay. The impact of trusting and trustworthiness was suggested to be further studied.

Interpersonal sensitivity originates from personalities, habits, and other personal factors. The more they care, the higher limitation of view they held, the lower cooperation possibility they can provide. "Who are their friends" has the highest mean (4.0 in the range from 1 to 6) in all the 15 interpersonal sensitivity questions. In this case, subject 1 may not cooperate with 2 because of 2's friend 3 is the guy who he doesn't like, even 2 is fine to 1. From this point of view, besides appropriate design, organizations could advocate an open mind as well as create an open environment for the workplace.

From organizational design perspective, providing efficient and effective communication listed in many organization's strategic goals which indicate how much organizations value communication. The results of this experiment show that both selfishness and interpersonal sensitivity are sensitive to the communication environment changed. It indicates that in the communication environment, compared with the organizations which have more selfish employees, the ones with more altruistic and open-hearted employees have competitive advantages in increasing performances.

Group-based pay is usually considered as the stimulation of increasing cooperation which will further benefit the performance. However, in this experiment, both selfishness and trusting have significant effects on performance when replace individual-based pay by group-based pay. And the effects are negative which opposed to the common imagination: the less selfish the workers are and the more co-workers trust each other, the greater performances will occur. It indicates that adopting group-based pay blindly may lead to performances decreased, especially, when higher level trustiness exists in the organization. As discussed in the results part, due to the limitation of this paper and the uncommon analysis results, the effects of trusting and trustworthiness on performance and how will it influences the organizational design should be further studied.

The limitations of this paper are:

(1) The sample selection is not representative enough. Classmates are more

familiar and more likely to interact and cooperate with each other than randomly selected subjects. The obvious effect of this limitation shows up the higher value send by subjects in both dictator game and trust game.

(2) Only two questions contained in each task limits the diversity of performances. More questions in each task may increase the diversity and rich the analysis.

(3) Simple trust game without agreement and binding/non-binding contract and summarized each possible amount of return as measurement of trustworthiness may deviate from the real value.

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Appendix 1: Instruction for experiment

A: Consent Form

Experiment in team performance

You are invited to participate in a study on team performance. We ask that you read this form before agreeing to be in the study. This study is being conducted by Professor Avner Ben-Ner and MA-HRIR student Shuang Liu at the Carlson School of Management at the University of Minnesota.

Background Information:

The purpose of this study is to investigate how different teams perform.

Procedures:

If you consent to participating in this study, you will fill out three task sheets two game sheets and one questionnaire. The session should take up to 30 minutes to complete.

Risks and Benefits of being in the Study:

The physical and/or psychological risks associated with participation in this study are minimal. However, you may withdraw from the study at any time you choose. There are no personal benefits to be derived from this study.

Compensation:

Your payment will be in the range of $5 to $25 based on your performance, including $5 show up fee. Your total reward for participating in this experiment will be equal to $5

plus the gain made in the experiment. You will receive your payment on next Monday (Apr 25th, 15:20-16:00, CSOM 1-124). Note that if you withdraw from the study early you will not receive any compensation.

Confidentiality:

This study is completely anonymous; the researchers will never be able or seek to connect your name or any other identifying information with your answers to the surveys you complete. The surveys carry a random number, and you will never be asked to provide your name. Furthermore, the records of this study will be kept private. In any sort of report we might publish, we will not include any information that will make it possible to identify a subject. Research records will be kept in a locked file; only researchers will have access to the records.

Voluntary Nature of the Study:

Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relations with the University of Minnesota, Carlson School of Management, or any other institution. If you decide to participate, you are free to not answer any question or withdraw at any time without affecting those relationships. Note that if you withdraw from the study early, the participation fee will be withheld.

Contacts and Questions:

If you have questions, you are encouraged to email: benne001@umn.edu, or liux0837@umn.edu. If you have any questions or concerns regarding this study and

would like to talk to someone other than the researchers, you are encouraged to contact the Research Subjects' Advocate Line, D528 Mayo, 420 Delaware St. Southeast, Minneapolis, Minnesota 55455; (612)625-1650.

Statement of Consent:

☐ **By checking this box I indicate that I have read the above information, and consent to participate in the study.**

GENERAL INSTRUCTIONS

1. Anything you write on the sheets and questionnaire is completely anonymous, and absolutely nothing can be associated with your name, which you are never asked to reveal.

2. Please follow the oral and written instructions carefully. The large envelope contains one flash card with a number and seven small envelopes marked A, B, C, D, E, F and G. When instructed, please take out envelope A, then take out the sheet inside it, complete it and put it back into envelope A. Then proceed to envelope B and so on.

3. When you are done, place all the materials **EXCEPT for the flash card** in the big envelope and proceed to the front of classroom.

4. **Please bring the flash card with you to the next class to get your payment**. You will not be paid without the number card.

Thanks again for your participation!

B: INSTRUCTIONS for task 1

General Information: Welcome! You are about to participate in a decision making experiment. Each of you received the same instruction sheet.

Group: At the beginning of the experiment you will be randomly assigned to a group. During the whole experiment you will interact only within your group. Each group has 3 participants.

Role: Each participant is identified by a letter (A, B or C). Each participant has to answer two questions on **the other side** of this sheet. **Each participant has different questions**.

You are **NOT allowed to communicat**e with anyone in your group or outside your group.

Compensation: **Each correct answer** is worth $**2**. You will be paid for **the correct answers you gave**.

If you have questions, please ask the experimenter, not another participant.

C: INSTRUCTIONS for task 2

General Information: Welcome! You are about to participate in a decision making experiment. Each of you received the same instruction sheet.

Group: At the beginning of the experiment you will be randomly assigned to a group. During the whole experiment you will interact only within your group. Each group has 3

participants.

Role: Each participant is identified by a letter (A, B or C). Each participant has to answer two questions on **the other side** of this sheet. **Each participant has different questions**.

You are **allowed to speak to and consult with your own group members about how to answer the questions**.

Compensation: **Each correct answer** is worth $**2**. You will be paid for **the correct answers you gave**.

If you have questions, please ask the experimenter, not another participant.

D: INSTRUCTIONS for task 3

General Information: Welcome! You are about to participate in a decision making experiment. Each of you received the same instruction sheet.

Group: At the beginning of the experiment you will be randomly assigned to a group. During the whole experiment you will interact only within your group. Each group has 3 participants.

Role: Each participant is identified by a letter (A, B or C). Each participant has to complete two questions on **the other side** of this paper. **Each participant has different questions**.

You are **allowed to speak to and consult with your own group members about how**

to answer the questions.

Compensation: **Each correct answer** is worth $2. You will be paid **1/3** of the value of

the correct answers given by **your entire group**.

If you have questions, please ask the experimenter, not another participant.

E: Experiment 1

Instructions:

This experiment is conducted with Experimental Dollars (*E*$). Each experimental dollar

is worth 10 cents of real dollars.

In this experiment, you are asked to **divide *E*$10 between yourself and another**

participant in today's experiment, with whom you've been paired **randomly**. This is all

you know about that individual. You will remain **anonymous** to one another during and

after the experiment. You may give money only in **increments of *E*$1**.

Please indicate what you want to do **with your *E*$ 10.**

Amount of money you give to this person	Amount of money you keep for yourself	Total
		E$10

F: Experiment 2

Instructions:

This experiment is conducted with Experiment Dollars (*E*$). Each experiment dollar is worth 10 cents of real US dollars.

You are asked to participate into **two parts** in this experiment. In the first part, you are asked to play in role **A**, and in the second part, you are asked to play in role **B**. In each part, you've been paired **randomly** with another participant in today's experiment. Please note that in each part you've been paired with a **different** participant.

The participant in role **A** has an opportunity to send any amount, or none, up to *E*$10 to the participant in role **B.** The experimenter *triples* this amount, so the amount that **B** receives is always *three times* the amount that **A** sends. **B** has an opportunity to send back to **A** some, all, or none of the amount received. **B** always keeps his or her original *E*$10.

Please note that in each part of this experiment, **A** and **B** make decisions **at the same time.**

Your total payment is the earnings from the first part when you are in role A and the second part when you are in role B.

Example: Suppose **A** decides to send **B** *E*$3. On the table, find *E*$3 under "**A** Sends/**B** Receives**.**" See that the experimenter triples the amount, so that **B** receives *E*$9 (*E*$3→*E*$9). Now suppose that **B** decides to send 33%, or 1/3, of that amount back to **A**.

On the table, find 33% (1/3) in the column headings. To determine both **A** and **B**'s final earnings, find the intersection of the selected row [E$3→E$9] and column [33% (1/3)]. The cell at the intersection of your row and column displays three values. The top value, E$3, is the amount **B** sent back to **A** (33% or 1/3 of E$9). The bottom two values [displayed in brackets] are **A** and **B**'s total earnings. See that **A** earned E$10 and **B** earned E$16.

A sends B receives	B sends to A						
	0%	17% (1/6)	33% (1/3)	50% (1/2)	67% (2/3)	83% (5/6)	100%
E$0→E$0	E$0 [10,10]	E$0 [10,10]	E$0 [10,10]	E$0 [10,10]	E$0 [10,10]	E$0 [10,10]	E$0 [10,10]
E$1→E$3	E$0 [9,13]	E$0.5 [9.5,12.5]	E$1 [10,12]	E$1.5 [10.5,11.5]	E$2 [11,11]	E$2.5 [11.5,10.5]	E$3 [12,10]
E$2→E$6	E$0 [8,16]	E$1 [9,15]	E$2 [10,14]	E$3 [11,13]	E$4 [12,12]	E$5 [13,11]	E$6 [14,10]
E$3→E$9	E$0 [7,19]	E$1.5 [8.5,17.5]	E$3 [10,16]	E$4.5 [11.5,14.5]	E$6 [13,13]	E$7.5 [14.5,11.5]	E$9 [16,10]
E$4→E$12	E$0 [6,22]	E$2 [8,20]	E$4 [10,18]	E$6 [12,16]	E$8 [14,14]	E$10 [16,12]	E$12 [18,10]
E$5→E$15	E$0 [5,25]	E$2.5 [7.5,22.5]	E$5 [10,20]	E$7.5 [12.5,17.5]	E$10 [15,15]	E$12.5 [17.5,12.5]	E$15 [20,10]
E$6→E$18	E$0 [4,28]	E$3 [7,25]	E$6 [10,22]	E$9 [13,19]	E$12 [16,16]	E$15 [19,13]	E$18 [22,10]
E$7→E$21	E$0 [3,31]	E$3.5 [6.5,27.5]	E$7 [10,24]	E$10.5 [13.5,20.5]	E$14 [17,17]	E$17.5 [20.5,13.5]	E$21 [24,10]
E$8→E$24	E$0 [2,34]	E$4 [6,30]	E$8 [10,26]	E$12 [14,22]	E$16 [18,18]	E$20 [22,14]	E$24 [26,10]
E$9→E$27	E$0 [1,37]	E$4.5 [5.5,32.5]	E$9 [10,28]	E$13.5 [14.5,23.5]	E$18 [19,19]	E$22.5 [23.5,14.5]	E$27 [28,10]
E$10→E$30	E$0 [0,40]	E$5 [5,35]	E$10 [10,30]	E$15 [15,25]	E$20 [20,20]	E$25 [25,15]	E$30 [30,10]

Circled by A

Circled by B

First Part : You are in role **A**

Example: You are randomly paired with a participant whose flash card number is **12-C**.

If you decide to send him/her E$6, and then s/he receives E$18.

Now make your choice of an amount to send to **B**, and **CIRCLE** a row heading.

Circle **ONLY ONE** of

the choices in this area

A sends B receives	B sends to A						
	0%	17% (1/6)	33% (1/3)	50% (1/2)	67% (2/3)	83% (5/6)	100%
ES0→ES0	ES0 [10,10]	ES0 [10,10]	ES0 [10,10]	ES0 [10,10]	ES0 [10,10]	ES0 [10,10]	ES0 [10,10]
ES1→ES3	ES0 [9,13]	ES0.5 [9.5,12.5]	ES1 [10,12]	ES1.5 [10.5,11.5]	ES2 [11,11]	ES2.5 [11.5,10.5]	ES3 [12,10]
ES2→ES6	ES0 [8,16]	ES1 [9,15]	ES2 [10,14]	ES3 [11,13]	ES4 [12,12]	ES5 [13,11]	ES6 [14,10]
ES3→ES9	ES0 [7,19]	ES1.5 [8.5,17.5]	ES3 [10,16]	ES4.5 [11.5,14.5]	ES6 [13,13]	ES7.5 [14.5,11.5]	ES9 [16,10]
ES4→ES12	ES0 [6,22]	ES2 [8,20]	ES4 [10,18]	ES6 [12,16]	ES8 [14,14]	ES10 [16,12]	ES12 [18,10]
ES5→ES15	ES0 [5,25]	ES2.5 [7.5,22.5]	ES5 [10,20]	ES7.5 [12.5,17.5]	ES10 [15,15]	ES12.5 [17.5,12.5]	ES15 [20,10]
ES6→ES18	ES0 [4,28]	ES3 [7,25]	ES6 [10,22]	ES9 [13,19]	ES12 [16,16]	ES15 [19,13]	ES18 [22,10]
ES7→ES21	ES0 [3,31]	ES3.5 [6.5,27.5]	ES7 [10,24]	ES10.5 [13.5,20.5]	ES14 [17,17]	ES17.5 [20.5,13.5]	ES21 [24,10]
ES8→ES24	ES0 [2,34]	ES4 [6,30]	ES8 [10,26]	ES12 [14,22]	ES16 [18,18]	ES20 [22,14]	ES24 [26,10]
ES9→ES27	ES0 [1,37]	ES4.5 [5.5,32.5]	ES9 [10,28]	ES13.5 [14.5,23.5]	ES18 [19,19]	ES22.5 [23.5,14.5]	ES27 [28,10]
ES10→ES30	ES0 [0,40]	ES5 [5,35]	ES10 [10,30]	ES15 [15,25]	ES20 [20,20]	ES25 [25,15]	ES30 [30,10]

Second Part: You are in role **B**

Example: You are randomly paired with a participant whose flash card number is **3-C.**

You've make decisions about how much you would like to send back to **A under EACH**

possibility. This is just an illustration and you should make your own choices below.

A sends / B receives	B sends to A						
	0%	17% (1/6)	33% (1/3)	50% (1/2)	67% (2/3)	83% (5/6)	100%
E$0→E$0	E$0 [10,10]	E$0 [10,10]	E$0 [10,10]	E$0 [10,10]	E$0 [10,10]	E$0 [10,10]	E$0 [10,10]
E$1→E$3	E$0 [9,13]	E$0.5 [9.5,12.5]	E$1 [10,12]	E$1.5 [10.5,11.5]	E$2 [11,11]	E$2.5 [11.5,10.5]	E$3 [12,10]
E$2→E$6	E$0 [8,16]	E$1 [9,15]	E$2 [10,14]	E$3 [11,13]	E$4 [12,12]	E$5 [13,11]	E$6 [14,10]
E$3→E$9	E$0 [7,19]	E$1.5 [8.5,17.5]	E$3 [10,16]	E$4.5 [11.5,14.5]	E$6 [13,13]	E$7.5 [14.5,11.5]	E$9 [16,10]
E$4→E$12	E$0 [6,22]	E$2 [8,20]	E$4 [10,18]	E$6 [12,16]	E$8 [14,14]	E$10 [16,12]	E$12 [18,10]
E$5→E$15	E$0 [5,25]	E$2.5 [7.5,22.5]	E$5 [10,20]	E$7.5 [12.5,17.5]	E$10 [15,15]	E$12.5 [17.5,12.5]	E$15 [20,10]
E$6→E$18	E$0 [4,28]	E$3 [7,25]	E$6 [10,22]	E$9 [13,19]	E$12 [16,16]	E$15 [19,13]	E$18 [22,10]
E$7→E$21	E$0 [3,31]	E$3.5 [6.5,27.5]	E$7 [10,24]	E$10.5 [13.5,20.5]	E$14 [17,17]	E$17.5 [20.5,13.5]	E$21 [24,10]
E$8→E$24	E$0 [2,34]	E$4 [6,30]	E$8 [10,26]	E$12 [14,22]	E$16 [18,18]	E$20 [22,14]	E$24 [26,10]
E$9→E$27	E$0 [1,37]	E$4.5 [5.5,32.5]	E$9 [10,28]	E$13.5 [14.5,23.5]	E$18 [19,19]	E$22.5 [23.5,14.5]	E$27 [28,10]
E$10→E$30	E$0 [0,40]	E$5 [5,35]	E$10 [10,30]	E$15 [15,25]	E$20 [20,20]	E$25 [25,15]	E$30 [30,10]

Now, make your choices of what's the portion you'd like to send back to **A** under each possibility.

Circle **EACH** choice to respond to the amount A sends to you in this area (**11 choices in total**)

A sends / B receives	B sends to A						
	0%	17% (1/6)	33% (1/3)	50% (1/2)	67% (2/3)	83% (5/6)	100%
E$0→E$0	E$0 [10,10]	E$0 [10,10]	E$0 [10,10]	E$0 [10,10]	E$0 [10,10]	E$0 [10,10]	E$0 [10,10]
E$1→E$3	E$0 [9,13]	E$0.5 [9.5,12.5]	E$1 [10,12]	E$1.5 [10.5,11.5]	E$2 [11,11]	E$2.5 [11.5,10.5]	E$3 [12,10]
E$2→E$6	E$0 [8,16]	E$1 [9,15]	E$2 [10,14]	E$3 [11,13]	E$4 [12,12]	E$5 [13,11]	E$6 [14,10]
E$3→E$9	E$0 [7,19]	E$1.5 [8.5,17.5]	E$3 [10,16]	E$4.5 [11.5,14.5]	E$6 [13,13]	E$7.5 [14.5,11.5]	E$9 [16,10]
E$4→E$12	E$0 [6,22]	E$2 [8,20]	E$4 [10,18]	E$6 [12,16]	E$8 [14,14]	E$10 [16,12]	E$12 [18,10]
E$5→E$15	E$0 [5,25]	E$2.5 [7.5,22.5]	E$5 [10,20]	E$7.5 [12.5,17.5]	E$10 [15,15]	E$12.5 [17.5,12.5]	E$15 [20,10]
E$6→E$18	E$0 [4,28]	E$3 [7,25]	E$6 [10,22]	E$9 [13,19]	E$12 [16,16]	E$15 [19,13]	E$18 [22,10]
E$7→E$21	E$0 [3,31]	E$3.5 [6.5,27.5]	E$7 [10,24]	E$10.5 [13.5,20.5]	E$14 [17,17]	E$17.5 [20.5,13.5]	E$21 [24,10]
E$8→E$24	E$0 [2,34]	E$4 [6,30]	E$8 [10,26]	E$12 [14,22]	E$16 [18,18]	E$20 [22,14]	E$24 [26,10]
E$9→E$27	E$0 [1,37]	E$4.5 [5.5,32.5]	E$9 [10,28]	E$13.5 [14.5,23.5]	E$18 [19,19]	E$22.5 [23.5,14.5]	E$27 [28,10]
E$10→E$30	E$0 [0,40]	E$5 [5,35]	E$10 [10,30]	E$15 [15,25]	E$20 [20,20]	E$25 [25,15]	E$30 [30,10]

G: Questionnaire

1. What is your gender?

☐ Male

☐ Female

2. What is your age?

[   ]

3. Where were your born?

Country [   ]   **State or Province** [   ]

4. What was the religious preference in your family when you were growing up, or what religion, if any, were you raised in? You may check more than one item if applicable.

☐ None   ☐ Baptist   ☐ Buddhist   ☐ Catholic

☐ Eastern Orthodox ☐ Hindu   ☐ Jewish   ☐ Lutheran

☐ Methodist   ☐ Mormon   ☐ Muslim   ☐ Other Protestant

☐ Other   ☐ Don't know

5. What are the most important things you look for in people with whom you associate? Please use a scale of 1 to 6 to mark your responses:

1 = "Not important" and 6 ="Very important"

	1 Not important	2	3	4	5	6 Very important
What they eat	☐	☐	☐	☐	☐	☐
Their religious belief	☐	☐	☐	☐	☐	☐
Their family	☐	☐	☐	☐	☐	☐
Their ethnicity	☐	☐	☐	☐	☐	☐
Their race	☐	☐	☐	☐	☐	☐
Who are their friends	☐	☐	☐	☐	☐	☐
Where they work	☐	☐	☐	☐	☐	☐
Where they come from	☐	☐	☐	☐	☐	☐
Their height	☐	☐	☐	☐	☐	☐
Their looks	☐	☐	☐	☐	☐	☐
Their political views	☐	☐	☐	☐	☐	☐
Their gender	☐	☐	☐	☐	☐	☐
The place they were born	☐	☐	☐	☐	☐	☐
Their nationality	☐	☐	☐	☐	☐	☐
Their musical preferences	☐	☐	☐	☐	☐	☐

Appendix 2: Regression Analysis

From OD1 to OD2

`Mic-Mi` = − 0.419 + 0.0372 D + 0.0024 Do + 0.0243 Tv + 0.0143 Tvo + 0.0129 Tw − 0.0072 Two − 0.00699 I + 0.00375 Io

Predictor	Coef	SE Coef	T	P
Constant	−0.4189	0.5648	−0.74	0.462
D	0.03723	0.03234	1.15	0.256
Do	0.00243	0.02245	0.11	0.914
Tv	0.02430	0.02509	0.97	0.338
Tvo	0.01427	0.01982	0.72	0.475
Tw	0.01294	0.03961	0.33	0.745
Two	−0.00715	0.02971	−0.24	0.811
I	−0.006986	0.006865	−1.02	0.314
Io	0.003751	0.004501	0.83	0.409

`Vic-Vi` = 0.352 − 0.0120 D + 0.0722 Do − 0.0094 Tv − 0.0078 Tvo + 0.0398 Tw − 0.0063 Two − 0.0197 I + 0.00095 Io

Predictor	Coef	SE Coef	T	P
Constant	0.3525	0.6353	0.55	0.582
D	−0.01200	0.03638	−0.33	0.743
Do	0.07218	0.02525	2.86	0.006
Tv	−0.00936	0.02822	−0.33	0.742
Tvo	−0.00777	0.02229	−0.35	0.729
Tw	0.03978	0.04455	0.89	0.377
Two	−0.00634	0.03341	−0.19	0.850
I	−0.019713	0.007722	−2.55	0.014
Io	0.000953	0.005063	0.19	0.852

From OD2 to OD3

Mgc-Mic = 0.883 − 0.0027 D + 0.0190 Do − 0.0554 Tv − 0.0129 Tvo − 0.0406 Tw − 0.0029 Two + 0.00603 I − 0.00617 Io

Predictor	Coef	SE Coef	T	P
Constant	0.8829	0.6233	1.42	0.164
D	−0.00272	0.03569	−0.08	0.940
Do	0.01901	0.02477	0.77	0.447
Tv	−0.05545	0.02769	−2.00	0.051
Tvo	−0.01291	0.02186	−0.59	0.558
Tw	−0.04058	0.04371	−0.93	0.358
Two	−0.00287	0.03278	−0.09	0.931
I	0.006026	0.007575	0.80	0.431
Io	−0.006173	0.004966	−1.24	0.220

Vgc-Vic = − 0.298 − 0.0355 D − 0.0532 Do − 0.0101 Tv − 0.0066 Tvo + 0.0964 Tw− 0.0015 Two + 0.0104 I + 0.00260 Io

Predictor	Coef	SE Coef	T	P
Constant	−0.2983	0.8193	−0.36	0.718
D	−0.03547	0.04691	−0.76	0.454
Do	−0.05318	0.03256	−1.63	0.110
Tv	−0.01012	0.03639	−0.28	0.782
Tvo	−0.00662	0.02874	−0.23	0.819
Tw	0.09644	0.05745	1.68	0.100
Two	−0.00149	0.04309	−0.03	0.973
I	0.010445	0.009958	1.05	0.300
Io	0.002602	0.006529	0.40	0.692