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Abstract

This paper investigates the role of intra- and inter-group effects on the ultimatum game. The paper presents the identity theory as a framework for analyzing intra- and intergroup bargaining behavior on the ultimatum game. An experimental ultimatum game was conducted between participants from Washington and Lee University and Virginia Military Institute. The results presented shows evidence of ultimatum bargaining behavior being influenced by in-group favoritism, along with some evidence of out-group hostility. The results also provide possible implications of the effect of testosterone levels.

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The Role of Identity in Intra- and Inter-Group Bargaining in the Ultimatum Game

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Abstract: This paper investigates the role of intra- and inter-group effects on the ultimatum game. The paper presents the identity theory as a framework for analyzing intra- and inter-group bargaining behavior on the ultimatum game. An experimental ultimatum game was conducted between participants from Washington and Lee University and Virginia Military Institute. The results presented shows evidence of ultimatum bargaining behavior being influenced by in-group favoritism, along with some evidence of out-group hostility. The results also provide possible implications of the effect of testosterone levels.

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I. Introduction

Past developments for over twenty years from various researchers within the field of experimental economics have gathered data that deviates from the traditional view that human beings act in an exclusively self-interested behavior. Experimental games such as the trust game, the ultimatum game, and the dictator game provides a robust set of data that consistently indicates that human beings act in a reciprocal behavior. Among these experimental games, the ultimatum game is perhaps the most vivid game that demonstrates negative reciprocal behavior and has been of interest to many experimental economists since its first study conducted by Guth et al. (1982). Since then, there have been few established features of human behavior within the context of the ultimatum game. Recently, data collected from these experimental games have piqued researchers in the possibility of “cultural effects” on bargaining behavior.

Despite the recent data collected, claims that a cultural impact on the ultimatum game bargaining is, perhaps, myopic or even misleading as a precise definition of culture still remains somewhat elusive. Manski (2000, 117) states, “Empirical economists may borrow jargon from sociology and social psychology, and write that they are studying ‘peer influences,’ ‘neighborhood effects,’ ‘social capital,’ or some other concept. Yet empirical analyses commonly fail to define these concepts with any precision. ... Coherent study of social interactions require a clear conceptualization of interaction processes”. In response to such claims of “cultural effects” on the ultimatum game, this paper proposes that the identity of the participants, as opposed to the participant’s culture, is the basis for some of the deviated results produced by various experimental studies of the ultimatum game.

This paper has three intended contributions to the field of experimental economics. First, is to provide an application of the utility of the identity function proposed by Akerlof and Kranton (2000) within the ultimatum game in regards to the concepts of “cultural effects”.

Although it may not be comprehensive, the intention is to present an applicable framework that provides a methodical process to further delineate the nuances of “culture effects”. Secondly, to contribute additional ultimatum game results to the already vast collection of results. And finally, to propose possible experiments that will further test the robustness of the proposed framework which will allow further understanding of the impact of “culture” and identity on an individual’s bargaining behavior.

A. Ultimatum Game

A compilation of ultimatum game results find that on average that the proposer’ offers 40% of the money at stake to the responder while, on average, 16% of the offers are rejected (Oosterbeek et al. 2003). Naturally, the rejection rate is lower when proposers’ offers are higher. Camerer compiles statistics from many studies of ultimatum games using specific offer in one-shot games. Camerer reports, “Modal and median ultimatum offers are usually 40-50 percent and means are 30-40 percent. There are hardly any offers in the outlying categories of 0, 1-10, and the hyper-fair category 51-100. Offers of 40-50 percent are rarely rejected. Offers below 20 percent or so are rejected about half the time” (Camerer, 2003, p.49).

Studies that focus on increasing the monetary stakes find no significant changes in the proposers’ offers although the rejection rates by the responders decreased as the stake increases (Oosterbeek et al., 2003). Another study of the ultimatum game has established that higher testosterone levels increases the frequency of rejection rates (Burnham, 2007). Experimental studies that compare ultimatum game behaviors among university students ranging from Pittsburg to Tokyo found little variations: the mean ultimatum game offer was typically between 42% to 48% (Henrich et al., 2004).¹ However, experimental studies in ultimatum game behaviors

¹ Henrich (p.19), Compared behavior among university students from Pittsburg, Ljubljana (Slovenia) Jerusalem, Tokyo, and Yogyakarta (Java, Indonesia). Modal Ultimatum Game offers were consistently

among different societies produced mean ultimatum game offers ranging from 25% to 57% (Henrich et al., 2004).² The data collected from the Henrich's et al. experiments has sparked an interest in the possible effects of cultural impacts on the aggregated individual bargaining behaviors which might affect the overall economy (Guiso et al., 2006).

More recently, an experimental study of the ultimatum game involved two factors: first, the location of the bargaining experiment, and secondly, the nationality of the participants (Swee-Hoon Chuah et al., 2007). The data from this recent study deviates from past anonymous ultimatum experiments and the deviations have been attributed to the possibility of a "clash of cultures". The results from Henrich's et al. (2004) experimental studies shows that different societies produce different mean offers in the ultimatum game which provide some justification for the argument that culture might affect bargaining behavior. In light of the recent developments, a review of the definition of "culture" in economics is presented below.

B. Culture

Guiso et al. (2006, 23) defines culture as "*those customary belief and values that ethnic, religious, and social groups transmit fairly unchanged from generation to generation*". Guiso et al. continues by dividing culture into two components: a "slow-moving" component which he provides a definition for, as stated above, and a "fast-moving" component of culture which he refers to Manski (2000) but refrains from exploring. Unaccounted for by Guiso et al. (2006) in his overview of culture is social norms. Bernhard et al. (2006, 217) defines social norms as "standards of behavior that are based on widely shared beliefs about how individual group members ought to behave in a given situation". The definition of Bernhard's social norms and

50% among university students.

² Henrich (p. 19), Compared behaviors from 15 different societies: Lamalera, Ache, Pittsburgh, Shona, Orma, Au, Achuar, Sangu, Gnau, Tsimane, Kazakh, Torguud, Mapuche, Hadza, Machiguenga, and Quichua. The sample modes varied from 15% to 50%.

Guiso's definition of the "slow-moving" component of culture are quite similar. In a similar context, the distinction between the "fast-moving" component of culture and social norms is also vague. The following sections attempts to delineate the subtle differences between the three components of culture.

Bernhard's definition of social norms is more specific than Guiso's definition of culture.

She continues to state:

"There are norms of fairness, cooperation, politeness, honesty, and subordination; norms regarding gender relations, and so on. Many people obey social norms voluntarily because their individual goals are in line with the behavior normatively prescribed. ... Another important aspect of social norms is that they are group specific. There are no norms without social groups-social norms emerge through interactions in groups, they apply to interactions within groups, and group members enforce them. ... Thus, group affiliations and ingroup-outgroup relations are presumably crucial determinates of normative behavior" (p. 217).

The key difference that needs to be pointed out is that social norms are *prescribed* whereas culture, at least the "slow-moving" component, is not prescribed nor enforced, but rather *endowed* upon an individual. Guiso's quotes Becker (1996, 16) stating: "Individuals cannot alter their ethnicity, race, or family history, and only with difficulty can they change their country or religion. Because of the difficulty of changing culture and its low depreciation rate, culture is largely a 'given' to individuals throughout their lifetimes (p.24)". Given the difference between social norms and the "slow-moving" components of culture, the differences between social norms and the "fast-moving" components of culture are more subtle.

Although Manski (2000, 122-123) never mentions a "fast-moving" component of culture, he does mention the term "social capital" and the troubles of defining it: "The origin of 'social capital' should be a resolvable matter, but the meaning of the term may not be. ... As I see it, the relevant question for economists is whether 'social capital,' 'community,' and other sociological concepts convey ideas that are missing in modern economic thought-ideas that cannot be

expressed using the core concepts of preferences, expectations, constraints, and equilibrium”. Even though the concepts of a “fast-moving” component of culture remains elusive outside of the terms such as “community” or “social capital”, it can be rationalized that the formation of groups or “communities” determine the social norms. Bernhard stated that social norms are group specific and that norms cannot exist without interactions within or among groups. Therefore it can be induced that Manski’s (2000) “social capital” or Gusio’s et al. (2006) “fast-moving” component of culture are groups formed by individual choice where interactions with other groups in turn creates the prescribed social norms.

II. Theory

The following section attempts to integrate the utility of the identity function with the concepts of the “slow-moving” components of culture, the “fast-moving” components of culture, and “social norms” in regards to the ultimatum game. The utility theory and models of rational choice are only approximations of human behavior and not applicable to all cases, and specific counterexamples are not sufficient arguments to abandon the rationality model (Kagel and Roth, 1995, 77). Furthermore, variations which relax the stringency of some assumptions or introduce new parameters to the utility theory have been motivated by repeated experiments that systematically violate the utility theory (Kagel and Roth, 1995, 78). These experiments that explore violations of the utility theory are important because they present the shortcomings of the utility theory, and offer new parameters to consider and further delineate older approximations. Therefore, instead of attempting to create a new model for behavior, this paper borrows the utility of the identity function formulated by Akerlof and Kranton (2000) to attempt an explanation within the parameters of the utility function for the behavior presented by the data set of the ultimatum game in regards the impact of “culture”.

Before presenting the identity function in its relationship with the ultimatum bargaining game a brief overview of Akerlof and Kranton is presented³. Akerlof and Kranton (2000) proposed the following utility function that account for identity:

$$1) U_j = U_j(a_j, a_{-j}, I_j).$$

The three variables that formulates the utility of person j is the identity or self-image represented by I_j , the usual vectors of j 's actions represented by a_j , and the vectors of other's actions represented by a_{-j} . Furthermore, Akerlof and Kranton (2000) continue to propose the representation of I_j in the following:

$$2) I_j = I_j(a_j, a_{-j}, c_j, \square_j, P).$$

The three additional variables that formulates the identity of person j is the assigned social category or social status represented by c_j , the given characteristics of person j represented by \square_j , and the prescribed behavior that is expected from the social category or social status assigned to person j represented by P .⁴ The assignments of the variables are simple, but the interactions between and among the variables are complex. Akerlof and Kranton (2000) mentions that the identity of person j depends on the extent to which j 's own actions and other's actions correspond to the prescribed behavior indicated by P . Therefore, the increase or decrease of utility that is derived from I_j is the gain or loss in identity.

Simply stated, the gain or loss of identity along with utility is dependent on the actions taken by the person j and the actions of others where the expected behavior of person j is prescribed by the social status or category person j is assigned and the individual characteristics

References

³ For further reading read Akerlof and Kranton's Economics and Identity (2000).

⁴ Akerlof and Kranton (p.719-720), For a comprehensive overview of the interactions of the variables.

of person j . In other words, j maximizes utility by choosing a_j in accordance to how well $\square_j = P$ where P is derived from c_j along with a_j . Like Akerlof and Kranton (2000) and the neoclassic utility theory, this paper is agnostic as to whether or not an individual is aware of the reason for choosing a specific vector of choice. In regarding choice, to some extent j may choose c_j , although this “choice” may or may not be a conscious decision. But since c_j is derived from the aggregate composition of a_j and a_{-j} which defines P , c_j is subject to change over time as a_j and a_{-j} changes. As a final note on c_j and P , there may not be a universal consensus about social categories and prescribed behaviors because of its subjective and malleable nature.

This paper makes the assertion that c_j is Manski’s (2000) “community” or “social capital”, or Gusio’s et al. (2006) “fast moving” component of culture, where c_j , the social category or social status, defines where an individual stands in which “community” or within what “community”. Since an individual, throughout one’s lifetime, is composed of more than one social category, an accumulation or aggregation of one’s “social capital” or “community” would define \square_j , or Guiso’s “slow-moving” component of culture, in combination with the genotype of an individual which would define the boundaries of an individual’s phenotype. Furthermore, P is similar to the description of social norms as stated above by Bernhard et al.(2006). The variable P which is defined as the prescribed behavior through the interactions of among groups is influenced mainly by c_j , but also includes the aggregate group composition of \square_j as a group is defined by its members. Restated in Gusio’s et al. (2006) terms, c_j is the “fast-moving” components of “culture”, \square_j is the “slow-moving” components of “culture” or Manski’s (2000) “social capital”, and P is Bernhard’s et al. (2006) social norms for prescribed behavior.

For the purposes of this paper, the cultural effects are not as important as the awareness of the participant’s identity in terms of social categories and its effects on the ultimatum

experiment. Manski (2000, 119) stated that, “Expectations interactions pervade the modern economics of information. A central concern is to understand the interactions of agents who know that other agents possess private information”. In accordance to the Manski’s statement, this paper is also concerned with the awareness of participants of other participants and its effects on bargaining behavior. Since there is no consensus on an economic model of reciprocity, this paper will assume that the aggregate ultimatum game results from an anonymous one-shot game is the given equilibrium point for both rejection rates and proposal offers.

To augment Akerlof and Kranton’s utility of the identity function for the ultimatum game there are assumptions made that alter the utility of the identity function to fit the anonymous ultimatum game. In ultimatum bargaining experiments where participants are anonymous, the utility of the proposer and responder is based off the identity function proposed in the following figure:

$$3) \quad U_j = U_j(a_j, I_j). \qquad U_i = U_i(a_i, a_j, I_i).$$

The proposer’s utility function remains similar, but a_j is excluded because one assumption is that the proposer, j , does not know the other proposers’ vectors of actions in the ultimatum game nor has previous knowledge of past research of the ultimatum bargaining game. However, the utility function of the responder, i , knows the vector of action taken by the proposer, j , but does not know the other responders’ vectors of actions in the ultimatum game nor has previous knowledge of past research. Therefore the utility of the responder is composed of the action of the responder represented by a_i , the action of the proposer a_j , and the identity of the responder I_i .

Again, since the proposers and responders are anonymous to each other during the ultimatum bargaining game, this assumption also affects the identity function as follows:

$$4) I_j = I_j(a_j, \alpha_j, P)$$

$$I_i = I_i(a_i, \alpha_i, P)$$

The identity function for both the proposer and responder is similar to their utility function but has two additional considerations of the individual's given characteristics, α_j and α_i , respectively, and the prescribed behavior, P , which is influenced by the given aggregate of the group's individual characteristics. The variable of the social category or social status, c_j and c_i , respectively, is omitted for both proposer's and responder's identity functions because both participants are only aware of each other as human beings. One additional note that must be included is that the variables within the I_j and I_i , respectively is endogenous within identity function. However it is unaccounted for within U_j and U_i , respectively and should be considered exogenous within the framework of the utility of the identity function.

In the case of an anonymous ultimatum game, social status does not exist outside of proposers and responders since neither participants are aware of the c_j , social status or social category, of the other and therefore a P , the prescribed behavior or social norms, remains trivial. Given that over twenty years of anonymous ultimatum bargaining experiments have been conducted with consistent results that proposers, on average, offer 40% of the monetary stake, this paper will make the assumption that an offer of 40% is the equilibrium or "convex point" of a proposer who plays a one-shot ultimatum game. With a similar frame of mind, responders, on average, do not accept offers less than 20% of the monetary stake, this paper will make the assumption that offers less than 20% of the monetary stake will surpass the "threshold" point where utility is gained by rejecting the offer from the proposer of a responder who plays a one-shot ultimatum bargaining game.

Continuing from the parameter's stated above; the utility of the identity is augmented once more to account for the participant's awareness of their corresponding bargaining partner.

Whereas once the participants are aware of their corresponding partner's identity, the utility of the identity function changes into the following:

$$5) \quad U_j = U_j(a_j, c_i, I_j). \qquad U_i = U_i(a_i, a_j, c_j, I_i).$$

The awareness of the bargaining partner creates additional consideration that might shift the utility curve of the proposer and responder, respectively. More importantly, partial awareness, where only a specific social category or social status is known by the participants, can mitigate or exacerbate social distances between bargaining partners which, in turn, augments the utility gained or lost from a specific vector of action, a_j or a_i respectively. However the utility of the proposer, U_j is derived from the action taken, a_j , which is based upon the information of the responder's social category or social status, c_i , and the identity of the proposer I_j . The saliency of the c_j and c_i makes the social category an endogenous variable within the utility of the identity function. Similarly, the utility of the responder, U_i , is derived from the action taken, a_i , which is based upon the action of the proposer, a_j , the proposer's social category or social status, c_j , and the identity of the responder, I_i .

Given the utility of the identity function of proposers and responders behavior in the one-shot ultimatum bargaining game, the identity function of the both proposer and responder is proposed as the following:

$$6) \quad I_j = I_j(a_j, c_j, \square_j, P) \qquad I_i = I_i(a_i, a_j, c_i, \square_i, P)$$

The inclusion of c_j and c_i will affect P which in turn will affect the results of ultimatum game. How c_j and c_i might alter P will also depend on whether $c_j = c_i$ or whether $c_j \neq c_i$. Another factor that will influence the identity of both proposer and responder, I_j and I_i , and ultimately the utility gained or lost from the vector of action taken by the participants respectively, a_j and a_i , is how

well their given characteristics, α_j or α_i , corresponds with the prescribed behavior, P , of the assigned social status, c_j and c_i . It must be noted that a “slow-moving” cultural effects might exist within the variable of α_j and α_i , but a salient inclusion of the “fast-moving” cultural effects of c_j and c_i will alter P along with the utility gained or lost, and subsequently, the outcome of the results.

By controlling which social categories will be the endogenous variables, deviated results from the traditional ultimatum game results can be analyzed with better precision. With this application and integration of the identity function to the ultimatum bargaining game in regards to “culture” in mind, an experiment was conducted between students of Washington and Lee University (W&L) and students of Virginia Military Institute (VMI).

III.Method

The objective of this paper is to assess the nature of the impact that the awareness of identity has on intra- and inter-group affiliation on the participant’s behavior in the ultimatum game. In the ultimatum game, the “proposer” offers a division of a monetary stake to a “responder” who either accepts or rejects. If the offer is accepted, then the proposed shares are paid out; otherwise neither players receives anything. Approaching the ultimatum game using backwards induction would predict that the rational responder would accept any positive amount offered. The rational proposer would anticipate this response and offer the lowest amount possible. Thus the sub-game perfect equilibrium for the proposer would be to offer the smallest amount possible, and the responder to accept any given amount above zero. Over twenty years of experiments have shown that this is not the case. Therefore to assess the effects of intra- and inter-group affiliations an experimental design similar to Swee-Hoon Chuah et al. (2007) and Fershtman and Gneezy (2001) has been reproduced.

A series of experiments was conducted in both academic institutions where the participants made their decisions at their respective institutions involving a total of $N = 232$ participants associated with Washington and Lee University and Virginia Military Institute. Participants from Washington and Lee University were recruited from either introductory economic classes or surveys whereas participants from Virginia Military Institute were recruited strictly from surveys. All participants were students attending their respective institution during the early spring of 2007. The ultimatum game design involved the intra- and inter-group parameters of institutional affiliations of either Washington and Lee University or Virginia Military Institute which generates $2^2 = 4$ possible experimental conditions for each game (See Table 1). The participants were divided into proposers and responders, and respectively for their institutional affiliation. Other than their institutional affiliation, the participants were told nothing about their particular opponent who was randomly chosen from the other group, but otherwise remained anonymous. The participants were asked to read and sign a consent form, fill out a quick survey, and were briefed on the rules of the ultimatum games. The forms were distributed among the proposers and collected after their choices were indicated. Subsequently, the forms were shuffled and randomly distributed to responders to indicate their decision. The stake size was ten dollars. Due to a lack of funding only half of the participants were randomly paid. The participants were made aware of this before the consent form was distributed.

Table 1

Description of the four experimental conditions according to the subject's group affiliation as W&L: Washington and Lee University and VMI: Virginia Military Institute.

Condition	Description	Proposer	Responder	Pairs
1.	VV	VMI	VMI	28
2.	VW	VMI	W&L	29
3.	WV	W&L	VMI	30
4.	WW	W&L	W&L	29
Total				116

IV. Results

This experiment generated a data set of observation and responses for 116 games played under the four different conditions with roughly 29 games per condition. Table 2 contains a summary in terms of the mean percentage of the stakes offered to the responder (O) as well as rejection rates as a proportion of all responses (R) for each condition. The original conditions given from the parameter in Table 1 is presented in addition to five other conditions that show different combinations of the previous four conditions. VA represents VMI proposers with the aggregated responders. WA represents W&L proposers with the aggregated responders. AW represents the aggregated proposers with W&L responders. AV represents the aggregated proposers with VMI responders, represented by AV. Lastly, AA represents the total aggregated results from proposers and responders. By grouping the different conditions in the given methods above, the data can be compared for behavioral differences given the salience of the identity of the participants for intra- and inter-group comparisons as well as the aggregated group behavior as a whole.

The descriptive statistics of the offer levels (O) and rejection rates (R) provide some interesting results that are worth examining. The mean offer of VMI's intra-group bargaining behavior, VV, is slightly above 50% but drops by 5.18% when under the condition of inter-group bargaining, VW. However the mode offer of 50% increases by 8.62% under the condition of VW when compared to VV. Similarly, the mean offer of W&L's intra-group bargaining, WW, is higher by 3.32% than the condition of W&L's inter-group bargaining, WV, but here the mode offer of 50% is 51.72% under the condition of WW, which drops by 5.06% to 46.66% under the condition of WV. When comparing the rejection rates in regards to intra- and inter-group bargaining provides some interesting insights. The rejection rate for VV is 14.28% but jumps to 50% under the condition of WV. Similarly, but not as significantly, WV's rejection rate is lower

by 3.45 when compared to WW, but interestingly, despite the higher mean offer of the condition VW this condition has a higher rejection rates than the WW. One final notable observation from Table 2 is the standard deviations. The standard deviations of offers are less than 1 only under the condition of VV and WW, whereas under all other conditions, the standard deviations are above 1. From this table alone the affects of in-group favoritism can be observed. Through the awareness of the identity, intra-group bargaining implies higher mean offers, lower rejection rates, and a less volatile distribution of offers when compared to inter-group bargaining.

Table 2
Descriptive statistics for offer levels O and rejection rates R by the participant's group affiliation.

Condition	O				R
	Mean	Median	Mode	S.D.	
1. VV	50.35%	50%	50 (50.00%)	0.961	14.28%
2. VW	45.17%	50%	50 (58.62%)	1.957	13.79%
3. WV	38.83%	50%	50 (46.66%)	1.595	50.00%
4. WW	42.15%	50%	50 (51.72%)	0.915	10.34%
5. VA	47.71%	50%	50 (54.38%)	1.558	14.03%
6. WA	40.46%	50%	50 (49.15%)	1.306	30.50%
7. AW	43.66%	50%	50 (55.17%)	1.521	11.86%
8. AV	44.39%	50%	50 (48.27%)	1.439	32.75%
9. AA	44.03%	50%	50 (51.72%)	1.475	22.41%

To further scrutinize the data, Table 3 presents the distribution of offers in accordance to their size quintiles. As the standard deviations have shown above, there is a convergence of the distribution of offers under the conditions of VV and WW. The condition of WW does not have any offers within the range of 0-20% nor 61-80%, but the offers are almost evenly distributed between the ranges from 21-40% and 41-60%. Under the condition of VV, 75% of the offers fall into the range group of 41-60%. Unlike the conditions of VV and WW, the distribution of offers is broader under the conditions of VW and WV. 23.33% of the offers under the condition of WV

falls within the range of 0-20% whereas the condition of WW did not have any offers within the range of 0-20%, but interestingly enough the number of offers within the range of 41-60% increased by 4.92%. However, in the case of comparing VV with VW, offers within the range of 41-60% dropped by 9.49%, but, like the comparison of WW and WV, an increase in 0-20% offers occurred and also some offers within the range of 61-80% increased. In both cases of inter-group bargaining, the number of offers within the range of 21-40% dropped by over 10%. The only other notable observation is that only the VA condition offered more than 61% whereas the WA condition offered nothing over 61%. Also, as mentioned above, the percentage of mode offer of 50% changes depending on the responder's group affiliation. VMI proposers offered less equitable offers when faced with inter-group bargaining when compared to their intra-group bargaining, and conversely W&L proposers offered more equitable offers when faced with inter-group bargaining when compared to intra-group bargaining.

Table 3

The distribution of offers over nine conditions of analysis and the offered size quintiles. The percentages represent the proportion of offers over the total number of offers within each condition and their corresponding sizes quintiles.

Condition	O				
	0-20%	21-40%	41-60%	61-80%	81-100%
1. VV	3.57%	17.85%	75.00%	3.57%	0%
2. VW	17.24%	6.89%	65.51%	10.34%	0%
3. WV	23.33%	20.00%	56.66%	0%	0%
4. WW	0%	48.27%	51.72%	0%	0%
5. VA	10.52%	12.28%	70.17%	7.01%	0%
6. WA	11.86%	33.89%	54.23%	0%	0%
7. AW	8.62%	27.58%	58.62%	5.17%	0%
8. AV	13.79%	18.96%	65.51%	1.72%	0%
9. AA	11.20%	23.27%	62.06%	3.44%	0%

The final analysis of the proposers' offers was conducted through the Mann-Whitney U statistical test presented in Table 4. Three tests were conducted grouped by the proposers.

Although the Mann-Whitney U statistical test confirms the aggregated difference of offer level

made by W&L and VMI's proposer's offer levels ($z = 3.4$, $p = 0.0007$); the tests do not confirm any difference in offer levels made by the W&L and VMI's proposers in regards to the responder's group affiliation. This result is insightful and somewhat contrary due to a less volatile distribution of offer levels within intra-group bargaining offers, but the offer levels do not significantly change from the aggregated group offer levels.

Table 4

Mann-Whitney U statistical z scores and associated p-values (two-tailed) for pairwise comparisons of offer levels O under the different experimental conditions.

Conditions	z-score	p
1. VA/WA	3.400	0.0007*
2. VV/VW	0.822	0.4108
3. WV/WW	-0.033	0.9735

*This result was derived from using STATA and at the time $n = 114$.

Table 5 reports the distribution of the rejection rates according to the number of offers given by the proposers. Again, the table presents that there are fewer rejections under the conditions of VV and WW when compared to VW and WV. Furthermore rejections of WV is significantly higher than any other results shown on the table, and as for VW only offers less than 20% were rejected. It is interesting to observe that only offer between the 41-60% range were rejected in the condition of VV. Also another interesting observation is the comparison of the conditions of VW and WW. In the case of VW there are rejections only when the offers are less than 20%, but in the case of WW offers of 21-40% were rejected and even an offer of 41-60% was rejected. A comparison of Table 3 and Table 5 will show that there were no offers within the range of 0-20% made under the condition of WW whereas under the condition of VV there were offers within the range of 0-20% and 21-40%, but Table 5 shows that under the condition of VV, no offers made within the range of 0-40% were rejected although some of the offers within the range of 41-60% were rejected. Comparison of the conditions of VV and VW shows a comparatively high rejection rate when faced with inter-group bargaining.

Table 5

The distribution of rejections rates in percentages of their given offered size quintiles.

Conditions	O				
	0-20%	21-40%	41-60%	61-80%	81-100%
1. VV	0%	0%	19.04%	0%	0%
2. VW	80.00%	0%	0%	0%	0%
3. WV	85.71%	50.00%	35.29%	0%	0%
4. WW	0%	14.28%	6.66%	0%	0%
5. VA	66.66%	0%	10.00%	0%	0%
6. WA	85.71%	25.00%	21.87%	0%	0%
7. AW	80.00%	12.50%	2.94%	0%	0%
8. AV	75.00%	27.27%	26.31%	0%	0%
9. AA	76.92%	18.51%	15.27%	0%	0%

Because some of the interesting results, further scrutiny was under took to see of some of the results were due to male female differences, age, or education level. Table 6 presents the demographics of the population sample. Gender and age has been known to significantly alter the results, but age, in this case, has been relatively constant among the subjects. Also the GDYR represents the graduation year of the participants to investigate whether the amount of time spend at the participant's respective institutions affect bargaining behavior. But like the variable of age the mean number of years the participants spent in their respective institution remained relatively constant.

The variable of gender shows some significant deviations ranging from 17 percent to 60 percent females within various groups. Eckel and Grossman (1998) conducted a double-anonymous dictator experiment that concluded that females tended to be more socially-orientated (selfless) while males tended to be more individually-orientated (selfish). This would imply that in an ultimatum experiment females on average would offer more equitable offers and would accept lower offers than males. However, for this experiment the participants were not informed on the gender of others, but only the participant's group affiliation.

The comparison of Table 2 and Table 6 shows some contrary results of Eckel and Grossman's (1998) conclusion of gender differences. The percentage of female proposers in the conditions of VV is a lower percentage than VW, but VV's mean proposal offer is higher than VW's mean proposal offer. Also, the percentage of female responders in the conditions of VV is a lower percentage than WV, but WV has a higher rejection rate than VV. Although these two results implies the conclusion of Eckel and Grossman's (1998) experiment, this particular experiment placed emphasis on the awareness of salient social categories.

Table 6
Demographics of proposers and responders by experimental conditions.

	Condition								
	VV	VW	WV	WW	VA	WA	AW	AV	AA
Proposer									
FEM	35.71	60.71	36.66	51.72	48.21	44.06	56.14	36.20	46.08
AGE	20.39	20.5	19.4	19.03	20.44	19.21	19.75	19.87	19.81
GDYR	8.21	8.07	9.4	9.37	8.14	9.38	8.73	8.82	8.77
Responder									
FEM	17.85	39.28	30.0	44.82	28.57	37.28	42.10	24.13	33.04
AGE	19.82	19.72	20.27	20.0	19.77	20.13	19.52	20.05	19.95
GDYR	8.85	8.96	8.46	8.75	8.90	8.60	8.70	8.64	8.74

* 115 observations were available as one survey for the proposer did not filled and one survey from the responder was omitted. Some participants were reluctant or did not completely fill out the questionnaire.

V. Conclusion

Needless to say, the results from the data above show that as the social categories of the participants becomes salient, bargaining behavior changes in terms of intra- and inter-group differences where in-group favoritism and perhaps out-group hostility is displayed. The data implies few conclusions and presents several questions that remain to be resolved. The results also indicate behavioral differences in offer levels between W&L proposers and VMI proposers implying the existence of some sort of social norm.

The difference between W&L and VMI proposers' offer levels can be interpreted in two different ways. Burnham's (2007) study found that individuals with high testosterone levels might correlate with higher offer levels, but Burnham's study did find statistically significant correlations between testosterone levels and rejection rates. This study finds that VMI participants have higher rejection rates and higher offer levels when compared to W&L participants. Since VMI is a military academy, it is possible that the institution served as a proxy where, on average, VMI participants had higher testosterone levels when compared to W&L participants. Another experiment with saliva samples can easily resolve this assumption.

Given the current uncertainty, and accounting for Henrich's past studies, another explanation could be that each institution acted as a proxy for collectivism and individualism; where VMI participants have a heightened sense of collectivism whereas W&L participants have a heightened sense of individualism due to the fact that the former is a military academy and the latter is a liberal arts academy. Ball's (2001, 58) states that "In more individualistic societies, people tend to behave like *Homo economicus*: they choose actions that maximize their private material self-interest. In more collectivist societies, people tend to behave like *Homo sociologicus*: their actions are conditioned by the norms, expectations, and interests of the social groups of which they are part". Perhaps, a survey focusing on these aspects might resolve such differences and their affects, if any, on the behavior of ultimatum bargaining game.

The results also points towards the implications of the existence of social norms. As mentioned above, since groups create the social norms, the partial awareness of the identity will form the social norms of the group's affiliation. The standard deviations in offers indicate that intra-group bargaining behavior is less volatile and more equitable, if not more favorable as implied by the results. However, when offers are made under an inter-group condition, the offer

levels are more volatile where offers are ranging from 21-40% offers deviate into either lower offers or more equitable offers or even some hyper-fair offers. The differences between the intra-group and inter-group bargaining might be that social norms are unknown in inter-group bargaining whereas in intra-group bargaining a social norm exists, although it might not be specified, within the concept of certain expectations, restated as social norms.

On hindsight, an anonymous condition should have been conducted to verify the bargaining behavior without the additional variable of group affiliation. Another experiment conducted anonymously among W&L and VMI participants would be beneficial to verify the statistically significant difference of mean offer and rejection rate.

This paper does not presume that the data will be replicated through just the participant's group affiliation. Davis (2006, 372) presented interesting questions where two issues occur: "how a single person can have different selves understood as a person's different social identities, and how different persons can make up a single social group understood as their shared social identity". He concludes that "it seems that the individual objective function *per se* involves a different type of representation associated with its higher order character" (387).⁵ Because the experiment conducted for this paper was based upon the individual's current and salient social group which was chosen by the individual, different experiments focusing on social grouping such as race or ethnicity, characteristics endowed upon the individual, is bound to produce different results. An example would be Chuah et al.'s (2007) experiment where the results deviated from this experiment but has some similarities. As a result, the identity of group affiliation would depend of what kind of group affiliation is being tested ethnicity, nationality,

References

⁵ For further references of the second issue read John B. Davis, Social Identity Strategies in Recent Economics.

education, employment, and etc might produced different results as different social categories might raise or lower self-esteem in regards to the given situation.

There are two major and two minor possibilities that need to be given consideration before a concrete assertion can be made, the first consideration that must be acknowledged is that the comparison made was between a military institute and a liberal arts institute. VMI is a military school could have been a proxy for either the overall testosterone levels or collectivism. Although testosterone levels have been shown for a higher frequency of rejection rates such behavior was curtailed when intra-group bargaining occurred. Perhaps it is combination of the two effects where the testosterone levels affected the higher offer levels and the higher rejection rates, but the cultivated sense of collectivism curtailed the innate reactions. Secondly, only half of the participants were randomly chosen to be paid out, therefore it is conceivable that some participants did not take this experiment seriously. A third consideration was the location while conducting the experiment. In this experiment the participants filled out the survey in their respective institution as the experiment was conducted before the awareness of Swee-Hoon Chuang et al. (2007) research. Finally, the last and perhaps unnecessary consideration is that the experimenter is institutionally affiliated with W&L and the information might have a slight impact on the behavior of VMI participants as well as W&L participants.

In regards to the Guiso's et al. (2000) definition of culture, it would be interesting to see if the results are replicated when the experiment is conducted among alumni. One note for this experiment would be that the experimenter must be careful not to have the experiment conducted by the same participants. An anonymous ultimatum experiment and an awareness of group affiliation ultimatum experiment could be conducted to compare and contrast the saliency of group affiliation.

It is not the intentions of this paper to predict how expectations and preferences might be altered due to an ingroup and outgroup effects, but rather to confirm that the concepts of the identity function and awareness of the participants' group affiliation have a significant impact on bargaining behavior. Furthermore, as stated above and before by Akerlof and Kranton the prescribed behavior of social categorization and social status is malleable. Further research should be conducted to gather more data to make precise assertions about culture, identity, and bargaining behaviors that violate the former utility functions to retain and further strengthen the theoretical use of the revised utility theory.

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