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Comparing Normative Influences as Determinants of Environmentally-
Conscious Behavior between the U.S. and Japan

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Key Words: environmentally- conscious behavior; subjective norm; descriptive norm;

U.S.; Japan

Abstract

The present study explored the influences of subjective and descriptive norms on environmentally-conscious behaviors between the U.S. and Japan. It was predicted that subjective norms would have a larger effect on behavior in Japan than in the U.S. Descriptive norms were expected to have a greater influence on behavior in the U.S. The survey was done with 160 American students and 114 Japanese students. The results showed that subjective norms are relevant only in Japan, but the effect was limited. Alternatively, descriptive norms were a powerful determinant in the U.S. It was also found that respondents asserted that they commit environmentally-conscious behaviors more frequently than others, regardless of their country. The present research suggests that the role of subjective and descriptive norms may vary between cultures, and highlights a necessity for distinguishing between interpersonal and social norms.

Comparing Normative Influences as Determinants of Environmentally- Conscious Behavior between the U.S. and Japan

Today, environmental problems such as global warming are a common concern in the world. However, perceptions and behavior concerning the environment are likely to differ between countries. The present study explores the determinants of environmentally-conscious behaviors between the U.S. and Japan. The U.S. discharges about one fourth of the carbon dioxide in the world, and electricity consumption per person is about 2 times of that of Japan (OECD, 1997). While there are many discussions based on the macroscopic data, studies that investigate individual differences in environmentally-conscious behaviors from a psychological perspective are few and far between.

Normative Influences

The present study compares normative influences on behavior between the U.S. and Japan. Subjective norms in the theory of reasoned action (TRA; Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975) are defined as the perceived expectations from significant others and compliance with them. The TRA has been widely applied in studying various behaviors in many countries (for review, see: Albarracin, Johnson, Fishbein & Muellerleile, 2001; Blue, 1995; Hagger, Chatzisarantis, & Biddle, 2002; Terry, Gallois & McCamish, 1993). The TRA proposes that behaviors are determined by a combination of attitudes toward the behavior and subjective norms.

It is also necessary to consider norms from a broader social context because subjective norms involve interpersonal influences only from very close others. Cialdini, Reno and Kallgren (1990) argued that researchers may also look at other types of norms, including descriptive norms (what most others do). Ravis and Sheeran (2003) conducted meta-analysis

for 21 studies which examined descriptive norms in the TRA model, and found that there was a medium to strong correlation between descriptive norms and intentions. Accordingly, their findings suggest the importance of considering descriptive norms within the TRA.

In the present study, participants' estimation of others' behaviors in their country was used to assess for descriptive norms. Kitaori and Yoshida (2004) observed illegal crossing in an intersection in Japan. These researchers found that the number of surrounding people who were illegally crossing was a strong predictor of the behavior. Accordingly, Kitaori and Yoshida's findings indicate that the mere number of others who engage in the behavior has effects through descriptive norms. Descriptive norms are presumed to be important especially as a determinant of environmentally-conscious behaviors because environmental problems are related to social benefits: If nobody engages in such behaviors, the whole society would suffer from a damaged environment in the near future.

The present study also measured eco-net for exploratory reasons, which is the number of friends who are environmentally minded. Ando and Hirose (1999) found that the existence of environmentally-minded friends had effects on participation in an environmental movement. Thus, we examined whether the source of influence is limited to very close others or whether environmentally-minded friends who are not important in people's daily life also have an effect on one's behavior. The eco-net was measured in order to check whether it is only significant others, broader interpersonal networks, or norms in the whole country which may affect the individual's behavior in Japan and in the U.S.

Cross-Cultural Differences

Regarding cross-cultural differences in relation to subjective norms, Markus and Kitayama's (1991) view of the independent and interdependent self suggests that subjective

norms may play a bigger role in Japan. They argued that views of the self vary among different cultures. For 'independent' cultures like in the U.S. or in Northern Europe, the self is defined as being independent of others, and the boundary of the self is clear; the aim of individuals in these cultures is to be unique from others. For 'interdependent' cultures like those found in East Asian countries including Japan, the self is defined in relation to others, and the aim in these cultures is to keep harmony with others. Therefore, in order not to offend others' feelings, people in interdependent cultures are often more aware of others' expectations.

Ajzen (1991) conducted a meta-analysis of 16 studies which used the theory of planned behavior and found that the effect of subjective norms was not clear when compared to the effect of attitudes. However, the studies used in the meta-analysis were mostly those conducted in Western countries. Abrams, Ando, and Hinkle (1998) found that subjective norms played an important role in determining one's intention of turnover in Japan, while it did not have a significant effect in the U.K. Their study suggests that the influence of subjective norms is stronger in Japan where interpersonal relationships are more important. In addition, environmental studies conducted in Japan have also shown that expectation from others played an important role (Ando & Hirose, 1999; Nonami, Sugiura, Ohnuma, Yamakawa & Hirose, 1997). Overall, these findings support Markus and Kitayama's (1991) view that individuals from East Asian cultures pay more attention to their significant others' expectations and try to comply with them as much as possible.

While subjective norms represent the influence from significant others, and depends on interpersonal relationships, social norms need to be understood in intra- and inter-group contexts. Social identity theory (e.g. Tajfel & Turner, 1986) suggests that belonging to a group constitutes a part of one's identity, which affects a number of one's cognitive and behavioral

processes. From within this theory, it can be predicted that one is likely to conform to group norms when group membership is salient.

By re-examining social identity theory and collectivism, Yuki (2003) proposed that in East Asian cultures as found in Japan, people hold a strong tendency to think about groups as predominantly relationship-based. In contrast, people from Western cultures such as the United States have a tendency to emphasize categorical distinctions between ingroups and outgroups. This idea of a relationship-focused group orientation for Japanese is consistent with Markus and Kitayama's (1991) notion of interdependent self and with Hamaguchi's (1977) idea of 'contextualism' (kanjin-syugi), which places importance on the relationship between individuals. In East Asian cultures, each group member is perceived as a meaningful social unit. In Western cultures, category-based group representations are more dominant and ingroup members are perceived as more homogeneous. Accordingly, processes consistent with social identity theory are expected to be most applicable to Western cultures (Yuki, Maddux, Brewer & Takemura, 2005). For example, Yuki *et al.* (2005) showed that Americans trusted strangers based on whether they shared category membership, while trust by Japanese depended more on the likelihood of sharing direct or indirect relationship links.

Since category-based group representations are more dominant in Western countries (Yuki, 2003; Yuki *et al.*, 2005), we hypothesized that estimations of others' behaviors in the country (i.e., descriptive norms within the ingroup) would play a bigger role in the United States than in Japan. On the other hand, we hypothesized that subjective norms would play a bigger role in Japan than in the U.S. where interpersonal relationships are more valued.

The Aim of the Study

The present study explores the determinants of environmentally-conscious behavior in

the U.S. and Japan. There are few studies which have compared the determinants of environmentally-conscious behaviors between the U.S. and Japan, although it is obvious that there are differences in behaviors at the macro level. We also aim to compare the determinants of different types of environmentally-conscious behaviors because it is assumed that determinants would differ across different behavioral domains. For example, subjective norms might have stronger effects on behaviors which can be observed by others, such as shopping behaviors and recycling behaviors.

The particular objective of this study is to compare the effects of various normative influences between the U.S. and Japan. To assess for interpersonal norms, subjective norms were measured. As a measurement of descriptive norms, estimation of others' behaviors was used. The eco-net was measured to examine the influence from one's interpersonal network which is broader than subjective norms. We hypothesize that Japanese are more likely to be influenced by significant others than Americans because it is of greater importance in Japan to maintain harmonious relationships with close others. The estimation of others' behaviors would have a bigger influence in the U.S. because category-based group processes would be more applicable in Western cultures. We did not have any specific predictions for the eco-net because it was introduced for exploratory reasons.

Method

Design and Sample

The survey was conducted on university students in the U.S. and Japan. In the U.S., questionnaires were distributed at two large public universities, one located in the Midwest and one located in the West Coast. A total of 160 questionnaires (87 men & 73 women) were obtained. In Japan, the survey was conducted at two national universities. A total of 114

questionnaires (45 men and 69 women) were obtained. The participants were not informed that the research project involved cross-cultural comparisons.

Measures

Scales in the questionnaire referred to environmentally-conscious behaviors, estimation of others' behaviors, attitudes toward environmental issues, subjective norms, and personal networks. Scores for each scale were the mean response to the relevant items. Every question was first constructed in Japanese, then translated into English and verified by back-translation.

Environmentally-conscious behavior. Ten items measured daily environmentally-conscious behaviors. Respondents were asked how often they engage in the relevant behavior by using a 4-point scale ranging from 1 (not do at all) to 4 (always do). The behavior domains included energy conservation, water conservation, recycling, shopping, and reuse. A higher score on this scale indicates a higher frequency to engage in environmentally-conscious behaviors.

Estimation of others' behavior. We asked respondents to estimate how many people in their country (all over the U.S. / Japan) engage in each of the 10 environmentally-conscious types of behaviors. These 10 types of behaviors corresponded to those in the behavior scale. Responses were coded using a 3-point scale (1: a few, 2: medium, 3: a lot).

Attitudes toward environmental issues. Attitudes toward environmental issues were measured by 3 questions using a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). Respondents were asked whether they believed it is good to engage in environmentally-conscious behaviors or not. Sample questions included: "Is it good to engage

in environmentally-conscious behavior", and "Is it good for society to have an environmentally-conscious lifestyle". A higher score on this scale indicates higher pro-environmental attitudes.

Subjective norm. Subjective norm was measured by 4 items asking how much each of the following people would expect respondents to engage in environmentally-conscious behaviors: parents, best friends, boyfriend/girlfriend, and the majority of other friends. Responses were coded using a 5-point scale. A higher score indicates a higher expectation.

Personal network. The number of friends who are environmentally minded was measured. This scale is named an 'eco-net'. The eco-net was measured by 7 questions, asking how many environmentally-minded friends respondents have. Sample questions were: "your friend(s) who are interested in environmental issues", "your friend(s) who are well acquainted with environmental issues", and "your friend(s) who are a member of an environmental group". The responses in the measures of the eco-net were all transformed into logarithm first and then mean scores were calculated because of the great variations in responses.

Results

Demographics

The average age of the American sample was 20.8 years old, ranging from 18 to 34 years of age, while that of the Japanese sample was 20.6, ranging from 18 to 46 years of age. There was no significant difference in age between the samples. In Japan, 51% of the students lived by themselves, whereas the corresponding number was only 14% in the U.S, which indicates that many students share houses or flats with friends in the U.S. ($\chi^2(4)=86.0$, $p<.001$).

Scale construction

At first, a factor analysis with Varimax rotation was conducted on the behavioral measures (Table 1). Three factors emerged. The first factor was interpreted as 'resource conservation behavior'. Statements such as "turn off faucets when I shampoo my hair" or "take my own bag for shopping" weighed heavily on this factor. The second factor included the statements; "turn off lights when you leave rooms", and "switch off air conditioners frequently". This factor was named 'energy conservation behavior'. The third factor included "take old items to second hand shops or garage sales" and "take old books to second hand shops". This factor was named 're-use behavior'.

(Table 1 Factor loadings of behavioral measures)

For subsequent analyses, scores on each behavior scale were calculated based on the means of the items which loaded heavily on each factor. Scores of the three types of behaviors for estimation of others behavior were calculated in the same way using the same factor structure as own behavior.

Cronbach's alphas for the scales used in the analysis were as follows: environmentally-conscious behaviors (resource conservation behavior, .62; energy conservation behavior, .67; re-use behavior, .52), estimation of others' behaviors (resource conservation behavior, .64; energy conservation behavior, .68; re-use behavior, .53), attitudes toward environmental issues (.84), subjective norm (.76) and eco-net (.86). The results indicated an almost satisfactory level of reliability for each of the measurement.

Cultural Differences of Environmentally-Conscious Behaviors

In order to examine whether mean scores on each of the behavioral scales differed between countries, between own behavior and estimation of others' behavior, we ran a 2 (country: U.S. vs. Japan) \times 2 (agent: self vs. others) \times 3 (types of behavior: resource conservation vs. energy conservation vs. re-use) analysis of variance (ANOVA) with repeated measures with the last two factors. Cell means and standard deviations are shown in Table 2.

First, all of the main effects were significant [country: $F(1, 265) = 29.7$, agent: $F(1, 265) = 474.0$, types of behavior: $F(2, 530) = 60.0$; all $p_s < .01$]. F value for the main effect of agent was particularly large, indicating that respondents estimated that they engaged in environmentally-conscious behaviors more frequently than others in the country ($M = 2.51$ vs. 1.76). Behavioral level of Japanese respondents was higher than American respondents ($M = 2.25$ vs. 2.02), and re-use behavior was conducted or estimated to be conducted more frequently than resource conservation behavior and energy conservation behavior ($M = 2.42$ vs. 1.98 vs. 2.00, respectively).

We also found significant interactions between country and types of behavior [$F(2, 530) = 45.1$, $p < .001$], agent and types of behavior [$F(2, 530) = 29.7$, $p < .001$]. The significant interaction effect between country, agent and types of behavior was also observed [$F(2, 530) = 39.8$, $p < .001$]. As Table 2 shows, Respondents estimated that they engaged in energy conservation behaviors most frequently, while others engaged in re-use behaviors most frequently. The table further indicates that the difference between self vs. others was largest for energy conservation in the U.S., while it was largest for resource conservation in Japan. It is also noteworthy that an interaction between country and agent was not found to be significant, indicating that respondents assumed that they conduct environmentally conscious behaviors

more frequently than others regardless of their country.

(Table 2 Mean scores and standard deviations of each type of environmental behavior)

Cultural Differences in Other Variables

Using country as the dependent variable, t-tests were conducted for each of the main variables separately except for own behaviors and estimation of others' behaviors. There was no significant difference between the two countries for attitudes. Means of attitude were high in both countries (over 4.3 in both countries), indicating high concern for environmental problems in both countries. The Japanese students, compared to American students, scored higher on subjective norm ($M = 2.82$ vs. 2.48 ; $t(269) = 3.36$, $p < .001$). Japanese students perceived higher expectations from significant others to engage in environmentally-conscious behaviors. The number of eco-net was higher in the U.S. ($M = .68$ vs. $.22$; $t(263) = 7.73$, $p < .001$). American students showed a larger network of environmentally-minded friends. It may seem like a contradiction that Japanese scored higher on subjective norm but had a smaller eco-net. However, it is not so uncommon in Japanese society given that people are required to read others' expectations even if it is not spoken clearly. Moreover, subjective norm measures significant others such as family, but eco-net measures a broader network, including weak ties. Japanese students talk about environmental issues with family members or very close others, but do not talk with distant friends about such issues in daily life.

Determinants of Behavior

The major focus of the present study is to compare the determinants of environmentally-

conscious behavior between U.S. and Japan. Before conducting the regression analysis, correlation coefficients between variables were examined (Table 3) and the results showed that a possibility of multicollinearity was not high with the present data.

Scores on subjective norm and on the eco-net were found to have a stronger correlation in the U.S., $r(152) = .59$, than in Japan, $r(113) = .22$, which indicates that in the U.S., expectations from specific others were not clearly distinguished from the attitudes of various friends. Subjective norm and eco-net were not related with any kind of estimation in the U.S and Japan, except for an association between eco-net and estimation of others on resource conservation behavior in Japan. Respondents perceived that even if they are expected to engage in environmentally-conscious behavior from significant others, it did not mean everyone in the country shared the same notion.

(Table 3 Zero-order correlations between variables in the U.S. and Japan)

Multiple regression analyses were conducted to explore the determinants of environmentally-conscious behaviors for the U.S. and Japan separately. Each type of environmentally-conscious behavior was used as a dependent variable. Independent variables were attitude, subjective norm, and the corresponding estimation of others' behavior. The results are shown in Table 4.

(Table 4 Multiple Regression for Each Kind of Behavior)

As the results show, attitude was a significant positive determinant of all kinds of behaviors in the U.S., while it was not significant in any behavioral domain in Japan. Subjective norm was a significant positive determinant of resource conservation behavior in Japan, while it failed to be a significant determinant in the U.S. for any of the behavioral domains. Eco-net was a positive determinant of resource conservation behavior in the U.S. and a positive determinant of re-use behavior in Japan. Estimation of others' behavior was a positive significant determinant of all kinds of behaviors in the U.S. and Japan except for energy conservation behavior in Japan.

All of the regression models were significant, but F values and R-square values were higher for the models involving American samples. None of the variables succeeded in explaining for significant amounts of variance in energy conservation behavior in Japan. Accordingly, other variables not measured in the present study may be involved as determinants of this type of environmentally-conscious behaviors in Japan.

Discussion

Environmentally- Conscious Behavior

Findings from the present study showed that many people are aware of the importance of protecting the environment, as indicated by high mean scores on attitude in both countries. However, there were some differences in the actual behaviors between the countries. The results indicated that environmentally-conscious behaviors are multi-factorial, and the mean scores differ depending on the behavioral domains.

In comparing own behaviors and estimation of others' behaviors, we found that respondents perceived that they commit environmentally-conscious behaviors more frequently

than others. This pattern was found both in the U.S. and Japan. Various cross-cultural studies showed that Japanese students show self-devaluating biases compared to Western students who are likely to show self-enhancing biases (e.g. Heine, Takata & Lerman, 2000; Kashima & Triandis, 1986). However, the present results showed that Japanese respondents also estimated that others engaged in environmentally-conscious behaviors less often than they do. The results also indicated that Japanese have self-enhancing biases regarding their behavior. This finding is consistent with Kitayama and Karasawa's study (1997), which found that Japanese students attached positive feelings to their own selves.

The estimation of others' behavior also differed between behavioral domains. Both American and Japanese respondents evaluated that they engaged in energy conservation behavior most frequently, but perceived others engaged in re-use behavior most frequently. Because people mostly engage in energy conservation behaviors at home, it is less likely that this type of behavior is observed from outside. In contrast, re-use behaviors, such as taking old items to recycle shops, are easier to be detected by others. Thus, it may be that others' behaviors were underestimated because they were more difficult to be observed.

This tendency to underestimate others' behavior may affect one's own behavior because estimation of others' behavior was found to be a strong predictor of own behavior in the U.S. and in Japan. Put another way, it may be possible to increase people's engagement in environmentally-conscious behaviors if they were made to believe that others also engaged in environmentally-conscious behaviors frequently.

Normative Influences

The regression analyses showed that the effect of subjective norm was present only for resource conservation behaviors in Japan. It did not account for any significant variance in

behaviors in the U.S. Findings from some previous studies (Hamaguchi, 1977; Markus & Kitayama, 1991) have suggested that people are more aware of others' thoughts and expectations in Japan because it is more adaptable in this society. Our present findings partly support this view. They showed that the influence of a few important people like parents and close friends are of particular importance in determining resource conservation behavior in Japan. Since subjective norm was not found to be a significant predictor of energy conservation and re-use behaviors in Japan, our hypothesis was not fully supported. Nonetheless, our findings showed that the effect of subjective norm differed between cultures and between different behavioral domains.

Estimation of others' behavior was a powerful determinant of behavior in the U.S. It was a significant determinant of all behavioral domains and was a stronger predictor than subjective norm. Our findings also showed that in the U.S., people are likely to be influenced by descriptive norms of a large category rather than expectations from very close people. Our results regarding eco-net were rather mixed. They were partly significant both in the U.S. and in Japan.

The results in the U.S. indicated that the effect of direct expectations from very close others was relatively weak, but descriptive norms had stronger effects. As Markus and Kitayama (1991) discussed, independence is valued over interdependence in the U.S., and thus people would feel less pressure to conform to the significant others' expectations compared to Japanese. However, it does not mean Americans are totally unaffected by social norms. According to Yuki (2003), category-based social representations are dominant in the U.S., which means one is likely to perceive the whole group to be homogenous. The results of the present study may indicate that descriptive norms are more powerful in the U.S. because the

notion that many people engage in the behavior is important in a society where people are perceived to be homogeneous. It is also necessary to point out that estimation of others' behavior was also found to be significant in Japan in two behavioral domains. It means that descriptive norms were also relevant in Japanese society, but the effect of descriptive norm appeared more clearly in the U.S.

Another possible explanation for the results in the U.S. is the effect of false consensus, to the tendency to overestimate the percentage of others' behavior who engage in the same behavior as oneself. Accordingly, one might argue that the false consensus effect was stronger in the U.S. One might be likely to see others as having the same attitudes as oneself in the U.S. However, respondents in both countries evaluated that they engaged in energy conservation behaviors most frequently, but they perceived that others engaged in re-use behaviors most frequently. If it is the effect of false consensus, it is difficult to explain this difference in behavioral domains. It would be necessary in the future research to clarify the causal relationship by experimental design or by panel study.

Conclusion

The present results give us some insights to help understand environmentally-conscious behavior in U.S. and Japan. In the U.S., estimation of others' behaviors was an important variable that affected one's behavior. This suggests that if the number of people who engage in environmentally-conscious behavior becomes higher than a certain percentage, then other people would follow suit, thus increasing the overall percentage of people who would engage in such behaviors.

For future research, it would be useful to distinguish between descriptive norms and false consensus processes in analyzing the data. In the present research, it was not clear

whether one engaged in environmentally-conscious behaviors because others did, or just because one perceived others engaged in the same behaviors as oneself. It would also be helpful to clarify the concept of network. The eco-net in the present study had some conceptual overlap with descriptive norms, but results of the present study showed that the eco-net was one of the important variables that determined behavior. Therefore, it would be interesting to further explore the role of social networks in the U.S. and in Japan.

Another limitation of the present study is that we only compared the U.S. and Japan using university students as respondents. In order to generalize the present results, it would be important to use more representative samples from other countries which perhaps have different perspectives on environmental issues.

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Table 1

Factor Loadings of Behavioral Measures

	Factor1	Factor2	Factor3
Turn off facets when I shampoo my hair	.77		
Prefer products with a green mark	.66		
Take own bag for shopping	.66		
Turn off facets when I brush my teeth	.56		
Turn off the lights		.78	
Switch off air conditioner frequently		.77	
Keep the temperature moderately		.67	
Take old items to second hand shops			.80
Take old books to second hand shops			.77
Recycle plastic bottles	.42		.44
Eigenvalues	2.05	1.88	1.59

Table 2

Mean Scores and Standard Deviations of Each Type of Environmentally - Conscious Behavior

Country		Own behavior			Estimation of others' behavior		
		Water conservation and shopping	Energy conservation	Re-use	Water conservation and shopping	Energy conservation	Re-use
U.S.	M	1.86	2.86	2.49	1.67	1.35	1.85
	SD	.53	.72	.80	.47	.29	.43
Japan	M	2.58	2.97	2.26	1.81	1.90	1.96
	SD	.69	.80	.70	.48	.41	.55

Table 3

Zero-order Correlations between Variables in the U.S. and Japan

	1	2	3	4	5	6	7	8	9
1 Attitude		.19*	.11	.02	.08	.01	.40***	.35***	.29***
2 Subjective norm	.27**		.59***	.02	.05	.05	.16*	.13	.21***
3 Eco-net	.04	.22*		-.09	-.03	-.05	.25**	.09	.17*
4 Estimation (water)	.09	.05	-.24*		.34***	.36***	.26***	.10	.06
5 Estimation	.00	-.05	-.13	.44***		.35***	.01	.44***	.08
6 Estimation (re-	.07	.15	-.08	.41***	.38***		.04	.11	.46***
7 Behavior (water)	.22*	.28**	.03	.24**	-.18	-.05		.44***	.46***
8 Behavior (energy)	.22*	.19*	.13	-.03	.15	-.01	.28**		.39***
9 Behavior (re-use)	.10	.13	.17	.05	.06	.33***	.21*	.25**	

Note. 1 Correlations for American sample are above the diagonal; those for the Japanese sample are below the diagonal.

2 Estimation: Estimation of others' behavior, Behavior: Own behavior

3 *** $p < .001$, ** $p < .01$, * $p < .05$

Table 4

Multiple Regressions for Each Kind of Behavior

	Water conservation and shopping behavior		Energy conservation behavior		Re-use behavior	
	U.S.	Japan	U.S.	Japan	U.S.	Japan
Attitude	.36***	.13	.33***	.19	.26***	.07
Subjective norm	- .07	.22*	- .06	.13	.05	.03
Eco-net	.27*	.03	.09	.11	.13	.18*
Estimation of others' behavior	.25**	.22*	.39***	.17	.46***	.33***
R-square	.25	.14	.28	.11	.32	.15
F value	11.8***	4.4**	13.7***	3.2*	16.3***	4.77**

Note. *** $p < .001$, ** $p < .01$, * $p < .05$