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The Role of Empathy in Entrepreneurial Opportunity Recognition: An Experimental Study in  
Japan and Pakistan

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The Role of Empathy in Entrepreneurial Opportunity Recognition: An Experimental Study in  
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Abstract

The paper investigates the role of perspective taking and empathic concern as cognitive and affective components of empathy in entrepreneurial opportunity recognition. The results of the scenario-based experimental study using the samples of undergraduate business students in Japan and Pakistan suggest that, although the use of perspective taking in the entrepreneurial context helps individuals in recognizing opportunities as the previous study found, the use of both perspective taking and empathic concern increases the ability of opportunity recognition more than the use of perspective taking only. We discuss theoretical and practical implications and future research directions.

*Keywords:* opportunity recognition, perspective taking, empathic concern, experiment

### **Introduction**

The scholarly field entrepreneurship is aimed at understanding how the opportunities are discovered, created and exploited (Shane & Venkataraman, 2000). Regarding this point, past research identified the importance of “perspective taking” or the adoption of the perspective of another person in an entrepreneur’s opportunity recognition because perspective taking enables entrepreneurs to think from the customer’s perspective (Prandelli, Pasquini, & Verona, 2016). While Prandelli et al.’s (2016) study is valuable in understanding the psychological process of opportunity recognition, their focus on perspective taking only concerns the cognitive component of taking another person’s perspective or “empathy” in a broad term. Indeed, prior literature indicates that perspective taking is a cognitive component of empathy and that there is also an affective component of empathy, which is called “empathic concern” (Davis, 1980). Therefore, the aim of the current study is to explore the psychological process of entrepreneurs’ opportunity recognition by paying close attention to both perspective taking and empathic concern as two components of an overarching construct of empathy.

### **Opportunity Recognition and Perspective Taking**

The whole process of opportunity recognition begins with the entrepreneur’s idea, and the process continues with the evaluation of the idea’s feasibility and the uncertainties related to its implementation (e.g., Dimov, 2007, 2010; Haynie, Shepherd, & McMullen, 2009). The idea itself is not the same as an opportunity, but the opportunity could never be brought into existence without an idea (Dimov, 2007). Opportunity recognition is a multidimensional construct involving the subdimensions of market alignment, feasibility, and desirability (Grégoire, Shepherd, & Lambert, 2010) and is different from creativity that is defined in the literature as the mere generation of novel and useful ideas (West, 2002). From this illustration

, the real spirit of opportunity recognition is to understand the customers' needs and wants in the form of demand (Prandelli et al., 2016).

Prior research has focused on the important cognitive mechanism of perspective taking in opportunity recognition (Prandelli et al., 2016). Perspective taking is defined as the adoption of the perspective of another person and anticipating his or her behavior (Davis, 1980). While users are better positioned to recognize market opportunities, entrepreneurs tend to be limited by their own experience which is narrow for recognizing opportunities. Therefore, taking the perspective of users will help entrepreneurs broaden their spectrum of perspectives for "entrepreneurial imagination" and to select those opportunities that are relevant for the users' needs and wants (Prandelli et al., 2016). Prandelli et al. (2016) empirically demonstrated that, through their experimental study, perspective taking increases the ability of opportunity recognition.

### **Perspective Taking and Empathic Concern**

Empathy has both cognitive and affective components that represent the psychological states of the understanding of other people (Davis, 1980), and perspective taking is a cognitive component of empathy. Therefore, to achieve deeper understanding of the psychological process of entrepreneurs' opportunity recognition, we add the affective component of empathy or empathic concern in the analytical framework. Empathic concern is defined as the understanding of the true feelings, emotions, and problems of another person, which means the emotional reaction to other people's problems (Davis, 1980).

We argue that the use of both perspective taking and empathic concern (i.e., the use of both cognitive and affective components of empathy) in the entrepreneurial context will increase the ability of entrepreneur's opportunity recognition more than the use of perspective taking only. First, at the neural level, affect influences several aspects of cognitions (e.g., Borman, Penne, Allen, & Motowidlo, 2001), which promotes the expansion and combination

of existing cognitive frameworks and the development of novel ideas (e.g., Ward, 2004). Therefore, the affective component of empathy (i.e., empathic concern) will enhance the effect of cognitive component of empathy (i.e., perspective taking) on opportunity recognition through widening the scope of the entrepreneurial mind further.

Second, research shows that entrepreneurs are more apt to be overconfident and self-centered (Zhao & Seibert, 2006), which may cause the ignorance of the feeling of customers in searching for entrepreneurial opportunities. Therefore, even though the use of perspective taking only will help entrepreneurs understand the needs and wants of the customers, its effect on entrepreneurial imagination may be moderate at best (see Kaish & Gilad, 1991). In this sense, the use of both perspective taking and empathic concern promotes the deeper understanding of customers' feelings as well as their perspectives, which contributes to the development of ideas that have higher levels of market alignment, feasibility, and desirability (i.e., opportunity recognition).

Third, the use of empathic concern leads to the feeling of compassion, which is defined as the motivation or desire to help others (Batson, Chang, Orr, & Rowland, 2002). Entrepreneurs are generally less altruistic than other types of individuals (Zhao, Seibert, & Lumpkin, 2010) and their motivation to help others are relatively weak (Zhao, & Seibert, 2006). Therefore, the use of empathic concern in addition to perspective taking will overcome these shortcomings by promoting their feeling of compassion or the motivation to help customers, which also contributes to the development of ideas that have higher levels of market alignment, feasibility, and desirability.

All in all, we predict that in the entrepreneurial context, the use of both perspective taking and empathic concern would be more helpful for entrepreneurs than the use of perspective taking only in recognizing opportunities because the former enables them to use

both cognitive and affective functions to understand the customers' feelings and thoughts more deeply and increases the entrepreneurs' feelings of compassion to help customers.

**Hypothesis 1:** The use of both perspective taking and empathic concern in the entrepreneurial context increases the ability of opportunity recognition more than the use of perspective taking only.

### **Method**

To test our hypothesis, we conducted a scenario-based experimental study that is similar to Prandelli et al's (2016) study. The questionnaire containing a scenario-based experiment was administered to undergraduate university students in Japanese and Pakistani universities as described below.

#### **Japanese Sample**

Participants were recruited from a management class in a public university located in Osaka, Japan. They were offered extra credit in return for participation in the study. All participants were told that participation in the study was anonymous and voluntary. About 90 percent of the students who attended the class agreed to participate in this study, resulting in a sample size of 131, which included 74.5 percent males and 25.95 percent females with an average age of 22.07 (SD=2.07). Over 90 percent of the participants had part-time work experience.

#### **Pakistani Sample**

Participants were recruited from a management class in a public university located in Islamabad, Pakistan. Extra credit was given in return for participation in the study. All participants were told that participation in the study was anonymous and voluntary. About 90 percent of the students who attended the class agreed to participate in this study, resulting in a sample size of 120, which included 75.0 percent males and 25.0 percent females with an average age of 21.19 (SD = 1.32).

### **Experimental Design and Procedure**

We developed a scenario in which participants play the role of an entrepreneur who is expected to develop a product. As a context for the entrepreneurial situation, we followed Prandelli et al. (2016) and selected the diet issue for the experimental setting. The health issue is important for both Japan and Pakistan. Japanese people are highly conscious of diet and health issues, and, on the other hand, health and diet issues are some of the concerns for the people of Pakistan (Rozin, Fischler, Imada, Sarubin, & Wrzesniewski, 1999; World Bank, 2012). It was likely for participants in both samples in Japan and Pakistan to come up with innovative ideas about health and diet issues.

The scenario used in our study is shown in the Appendix. Similar to the study by Prandelli et al., (2016), participants were told the story of a successful manager who is sensitive to his diet issues because he likes sports and running. Then, we asked the participants to help the manager invent a new product that would help him maintain his health and keep him fit during working hours. Following Prandelli et al. (2016), the participants were told that their idea would be evaluated in terms of usefulness, alignment and novelty. The participants provided their ideas in writing by explaining in detail about their product and how its usage will solve the problem of the manager.

In this experimental study, one factorial between-subjects design was employed in which state empathy was manipulated: the use of both perspective taking and empathic concern (hereafter PT & EC), the use of perspective taking only (hereafter PT only), and no use of empathy (i.e., control). The students were randomly assigned to the three conditions for both samples of Japan and Pakistan. The Japanese sample included the PT & EC group (n = 47), the PT only group (n = 43), and the control group (n = 41). The Pakistani sample included the PT & EC group (n = 45), the PT only group (n = 39), and the control group (n = 36). Each group received the same scenario except for the manipulation of state empathy.



### **Manipulation of State Empathy**

We manipulated state empathy of participants in the scenarios. For the PT & EC condition, we asked the participants to imagine how this problem was affecting the life of a manager. The participants were asked to emotionally engage in the manager's problem with emotional attachment and empathy to figure out his problem. They were asked to see the full impact of how this manager was feeling. There is evidence that understanding emotional cues require cognitions and emotions and this manipulation were expected to activate both empathic concern and perspective taking (Eisenberg, Shea, Carlo, & Knight, 2014). For the PT only condition, the participants were asked to put themselves in the manager's shoes and find the solution to his problem. For the control condition, participants were asked to see the problem independently and objectively. That is, these participants were expected to avoid using the perspective taking and empathic concern (see Prandelli et al., 2016).

The participants answered the manipulation check question drawn from Davis et al. (1996) and Galinsky et al. (2008) to assure that they properly understand the story and questions according to the priming. Questions were asked using 7 points Likert scale. The following questions were asked that correspond to the manipulation: "I see the full impact of how this manager was feeling and completely understand his emotions and feelings (PT & EC group answered this question; M = 6.44 for Japanese sample and M = 6.51 for Pakistani sample, respectively)", "I took Charles' perspective and put myself in his shoes (PT only group answered this question; M = 6.05, M = 6.11, respectively)" and "I read the story objectively (Control group answered this question; M = 6.02, M = 5.71, respectively). All participants rated above the midpoint of the scale, indicating the successful manipulation of the all three groups in both samples.

### **Dependent Variable**

As in Prandelli's (2016) study, we used the consensual assessment technique to measure opportunity recognition as a main dependent variable (Grant & Berry, 2011). For each sample, we requested two individual raters having a lot of experience in food and beverages and health-related industries to evaluate the participants' idea. The raters evaluated the idea on the Likert scale of 1 to 7. We adopted Gregoire et al.'s (2010) scale to measure the sub-dimensions of opportunity recognition, namely, alignment, desirability, and feasibility. The scale reliability and the inter-rater reliability using the intraclass correlation coefficient (ICC) (Grant & Berry, 2011; LeBreton & Senter, 2008) are reported in the result section.

### **Control Variables**

Following Prandelli et al.'s (2016) study and also based on the past research on opportunity recognition and exploitation (Baron, 2006; Grant & Berry, 2011; Nicolaou, Shane, Cherkas, & Spector, 2009; Tominc & Rebernik, 2007), we controlled for age, gender, job experience, prosocial motivation (4 items, Grant, 2008), intrinsic motivation (4 items, Grant, 2008), entrepreneurship self-efficacy (4 items, Zhao, Seibert, & Hills, 2005), self-efficacy for help (5 items, Morrison & Phelps, 1999; Podsakoff, MacKenzie, Moorman, & Fetter, 1990), entrepreneurship alertness (4 items, Kaish & Gilad, 1991), entrepreneurship intentions (4 items, Zhao et al., 2005), self-perceived creativity (30 adjectives, Oldham & Cummings, 1996), and personal innovation (20 items, Baumgartner & Steenkamp, 1996).

### **Results**

As a preliminary analysis, we tested the reliability of the dependent variable measured in both samples. The compact measure of opportunity recognition including three facets of alignment, desirability, and feasibility showed the good reliability of 0.98 for the Japanese sample and 0.97 for the Pakistani sample.

--- Insert Table 1 about here ---

--- Insert Table 2 about here ---

Tables 1 and 2 show the ICC of two raters for the Japanese and Pakistani samples. For the Japanese sample, the means of alignment, feasibility and desirability are 4.55, 4.44 and 4.36 respectively. Two raters get good ICCs of alignment = 0.80, feasibility = 0.70 and desirability = 0.78. For the Pakistani sample, the means of alignment, feasibility and desirability are 4.35, 4.19 and 4.28 respectively. Two raters achieved ICC of alignment = 0.68, feasibility = 0.69 and desirability = 0.70. Therefore, for both samples, we calculated the average of three sub-dimensions to obtain a compact measure of opportunity recognition.

--- Insert Table 3 about here ---

--- Insert Table 4 about here ---

Tables 3 and 4 present means and standard deviations of the variables (per group), and correlations between the variables for both Japanese and Pakistani Samples respectively. Reliability coefficient for each variable is also shown in the correlation matrix when available.

To test our hypothesis, we conducted one-way ANOVA to test the differences of means between experimental groups (PT & EC, PT only, and control) on opportunity recognition. In the Japanese sample, the results show that mean differences between the three groups is significant ( $F = 255.5$ ,  $p < 0.01$ ). We further conducted Tukey HSD test to compare the mean differences between the groups. The difference between each pair of groups is all significant at the  $p < 0.01$  level. The mean of the PT & EC group ( $M = 5.66$ ,  $SD = 0.44$ ) is significantly higher than that of the PT only group ( $M = 4.42$ ,  $SD = 0.56$ ), the latter of which is also significantly higher than that of the control group ( $M = 3.10$ ,  $SD = 0.59$ ). In the Pakistani sample, the ANOVA results show that mean difference between the three groups is significant ( $F = 80.8$ ,  $p < 0.01$ ). We further conducted Tukey HSD test to compare the mean

differences between the groups. The mean of the PT & EC group ( $M = 5.16$ ,  $SD = 0.91$ ) is significantly higher than that of the PT only group ( $M = 4.14$ ,  $SD = 0.44$ ), the latter of which is also significantly higher than that of the control group ( $M = 3.30$ ,  $SD = 0.44$ ). The results for both samples are consistent with the findings by Prandelli et al. (2016) such that the PT only group performed better than the control group. However, the results from both samples further show that the PT & EC group performed even better than the PT only and the control groups. Figure 1 illustrates the results of Japanese and Pakistani samples.

--- Insert Figure 1 about here ---

We also checked the robustness of the model through ANCOVA with control variables to examine mean variations. The mean differences between groups in the ANCOVA model were significant for both Japanese sample and Pakistani samples ( $F = 223.94$ ,  $p < 0.01$ ;  $F = 29.49$ ,  $p < 0.01$ , respectively). To further confirm whether any pair of groups is significantly different in the dependent variable after controlling for the covariates, we conducted Tukey HSD test. The results revealed that differences between groups were all significant ( $p < 0.05$ ) with the same pattern as the main analysis for both Japanese and Pakistani samples.

To ensure that the instructions and manipulations of our main study are appropriate, we conducted a follow-up study in which 41 undergraduate students (the PT & EC group [ $n = 17$ ], the PT only group [ $n = 12$ ], and the control group [ $n = 12$ ]) in business classes in Japan read one of the same scenarios used in our main study and answered the following manipulation check items<sup>1</sup>. First, two items were used to see whether slight wording differences in the instruction in the scenarios influenced the understanding of the expected tasks. A sample item was: "I am expected to invent a new product to solve Charles's diet

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<sup>1</sup> Participants in the follow-up study were also asked to create the business ideas like our main study but they were not used in the analysis.

issues." The result from one-way ANOVA shows that there was no significant mean difference between the experimental groups ( $F = 2.24$ , n.s.).

Next, two items were used to check whether the expected usage of empathic concern was different between the experimental groups. A sample item was: "I am required to imagine how Charles feels about his problem." The result from one-way ANOVA shows that there were significant mean differences between the experimental groups ( $F = 53.18$ ,  $p < .01$ ). The Tukey HSD test further revealed that the mean score of the PT & EC groups ( $M = 4.80$ ,  $SD = 0.43$ ) was significantly higher than that of the PT only group ( $M = 3.41$ ,  $SD = 1.29$ ), and the mean score of the control group ( $M = 1.33$ ,  $SD = 0.80$ ) was significantly lower than those of two other groups.

Finally, two items are used to check whether the expected usage of perspective taking was different between the experimental groups. A sample item was: "I am expected to invent a new product by understanding Charles's perspective." The result from ANOVA shows that there was a significant difference in the mean scores between the experimental groups ( $F=16.01$ ,  $p < .01$ ). The Tukey HSD test further revealed that the mean scores of the PT & EC group ( $M = 4.50$ ,  $SD = 0.70$ ) and the PT only group ( $M = 4.70$ ,  $SD = 0.45$ ) were significantly higher than that of the control group ( $M = 2.54$ ,  $SD = 1.71$ ), but the mean difference between the former two groups was not significant. All in all, the results of the follow-up study suggest that the participants used both perspective taking and empathic concern in the PT & EC condition whereas the participants mainly used perspective taking in the PT only condition, which is consistent with our intended manipulation.

### **Discussion**

The current study contributes to the entrepreneurship literature in various ways by constructively replicating and extending the part of the findings by Prandelli et al. (2016). First, for both Japanese and Pakistani samples, our results successfully replicated Prandelli et

al.'s (2016) finding that the use of perspective taking in the entrepreneurship context increases the ability of recognizing opportunities in the market, demonstrating the generalizability of their finding to different regions of the world (e.g., collectivistic cultures). Second, the current study extended Prandelli et al.'s (2016) study by providing the complete picture of the construct of empathy and its role in opportunity recognition. Specifically, considering both perspective taking and empathic concern as cognitive and affective components of empathy, the results from both Japanese and Pakistani samples consistently show that the use of both perspective taking and empathic concern has greater merit than the use of perspective taking only, at least in the early stages of the entrepreneurial process such as opportunity recognition.

### **Practical Implications**

Our findings have implications for practice of entrepreneurship. First, prior research suggested that taking user perspectives can enhance the ability of entrepreneurs to recognize opportunities with strong market preferences (Prandelli et al., 2016). Our findings further suggest that trying to understand the true feeling of customers add extra benefits to the effect of perspective taking in helping entrepreneurs come up with ideas which are desirable and aligned with the needs of the customers (Shane & Venkataraman, 2000). Second, research suggests that user information is idiosyncratic and costly to transfer to entrepreneurs (Von Hippel & Tyre, 1995). Moreover, entrepreneurs' cognitive biases also impede their ability to understand the needs and wants of customers (Hmieleski & Baron, 2008; Simon & Houghton, 2002). In this sense, findings of our study suggest that using both cognitive and affective components of empathy helps entrepreneurs overcome these limitations and generate useful ideas to bring entrepreneurial opportunity in the market.

### **Limitations and Future Research**

Our research is not without limitations. First, our samples as business undergraduate students may not be able to fully generalize the characteristics of the real entrepreneurs. Second, because one of our research objectives was to replicate and extend Prandelli et al. (2016)'s work using different samples, we used the experimental design, including the method of manipulation and the idea generation format, which is very similar to the study of Prandelli et al. (2016). However, the inducement of cognitive and affective components of empathy could be richer and more compelling way. Different formats could also be used to describe the ideas generated by participants. Third, experiments may not be able to identify the real-world opportunities in the market (Colquitt, 2008).

While our research identified the importance of cognitive and affective components of empathy, future research could investigate factors that influence the entrepreneurs' use of empathy in recognizing opportunities. For example, empathy can be influenced by certain personality traits (Mitsopoulou & Giovazolias, 2015) and being empathic can be learned (Boker, Shapiro, & Morrison, 2004). Therefore, future research could examine personality traits and training as the antecedents of the use of empathy in the entrepreneurial context. Additionally, it may also be interesting to find out whether perspective taking and empathic concern lead to the recognition of different kinds of opportunities.

Exploring the construct mindfulness and its influence on cognitions and affects are promising avenues for entrepreneurship research. We believe that our research is beneficial towards the deeper understanding of the cognitive and affective theories of entrepreneurship.

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Table 1

*Consensus Technique: Ratings From Experts (Japanese Sample)*

Rater	Mean(SD)			
	<i>Alignment</i>	<i>Desirability</i>	<i>Feasibility</i>	<i>Opportunity Recognition</i>
1	4.55 (1.42)	4.32 (1.4)	4.46 (1.39)	4.45 (1.36)
2	4.33 (1.23)	4.39 (1.22)	4.42 (1.24)	4.45 (1.2)
Total	4.55 (1.22)	4.36 (1.19)	4.44 (1.19)	4.45 (1.18)

Note: For Alignment, ICC=0.80, for Desirability, ICC=0.78, and for Feasibility, ICC=0.76 (P<0.01)

Table 2

*Consensus Technique: Ratings From Experts (Pakistani Sample)*

Rater	Mean(SD)			
	<i>Alignment</i>	<i>Desirability</i>	<i>Feasibility</i>	<i>Opportunity Recognition</i>
1	4.19 (1.26)	4.09 (1.21)	4.00 (1.31)	4.10 (1.20)
2	4.51 (1.17)	4.46 (1.05)	4.38 (1.13)	4.45 (1.06)
Total	4.35 (1.06)	4.28 (0.99)	4.19 (1.07)	4.27 (1.01)

Note: For Alignment, ICC=0.68, for Desirability, ICC=0.70, and for Feasibility,

ICC=0.69 (P<0.01)

Table 3  
*Descriptive Statistics and Correlation Matrix (Japanese Sample)*

	PT & EC Group n=47		PT Only Group n=43		Control Group n=41		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
	Mean	SD	Mean	SD	Mean	SD																
1 Age	22.26	2.04	21.65	1.73	22.29	2.38																
2 Gender	0.72	0.45	0.74	0.44	0.76	0.43	0.05															
3 Job Experience	2.13	1.46	2.15	1.18	2.15	1.4	0.24*	-0.08														
4 Opportunity Recognition	5.66	0.44	4.42	0.56	3.1	0.59	-0.02	-0.03	-0.06	(0.98)												
5 Alignment	5.79	0.47	4.53	0.59	3.16	0.63	-0.02	-0.04	-0.06	0.99**	(0.80)											
6 Feasibility	5.64	0.51	4.42	0.56	3.09	0.6	-0.02	0.06	-0.08	0.99**	0.96**	(0.76)										
7 Desirability	5.55	0.48	4.31	0.66	3.04	0.65	-0.02	0.01	-0.04	0.98**	0.95**	0.95**	(0.78)									
8 Entrepreneurial Self-Efficacy	3.43	0.96	3.69	0.56	3.69	0.58	0.06*	0.21	0.05	-0.14	-0.14	-0.16	-0.13	(0.86)								
9 Efficacy for Help	3.86	0.57	3.87	0.61	3.85	0.57	0.02	0.05	0.00	-0.03	-0.03	-0.03	-0.03	0.36**	(0.82)							
10 Intrinsic Motivation	4.09	0.54	4.08	0.56	3.87	0.49	0.15	0.12	0.08	0.13	0.14	0.13	0.12	0.34**	0.42**	(0.76)						
11 Pro Social Motivation	3.91	0.81	4.03	0.56	4.05	0.55	0.00	0.19*	0.02	-0.12	-0.10	-0.11	-0.13	0.39**	0.45**	0.55**	(0.81)					
12 Entrepreneurial Alertness	4.62	0.94	4.41	0.77	4.48	0.93	0.03	0.20*	0.10	0.05	0.06	0.03	0.05	0.31**	0.42**	0.42**	0.36**	(0.70)				
13 Entrepreneurship Intention	2.91	1.21	3.38	0.70	3.09	0.79	0.13	0.27**	0.09	-0.07	-0.09	-0.06	-0.04	0.5**	0.11**	0.25	0.20*	0.17	(0.91)			
14 Personal Innovation	3.47	0.52	3.97	0.47	3.64	0.39	0.00	0.07	-0.05	-0.17	-0.15	0.199*	-0.16	0.39**	0.31**	0.34**	0.34**	0.15	0.44**	(0.87)		
15 Self-Perceived Creativity	1.18	1.4	2.06	1.15	1.65	1.66	0.05	0.24**	-0.05	-0.09	-0.09	-0.08	-0.09	0.34**	0.05	0.14	0.22*	0.04	0.39**	0.24**	(0.42)	

Note: Reliabilities are in parentheses on the diagonal when applicable.

\*\* p<0.01

\*p<0.05

Table 4  
*Descriptive Statistics and Correlation Matrix (Pakistani Sample)*

	PT & EC Group n=47		PT Only Group n=43		Control Group n=41		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
	Mean	SD	Mean	SD	Mean	SD																
1 Age	20.56	0.94	21.74	1.35	21.39	1.38																
2 Gender	0.71	0.46	0.72	0.46	0.83	0.38	0.20															
3 Job Experience	0.62	0.74	0.58	0.33	0.71	0.75	-0.20	-0.34														
4 Opportunity Recognition	5.16	0.91	4.15	0.45	3.3	0.44	-0.22*	-0.01	0.13	(0.97)												
5 Alignment	5.25	0.97	4.23	0.5	3.36	0.53	-0.21*	0.01	0.06	0.98**	(0.70)											
6 Feasibility	5.06	1.03	4.07	0.55	3.24	0.58	-0.21*	0.00	0.16	0.97**	0.94**	(0.70)										
7 Desirability	5.18	0.85	4.13	0.44	3.3	0.41	-0.22*	-0.03	0.15	0.96**	0.91**	0.9**	(0.70)									
8 Entrepreneurial Self-Efficacy	3.88	0.54	3.67	0.59	3.98	0.50	0.06	0.15	-0.07	-0.06	-0.08	-0.02	-0.09	(0.54)								
9 Efficacy for Help	3.77	0.44	3.64	0.64	3.92	0.42	-0.04	0.03	0.18	-0.03	-0.06	0.00	-0.03	0.39**	(0.55)							
10 Intrinsic Motivation	3.82	0.64	3.8	0.73	3.98	0.53	-0.02	0.25*	-0.05	-0.06	-0.07	-0.01	-0.11	0.3**	0.16	(0.78)						
11 Pro Social Motivation	3.8	0.65	3.81	0.61	3.97	0.49	-0.08	0.08	0.02	-0.05	-0.06	0.01	-0.09	0.29**	0.29**	0.54**	(0.74)					
12 Entrepreneurial Alertness	4.01	0.84	4.24	0.88	4.69	0.62	0.09	0.20*	0.31	-0.27*	-0.28**	-0.22*	-0.31**	0.36**	0.26**	0.28**	0.29**	(0.74)				
13 Entrepreneurial Intention	3.65	0.64	3.72	0.57	3.84	0.57	-0.06	-0.02	0.04	-0.08	-0.09	-0.03	-0.11	0.37**	0.41**	0.27**	0.49**	0.27**	(0.70)			
14 Personal Innovation	3.66	0.34	3.66	0.41	3.76	0.31	0.05	0.08	0.04	-0.11	-0.14	-0.08	-0.10	0.26**	0.29**	0.29**	0.36**	0.26**	0.28**	(0.76)		
15 Self-Perceived Creativity	4.8	2.42	5.44	1.52	5.31	1.12	0.03	0.01	0.15	-0.19	0.21*	-0.17	-0.17	0.19*	0.16	0.02	0.06	0.20	0.17	-0.03	(0.53)	

Note: Reliabilities are in parentheses on the diagonal when applicable.

\*\* p<0.01

\*p<0.05



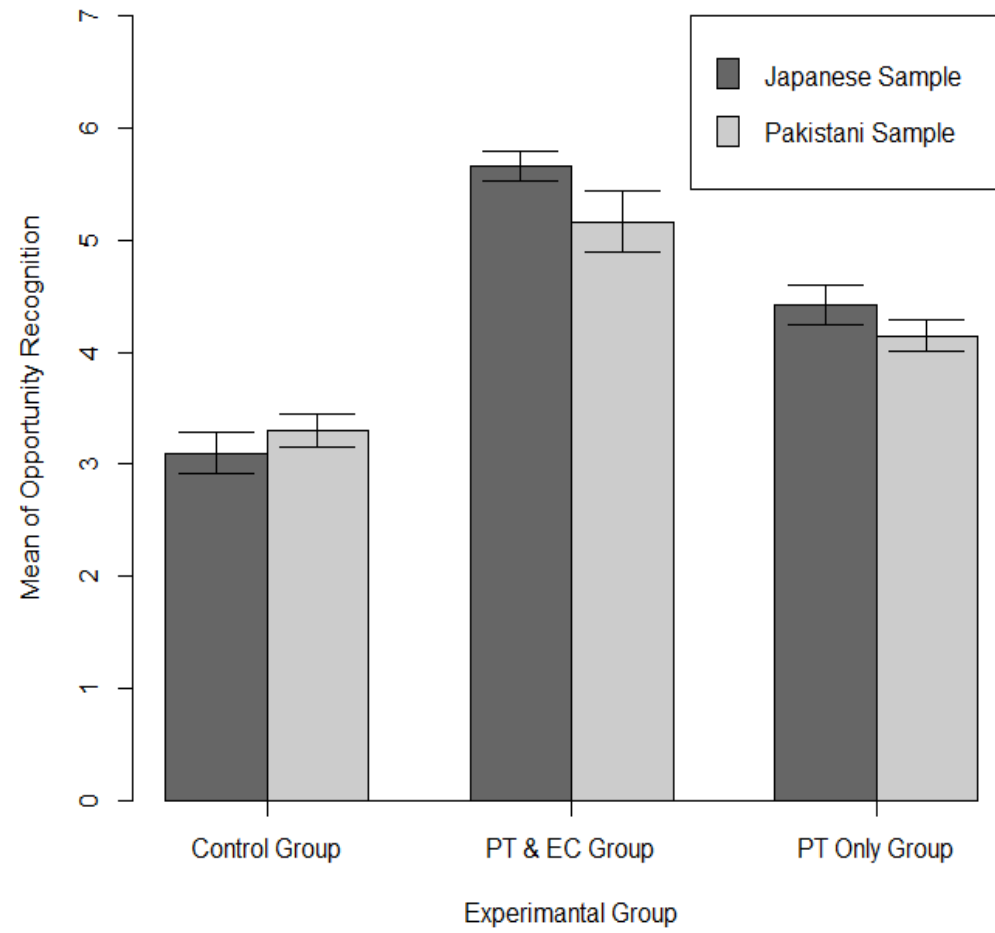


Figure 1. Opportunity recognition across experimental groups.

## APPENDIX

**Experimental Scenario (PT & EC Condition)**

**Please read the following scenario and present your idea for a new product.**

Charles is a successful manager who is passionate about sports and running and who is sensitive to diet issues. He wants a product for himself to maintain a healthy lifestyle during working hours. *Imagine how Charles feels about his problem. See the full impact of Charles' feelings and emotions. Try to emotionally engage and be involved with Charles' problem by feeling how diet issues can affect his life. Please help Charles by inventing a new product that might help him solve his diet issues. By emotionally attaching yourself with Charles' problem, present your new product idea for Charles, which can help him resolve his diet issues.* Your idea will be evaluated in terms of novelty, usefulness, and alignment with the user's needs.

**PT Only Condition (Replacing the Italicized Part)**

Put yourself in Charles' shoes and try to figure out his thoughts when experiencing the problem. Imagine and think about his viewpoint as vividly and clearly as possible and help Charles by inventing a new product that will help him to maintain his healthy lifestyle during working hours. Please briefly suggest a new product that might help Charles solve his diet issues.

**Control Group (Replacing the Italicized Part)**

You should avoid the user's perspective and should not emotionally see the problem, and you should instead provide more independent and careful ideas for a new product. Please briefly suggest a new product that might help Charles solve his diet issues.

*Note:* Scenarios and instructions were written in Japanese for the Japanese sample and in English for the Pakistani sample.