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## A Meta-analytic Test of the Effects of Group Diversity on Group Outcomes

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### **Abstract:**

*This study carried out a meta-analysis on group diversity and group outcomes. Using data from 3,534 teams in 13 studies conducted in team-level settings, it was examined whether contextual factors at research local and team-size influenced group outcomes of group diversity. This study analyzed the relationship between group diversity and group performance through meta-analytic test. The analysis included 13 papers published between 2009 and 2014. As a result of the meta-analysis that group diversity had a positive effect on group performance (Fisher's  $Z = .112$ ,  $k = 32$ , 95% CI = 0.039 to 0.183). After that, we investigated the moderating effect of the research area and team-size. As a result, research area moderating effect was significant, but team-size was not supported. Based on the above, the findings suggest implications and future research directions.*

**Keywords:** Group diversity, group outcomes, meta-analytic, cross-cultural research

### **1. Introduction**

Diversity of a company's human resources has been gradually intensifying. The impact of diversity on human resource performance is both positive and negative, like a double-edged sword (Webber & Donahue, 2001). Organizations will be able to improve outcomes depending on how the diversity is utilized. The focus of this study is the relationship between diversity and performance of human resources.

In order to achieve the research purpose, we used a meta-analytic test. It analyzes the overall flow between diversity and performance. Meta-analysis is a comprehensive analysis method that systematically and quantitatively analyzes various research results on the same topic (Hwang, 2014).

Research in the area of group diversity has grown dramatically however related studies do not provide a clear consensus. In the previous study, the influence of group diversity was verified through meta-analysis, and the task-related diversity had a positive influence on group performance (Horwitz & Horwitz, 2007). There are three main streams of diversity research. First, diversity has a positive effect on performance. The study showed that group heterogeneity is positive for group performance (Hambrick, Cho, & Chen, 1996), and active advances in women and minorities contribute to creativity and competitive advantage (Milliken & Martins, 1996). Second, diversity has a negative impact on performance (Michel & Hambrick, 1992; Zajac, Golden, & Shortell, 1991). According to related research, group heterogeneity is negative for group performance, increasing turnover and absenteeism, reducing satisfaction (Ely, 2004; O'Reilly, Caldwell, & Barnett, 1989), and causing conflict among members (Harrison & Klein, 2007). Finally, studies show that diversity has nothing to do with group performance (O'Reilly, Snyder, & Boothe, 1993). It is necessary to grasp the whole flow of diversity research through meta-analysis in a situation where the relationship between diversity and performance is mixed. It also extends the scope of the study by identifying contextual factors in relation to diversity and group performance.

This study reveals the relationship between diversity and performance and verifies the moderating effect of the context variables (local and team-size). Based on the results of the analysis, the implications of the research will be derived and future research directions will be presented.

### **2. Theoretical Background and Hypothesis**

#### *2.1. Group Diversity and Group Outcomes*

Studies on diversity are being actively conducted. Diversity has a negative effect, such as creating conflicts among members and hindering communication, while also positively affecting creativity and innovation (Ely, 2004; Jehn, Northcraft, & Neale, 1999). Because of these findings some scholars call diversity a 'double-edge sword'. Thus, the researchers subdivided the diversity dimension. Some researchers were divided on surface-level diversity and deep-level diversity (Milliken & Martins, 1996; Harrison, Price, Gavin, & Florey, 2002). Also, Jehn et al. (1999) verified the relationship between variables, separated by social category diversity, information diversity and value diversity (Van der vert, Vliert, & Huang, 2005).

In some studies, researchers have tested that group diversity is positively associated with team outcomes (Horwitz & Horwitz, 2007). Diversity has a positive impact on solving problems and deriving new ideas. Although diversity research results are mixed, this paper examines whether diversity is positive for group performance. For example, educational background diversity can be expected to improve performance by bringing a variety of information, skills, and expertise from the team (Jehn et al., 1999). As a result, we expect that:

- Hypothesis 1. The Group diversity will have a positive impact on Group outcomes.

### 2.2. Moderating Effects (Local and Team-Size)

In diversity studies, it is important to identify the contextual factors because of the mixed results (positive effect and negative effect). Team-size is one of the most important variables that can limit or enhance the impact of diversity. In previous studies, the size of organization was tested as an important variable affecting the organization within the practices and procedures (Roh, 2014). From the organizational ecology point of view, the large organization is dependent on the inertia, rather than change (Hannan & Freeman, 1984). In addition, the large team negatively affects performance due to the variety of opinions and interpersonal-conflicts. In other words, a larger team-size can have a negative effect on overall performance.

In this study, to separate the literature on diversity into the Republic of Korea and elsewhere was to determine the intercultural differences that were inferred; that there is a difference in the affect depending on the effect-size of the study area. Based on the above discussion, the following hypotheses were established:

- Hypothesis 2. Local moderates the relationship between Group diversity and Group outcomes. The effect-size based on the study area will show a statistically significant difference.
- Hypothesis 3. Team-size moderates the relationship between Group diversity and Group outcomes. That is, the larger team-size will have a more negative moderating effect.

### 2.3. Research Model

As previously discussed research model was set up. H1 is the relationship between diversity and performance, H2 and H3 are investigating the moderating effect of local and team-size. The research model is shown in Fig. 1.

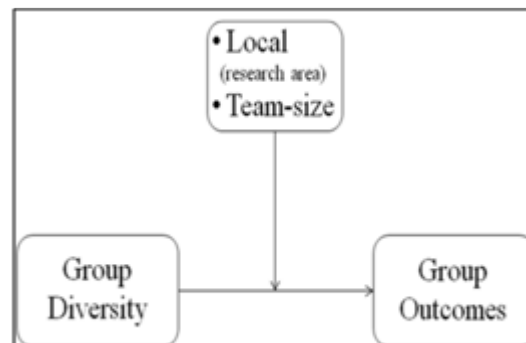


Figure 1: Research Model

## 3. Method

### 3.1. Literature Search

We implemented multiple search techniques to identify prior research. We searched the computerized databases RISS, KCI Index, EBSCO HOST, and Google Scholar using keywords such as "diversity in the workplace and performance", "diversity and satisfaction", "diversity and commitment", "diversity and creative", "diversity and OCB", "diversity and innovation". A search through the literature study were collected in the diversity and performance required for the meta-analysis.

### 3.2. Sampling

The analysis used in the study was enrolled in the study from 2009, published in 2014. However, studies with TMT were excluded, it was also excluded studies on statistics (standard deviation, correlation coefficients, sample size, etc.) required for analysis. This research was included in the final analysis utilizing the Korea Literature 6, 7 and other local papers of 13 studies (32 effect-sizes).

### 3.3. Measures

The independent variable of this study is group diversity. The types of diversity variables are as follows. Sampling results included age diversity, tenure diversity, educational diversity, racial diversity, culture diversity and gender diversity. The dependent variable was set as group outcomes. Sampling results included team performance and team creativity. Context variables included local (research area) and team-size. The research area is divided into Republic of Korea (dummy=1) and other regions (dummy=0). The team size included between 3 and 15 members. In addition, we examined industry type and team-tenure, the lack of samples could not be used for the analysis. This should be supplemented in future studies.

### 3.4. Coding of Studies

The coding was performed on the information of the literature for analysis. The information contained in coded is study name, the number of samples, a correlation, and local team-size. The 32 effect-size coding data collected for the study are shown in Fig. 2.

1	A	B	C	D	E	F
2	No.	Study name	N	r	Local	Team-Size
3	1	Park. J-1	89	0.19	1	5.75
4	2	Park. J-2	89	-0.09	1	5.75
5	3	Eom-1	365	0.189	1	13.7
6	4	LEE. J-1	238	0.14	1	5.3
7	5	Lee-1	559	0.24	1	14.07
8	6	Lee-2	559	-0.07	1	14.07
9	7	Lee-3	559	-0.13	1	14.07
10	8	Lee-4	559	-0.03	1	14.07
11	9	Park-1	163	0.187	1	3.42
12	10	Park-2	163	0.102	1	3.42
13	11	Jeon-1	213	0.526	1	6.5
14	12	Jeon-2	213	0.418	1	6.5
15	13	Jeon-3	213	0.545	1	6.5
16	14	Jeon-4	213	0.389	1	6.5
17	15	Kearney-1	83	0.1	0	6.67
18	16	Kearney-2	83	0.01	0	6.67
19	17	Kearney-3	83	-0.04	0	6.67
20	18	Kearney-4	83	0.06	0	6.67
21	19	Kearney-5	83	0.15	0	6.67
22	20	Miller-1	326	0.1	0	5.8
23	21	Miller-2	326	0.09	0	5.8
24	22	Ali-1	150	0.13	0	6.1
25	23	Ali-2	150	0.02	0	6.1
26	24	Pieterse-1	77	-0.1	0	3.9
27	25	Pieterse-2	109	-0.06	0	4.2
28	26	Andrevski-1	287	0.02	0	6.7
29	27	Andrevski-2	287	0.19	0	6.7
30	28	Badal-1	532	0.006	0	7.1
31	29	Badal-2	284	0.078	0	7.1
32	30	Poel-1	168	0.44	0	5.78
33	31	Poel-2	168	-0.22	0	5.78
34	32	Poel-3	168	-0.29	0	5.78

Figure 2: Coding of Studies

## 4. Results

### 4.1. Main Effects: Group Diversity and Group Outcomes

We tested the main effects of group diversity on group outcomes as well as the moderating effects of research local (Republic of Korea=1, other area=0) and team-size. Table 1. presents the main effect results.

	Effect Sizes(k)	Total Teams(N)	Fisher's Z	95% Confidence Interval	Q
Diversity	32	3,534	0.112	.039, .183	309.51***

Table 1: Main Effects (The Relationship between Group Diversity and Group Outcomes)

Notes. k = number of effect sizes; N = total sample sizes; Q is the effect-size heterogeneity statistic indicating the possibility of moderators (\*\*\*p<.001)

We examined the correlations between all types of diversity and group outcomes small effect-size, with statically significant results (Fisher's Z = .112, k = 32, 95% CI = 0.039 to 0.183). That is that Hypothesis 1 where group diversity has a positive impact on group outcomes was supported (Fig. 3).

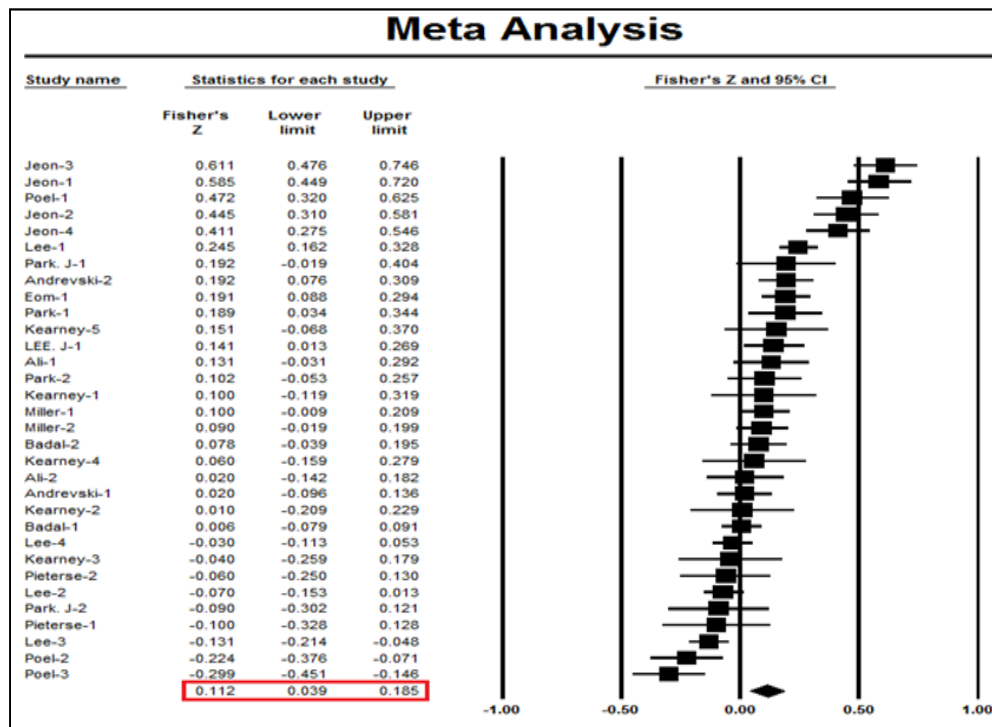


Figure 3: Forest-plot of Main Effects

4.2. Heterogeneity of Effect-Sizes

Through heterogeneity analysis it is possible to predict the difference between the effect-size. From the analysis, the heterogeneity  $Q = 309.510$ , is analyzed with  $df = 31$ ,  $p < 0.001$ ,  $Q-df > 0$  could confirm the heterogeneity (Fig. 4).

Model	Effect size and 95% interval				Test of null (2-Tail)		Heterogeneity				Tau-squared			
	Number Studies	Point estimate	Lower limit	Upper limit	Z-value	P-value	Q-value	df (Q)	P-value	I-squared	Tau Squared	Standard Error	Variance	Tau
Fixed	32	0.101	0.079	0.123	8.818	0.000	309.510	31	0.000	89.984	0.039	0.013	0.000	0.197
Random	32	0.112	0.039	0.183	2.997	0.003								

Figure 4: Heterogeneity Analysis

4.3. Moderating Effects of Local and Team-size

As heterogeneity was identified in a previously conducted analysis of the context variables, the situational factors were set at local and team size. The moderator effect in the meta-analysis verifies the effect size differences between sub-groups. In a meta-analysis refers to the variables of the study-level. Contextual variable (moderator) study area (local) was divided into South Korea and other regions were analyzed utilizing meta-analysis ANOVA (moderator variable = categorical type). Team size was analyzed utilizing meta-regression (moderator variable = continuous type). The results have been analyzed that if the moderating effect of the study area (local), team-size is statistically significant result was not obtained in the case.

4.3.1. The Moderating Role of Local

Depending on the study area were separated groups (International = 1, Korea = 0), where the effect-size of the two groups showed 0.041 and 0.198, Q-value of 4.41 ( $df = 1$ ,  $p = .036$ ) indicated by the two groups confirmed the difference between the size effect. That is, Hypothesis 2 was statistically supported (Table 2).

Groups	Effect size and 95% CI				Heterogeneity		
	Number studies	Point estimate	Lower Limit	Upper limit	Q-value	d.f(Q)	P-value
0(Others country)	18	.041	-.057	.140	4.419*	1	.036
1(Korea)	14	.198	.090	.307***			
Total Between overall	32	.112	.039	.185			

Table 2: Contextual influence: Local (research area)

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

4.3.2. The Moderating Role of Team-Size

The result because it is not supporting all the slope coefficients and regression fit moderating effect of team size was rejected (Table 3). Also moderating effect on the results shown in Fig. 5 meta-regression was not supported. That is, Hypothesis 3 was not statistically supported (Fig. 5). Team size may be inferred that it is not effective to cause the effect size difference.

	Point estimate	Lower limit	Upper limit	Z-value	P-value
Slope	-.00661	-.02964	.01641	-.56296	.57346
Intercept	.16047	-.02328	.34422	1.71162	.08697

Table 3: Contextual influence: Team-size

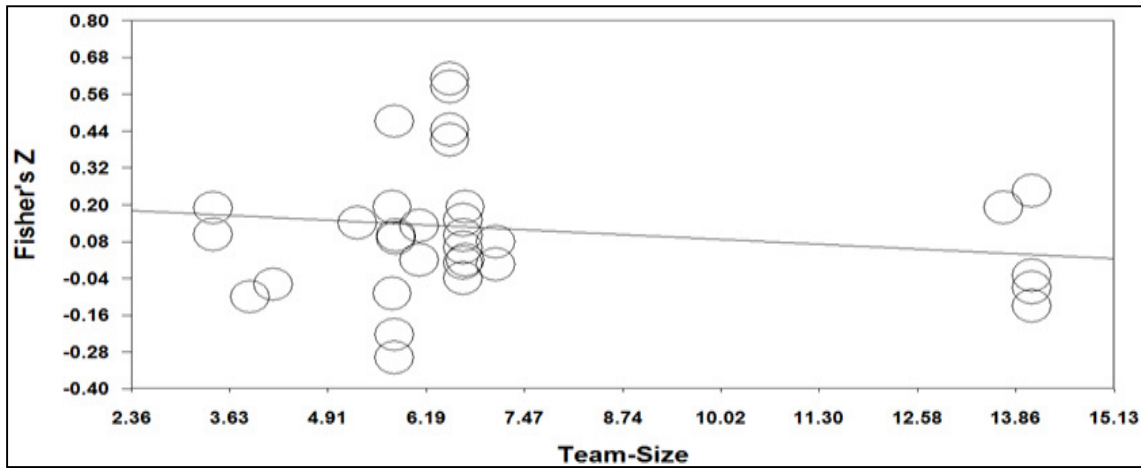


Figure 5: Regression of Team-size on Fisher'Z

4.4. Publication Bias

As research may exist that is not included in the meta-analysis conducted, publication-bias verification was carried out. To this end, we utilize the Funnel-plot and Egger's regression test (Hwang, 2014). The results show that statistical publication bias is not serious (Table 4 and Fig. 6). That verification results for this hypothesis is the level of reliable.

5. Discussion

5.1. Implication

The implications of this study are as follows: First, the theoretical implications would be statistically proven for a variety of situational factors in the relationship between diversity and performance. It confirmed the intercultural differences for the same research subject. This will need to clarify the relationship between the variables of the cultural diversity in future studies. Around the world, the diversity of the workforce is now being strengthened. Therefore, related studies should be actively proceeding. Also,

	1.2031
Standard error	1.7853
95% lower limit	-2.4449
95% upper limit	4.8512
t-value	0.6735
d.f	30
p-value	0.5057

Table 4: Publication Bias (Egger's Regression Intercept)

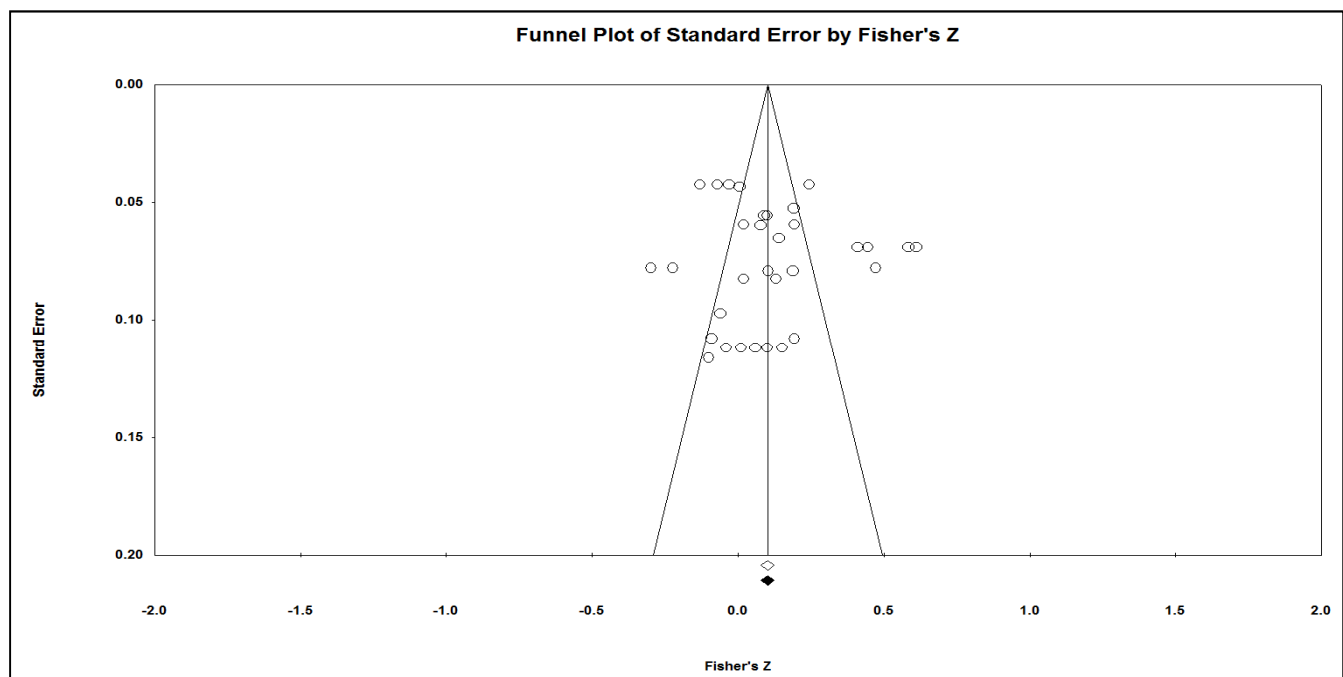


Figure 6: Funnel Plot of Standard Error by Fisher's Z

we can see it through the social identity theory, social categorization theory, and attraction-selection-attrition dealing in diversity studies infers the effects of diversity, and how the application of theory may affect the diversity to identify variables. Second look at the practical implications is as follows: The relationship between diversity and performance was proven to have a negative impact on team size; the larger the size of the team, the increase in the diversity of members, which leads to conflict and disagreement between the team members. Therefore, it is necessary to form a team of appropriate size. Thus, related hypothesis is rejected and organization administrators should set appropriate sizes for teams.

### 5.2. Limitations and Future Research

This study has some limitations. First, it did not utilize a variety of database from the literature search. Therefore, there may be studies that are not included in the analysis. Publication bias through the verification knew that minor errors published in future studies will need to run integrated into the meta-analysis, including a variety of literature. Second, without distinguishing between the dimensions of the independent variable it is analyzed in one dimension. In future studies to distinguish between diversity dimensions (population, information, values, etc.), we will need to clarify the relationship between the various variables. Third, this study only analyzed the factors of local area and team-size, and thus, future studies should include a variety of situational factors to extend the scope of the research.

## 6. Conclusion

This study reveals the relationship between group diversity and team performance. In addition, we verified the moderating effects of local and team-size. According to meta-analysis, the relationship between group diversity and group outcomes were identified as positive effect-size (Fisher's  $Z = .112$ ,  $k = 32$ , 95% CI = 0.039 to 0.183). In the context of local factors, the moderating effect has been verified. That is, it can be seen by analogy that the analysis results are different according to the study carried out in the research area. However, the moderating effect of team-size has not been verified.

A meta-analysis is a statistical analysis that combines the results of multiple quantitative studies, it refers to research synthesis. Since studies that are not included in the analysis may be ample in number, future studies will need to include a larger amount of research. Thus, human resources are becoming more diverse because it is important to effectively manage the diversity. Diversity research focuses on social categorical diversity (such as gender, age, ethnicity etc.) and information-based diversity (such as educational background, tenure, functional background etc.) (Knippenberg, De Dreu, & Homan, 2004). However, future research needs to broaden the dimension of diversity and become more concerned about how members perceive diversity. Existing diversity studies should be supplemented because they overlook the perception of members.

## 7. Notes

The draft of this paper was presented at the Zurich Switzerland Conference in January, 2017(WASET, ICBBS 2017: International Conference on Business and Behavioral Sciences) (Jeong & Baek, 2017).

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