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Examination of the Impact of Blood Groups on Group Participation

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Abstract

Could blood type provide a key to wellness and even affect our personality? The theory that blood type is linked to personality (and other mental and physical qualities) is popular mainly in Japan, though it has carried over to Taiwan and South Korea. The present study is the result of a scientific research in which the relationship between two important variables, namely blood group and group participation, are determined in the research framework. Based on some collected data from manufacturing firms which are accepted firms in Tehran Stock Exchange, and through cluster sampling a sample was selected. 380 questionnaires were distributed to the personnel of production line, of the firms then the reliability and validity of the questionnaires through independence test and average ratio comparison of the two population were examined, and through Pearson's chi-square formula, the relationship between blood group (independent variable) and group participation (dependent variable) were tested, then through Schuprow coefficient, the prioritization of blood groups over group participation was identified and the following results were obtained: people group participation is affected by their personality features which is derived from their temperament, mood, and characteristics. The study also showed that people blood groups has an effect on their group cooperation, and among blood groups, blood group A has the greatest tendency to group participation and then blood group O, AB, B are prioritized respectively.

Keywords: Blood Features, Blood Groups, Group Participation.

1. Introduction

Managers have utilized different methods to enhance employees' group participation. But various factors affect group participation. One of the most important factors is people's temperament characteristics which are, to a large extent, affected by their blood groups. A great number of researches have been conducted regarding the effect of blood groups on people's temperament. In his first research Frovave (1927), regarding blood group and personality, concluded that human blood group is one of the most important determinants of people is temperament. He stated that O and B blood groups are active (aggressive, advancing, positive) while A and AB groups are inactive (conservative, defensive, negative), thus by determining blood group we can, to some extent, identify people is temperament characteristics adequately by matching employees at work we can enhance employees participation and thus enhancing productivity in organization. Thus, this study intends to show a frame that could identify characteristics of persons in the job environment and also impress the new alternatives to managers regarding the personnel arrangement to improve productivity in organizations.

This study addresses the issue in two aspects:

1) Can people blood group affect their temperament characteristics?
2) How can a relationship between people blood group and their group cooperation be found?

2. Materials and methods

2.1. Literature review

Two recent studies (Cramer and Imaike, 2002; Rogers and Glendon, 2003) used inventories based on the widely accepted five-factor model and found no significant relationship between blood type and personality. The present study is the third published paper to examine this relationship using the five-factor model. Researchers of this study analyzed 2681 Taiwanese high school students who completed the Chinese version of NEO-PI-R (Costa & McCrae, 1992a) and reported their blood type.Personality traits are usually considered to be lifelong (Costa and McCrae, 1997; Rabin, 1977). Studies have shown that approximately 40% of the variation in personality can be explained by genes (Costa and McCrae, 1992b; Jang, Livesley, and Vernon, 1996). The Ancient Greek physician Galen proposed a temperament theory based on imbalances in bodily fluids. Several more recent personality theories still advocate biological antecedents to individual differences, including Sheldon's constitutional theory (Sheldon and Stevens, 1942), Eysenck's (1987) cortical arousal theory, Wilson's (1975) socio-biological theory, and Plomin's theory of behavioral genetics (Plomin and Caspi, 1999).

Popular books (e.g. Constantine, 1997; D'Adamo and Whitney, 2001; Nomi and Besher, 1983) have been supplemented by scientific studies on a possible connection between blood type and personality in normal populations. Medical science has investigated the relationship between blood group and different diseases, while clinical studies have identified associations between blood type and psychological disorders. This study considers a non-clinical population. In his first study of blood type and personality Furukawa (1927) concluded that human blood types are one of the most important determinants of temperament. He maintained that types O and B were active (aggressive, progressive and positive) while types A and AB were passive (conservative, defensive, negative). Furukawa (1930) found that a majority of blood Type O individuals chose temperamental characteristics such as being optimistic, sociable and strong-willed (phlegmatic). Blood Type As he found to be melancholic—shy, docile, diffident, worrying, reserved and impressionable. Blood Type Bs was sanguine—frank, light-hearted, cheerful, sociable, quick and attentive. Blood Type AB persons had contradictory temperaments and could not be easily judged. Arguing that Furukawa's studies were methodologically and statistically unsound, Thompson (1936) found no relationship between blood type and intelligence, emotions, idiosyncrasies, or personality. In the 1960s and 1970s, researchers developed more sophisticated instruments to assess personality traits, such as the Eysenck Personality Inventory (Eysenck and Eysenck, 1964), and the Sixteen Personality Factors Inventory (Cattell, Eberand Tatsuoka, 1970). Since then, psychologists have studied Neuroticism and Extraversion extensively in relation to blood types. Angst and Maurer-Groeli (1974) found higher Neuroticism scores among persons with Type B. Jogawar (1983) found that people with Type B blood were less emotionally stable, more apprehensive, and less self-sufficient. Gupta (1990) observed that Neuroticism scores were significantly higher for participants with Type B blood. Similarly, Marutham and Prakash (1990) reported that Type B scored significantly higher on Neuroticism than other groups did. Three studies have reported associations between neuroticism and blood type. Rinieris, Christodoulous, and Stefanis (1980) found that irrespective of blood type, females had a higher mean neuroticism score than males did. Their results suggested that gender may be an intervening variable in the relationship between blood type and personality. Jogawar (1984) found those with Type B blood to be more neurotic than individuals of other blood types. Marutham and Indira (1990) initially found no difference between blood groups and extraversion, neuroticism and "Type A" behavior, but after dividing the groups on the basis of EPI norms, found that blood Type Bs had higher scores on neuroticism than did any other group.

Summarizing findings from blood type and personality studies reveals some conflicting results. Findings are fairly consistent for blood Type As who have been found to be passive, shy, docile, tender-minded, introverted and emotionally vulnerable. However, de Mikusinski and Omar de Urteager (1983) found blood Type A males to be extraverted. While Rinieris et al. (1980) found no relationship between

blood type and neuroticism, four other studies revealed blood Type B to be related to neuroticism. Furukawa (1927) found blood Type Bs to be active, while Furukawa (1930) found blood Type Bs to be cheerful, sociable, frank, light-hearted, attentive and quick. Lester and Gatto (1987) found blood Type Bs to be introverted. Findings for blood Type Os were fairly consistent, suggesting that they are active, optimistic, sociable and extraverted. However, de Mikusinski and Omar de Urteager (1983) maintained that only blood Type O females were extraverted while blood Type O males were introverted. Findings for blood Type ABs were inconsistent. One study revealed them to be passive; two studies revealed them to be introverted; while another considered them aggressive, open and extraverted. Furukawa (1930) reported blood Type ABs as showing contradictory traits. Two studies reported significant gender differences. de Mikusinski and Omar de Urteager (1983) found that blood Type A males and blood Type O females were extraverted and blood Type O males to be introverted.

Three studies have reported an association between extraversion and blood type. Lester and Gatto (1987) found that those with blood types O and AB had significantly higher extraversion scores, while blood type A and B individuals had significantly higher introversion scores. Angst and Maurer-Groeli (1974) found that blood Type Bs were higher on neuroticism and that blood Type ABs were introverted. Maurer-Groeli (1974) found that blood Type as were more emotionally vulnerable and that blood Type ABs were more aggressive, open and extraverted than were individuals with other blood types. Findings for blood Type AB contradicted Angst and Maurer-Groeli's results. De Mikusinski and Omar de Urteaga's (1983) first study found blood Type O females to be higher than blood Type A females on extraversion. Their second study found that blood Type A males were more extraverted and blood Type O males more introverted, while blood Type O females were more extraverted. Citing results from a self-selected sample of 20,635 respondents to the Myers–Briggs Type Indicator (MBTI) but presenting no quantitative data, D'Adamo and Whitney (2001)summarized the blood types as: O extraverted, A introverted, B independent, AB intuitive. Furthermore, Mao, Xu, Mu, and He (1991) assessed blood types among Chinese respondents, but could not predict relative levels of the Type A behavior pattern. However, blood type is genetically predetermined and can be easily identified, so it has been used as a biological marker to assess the influence of genetic factors on personality in Australia (Rogers and Glendon, 2003), Canada (Cramer and Imaike, 2002), Greece (Rinieris, Christodoulou, and Stefanis, 1980), India (Gupta, 1990; Jogawar, 1983; Marutham and Prakash, 1990), Italy (Cattell, Boutourline, and Hundleby, 1964), Japan (Furukawa, 1930), and the United States (Lester & Gatto, 1987).

Alternatively, even among those studies that report a significant relation, findings remain equivocal (Iwaki, 1997). For instance, Lester and Gatto (1987) compared blood types with respondents' scores from both the Eysenck Personality Questionnaire (EPQ) and Minnesota Multiphasic Personality Inventory (MMPI) Depression Scale. Results showed that Type O and AB respondents were significantly more extraverted

than Type A and B respondents. Similar results were reported by de Mikusinski and Omar de Urteaga (1983), whose sample was overrepresented by extraverted Type Os. In addition, Eysenck (1982) reported higher extraversion scores among Type ABs; whereas Angst and Maurier-Groeli (1974, cited in Lester and Gatto, 1987) reported higher neuroticism scores among Type Bs, and higher psychoticism scores among both Type Bs and Type ABs. Almost 600 Indian undergraduates indicated their blood type and completed the 16 Personality Form (Jogawar, 1983). Results showed that Type Bs were more emotionally unstable than both Type As and Os. Moreover, Neuman, Shoaf, Harvill, and Jones (1992) compared the profiles of 15 patients with duodenal ulcers (9 Type As, 6 Type Os) to 10 controls (6 Type As, 4 Type Os). Results showed that Type As felt more depression, trait anger, and trait anxiety than Type Os. An earlier study found higher Type A behavior scale scores among Type Os compared with both Type As and Bs based on the Jenkins Activity Survey (Neuman, Chi, Arbogast, Kostrzewa, and Harvill, 1991). Finally, 137 postgraduate students completed both the EPQ and Type A behavior self-rating inventory (Marutham and Prakash, 1990). Although the authors found no evidence to link Type A behavior to blood type, they did find significantly higher Neuroticism scores among Type B respondents.

Two chief issues warrant mention. First, most investigations into the relation between blood type and personality were conducted without prior hypotheses, so virtually any significant difference was taken as meaningful. Second, studies to date have assessed the relation using a variety of personality measures, both specific (e.g. MMPI Depression) and general (e.g. EPQ, 16PF). Although more general personality inventories can test a broader and more comprehensive coverage of the relevant domains of personality, no study to date has evaluated these hypotheses using measures based on the Five-Factor Model (McCrae and Costa, 1999). Many researchers and theoreticians currently advocate the presence of five independent underlying personality dimensions: Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to Experience. To address these two issues, the present study evaluated a series of a priori hypotheses, each predicting a unique relation between blood type and personality, as measured by the NEO-PI (McCrae and Costa, 1987). The following seven hypotheses were evaluated:

1. There will be (a) higher extraversion scores among both Type ABs and Os, and (b) lower extraversion scores among both Type As and Bs (Lester and Gatto, 1987).

2. There will be higher extraversion scores among Type ABs (Cattell and Eysenck,1964).

3. There will be higher extraversion scores among Type Os (de Mikusinski and Omar de Urteaga,1983).

4. There will be lower extraversion scores among Type ABs (Angst and Maurer-Groili, 1974; cited in Lester and Gatto, 1987).

5. There will be higher neuroticism scores among Type Bs (Angst and Maurer-Groili, 1974, cited in Lester; Cattell; Jogawar and Marutham).

6. There will be (a) higher neuroticism scores among Type As, and (b) lower neuroticism scores among Type Os (Neuman et al., 1992).

7. There will be lower Agreeableness and Conscientiousness (or a lack of Psychoticism, Eysenck and Eysenck, 1976) scores among Type Bs and ABs (Angst and Maurer-Groili, 1974, cited in Lester and Gatto, 1987).

2.2. Research presumption

In order to conduct this research the following presumptions are considered:

1) The research has been conducted in manufacturing firms.
2) The manufacturing firms must have production or assembly line.
3) The number of personnel must exceed 20.

2.3. Research Hypothesis

Based on the pre stated assumption in theoretical principles the research hypotheses are as follow:

1) Blood group A affects group participation.
2) Blood group B affects group participation.
3) Blood group O affects group participation.
4) Blood group AB affects group participation.

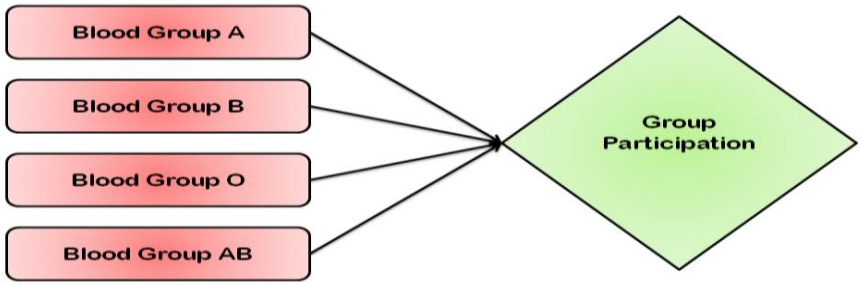

Figure 1: Conceptual model of study

2.4. Research Methodology

This study was conducted during time period of 2007-2009 and through questionnaires, the data related

to the type of blood groups and the extent of people participation was examined. Due to the nature of the subject matter, research statistical population includes firms that have been accepted in Tehran stock Exchange. The research was conducted by using cluster sampling method. First through formula 1 (determining limited sample volume) some firms were selected and then through formula 2 (determining unlimited sample volume), some production line personnel from the selected, firms were selected and finally 380 questionnaires were distributed to the production line personnel. In this research, questionnaires with five-option variance scale and nine questions were utilized. The respondent had to choose only one option.

$$n=\frac{NZ^2_{1-\frac{\alpha}{2}}pq}{N\varepsilon^2+Z^2_{1-\frac{\alpha}{2}}pq} \quad n=\frac{Z^2_{1-\frac{\alpha}{2}}pq}{\varepsilon^2}$$

The questionnaire's reliability and validity were examined using independence test and average ratio comparison of the two populations and through Pearson formula was tested. The research variables in this study were as follow:

1) Group participation (dependent variable)
2) Blood groups (independent variable)

2.5. Questionnaire's reliability and validity results

2.5.1. Reliability

In order to examine the reliability of the questionnaires, two groups of 15 samples (sample from the aggregate population) were selected and through comparison of ratios, the reliability was examined.

$$H_0 : P_1 = P_2$$

$$H_1 : P_1 \neq P_2$$

$$K=\frac{\frac{m_1}{n_1}-\frac{m_2}{n_2}}{\sqrt{(\frac{m_1+m_2}{n_1+n_2})(1-\frac{m_1+m_2}{n_1+n_2})(\frac{1}{m_1}+\frac{1}{m_2})}}$$

Because the test function sample is not in the critical area and keeping hypothesis H_0, the questionnaire's reliability is confirmed.

Table 1: Table of test result

Test Result	UTable	Calculated U
Hypothesis H0 is not	1.96	0.4149

rejected		

2.5.2. Validity

To examine the questionnaire's validity, Pearson test in the probable error level α= 0.05 was used.

H_0: Questions are independent.

H_1: Questions are dependent.

$$K = \Sigma\Sigma \frac{(m_{ij} - m_{ij}')^2}{m_{ij}'} = \Sigma\Sigma \frac{m_{ij}^2}{m_{ij}'} - n = \chi^2_{1-\alpha(s-1)(t-1)}$$

Table 2: Validity test result for nine questions of the questionnaire

Test Result	χ^2 Table $(\chi^2_{0.95,8})$	χ^2 Calculated
Hypothesis H_0 is rejected	16.9	37.69

The function of test samples are in the critical area hypothesis H_0 is rejected so validity of the questionnaire is confirmed.

2.5.3. Test results of the hypotheses

2.5.3.1. Hypothesis #1

Blood group A does not affect group participation: H_0

Blood group A has an effect on group participation: H_1

Pearson's chi-square test at probable level of error α =0.05 was used to examine the hypothesis.

$$\Sigma\Sigma \frac{(m_{ij} - m_{ij}')^2}{m_{ij}'} = \chi^2_{1-\alpha(s-1)(t-1)} \quad K = \Sigma\Sigma \frac{m_{ij}^2}{m_{ij}'} - n$$

Table 3. The test result of hypothesis #1

Test Result	$\chi^2_{1-\alpha(s-1)(t-1)} = (\chi^2_{0.95,8})$	χ^2 Calculated
Hypothesis H_0 is rejected	26.3	3988.68

With the function of test sample being in the critical area and rejecting hypothesis H_0, H_1 is confirmed.

2.5.3.2. Hypothesis #2

Blood group B does not have an effect on group participation: H_0

Blood group B has an effect on group participation: H_1

Pearson's chi-square test at probable level of error α=0.05 was used to examine the hypothesis.

$$K = \Sigma\Sigma\frac{m_{ij}^2}{m_{ij}^t} - n = \Sigma\Sigma\frac{(m_{ij} - m_{ij}^t)^2}{m_{ij}^t} = \chi^2_{1-\alpha(s-1)(t-1)}$$

Table 4: Test result of hypothesis # 2

Test Result	$\chi^2_{1-\alpha(s-1)(t-1)} = \chi^2_{0.95,7,1}$	χ^2 Calculated
Hypothesis H_0 is rejected	26.3	27.2738

With the function of test sample being in the critical area and rejecting hypothesis H_0, H_1 is confirmed.

2.5.3.3. Hypothesis #3

Blood group O does not have an effect on group participation: H_0

Blood group O has an effect on group participation: H_1

Pearson's chi-square test at probable level of error α=0.05 was used to examine the hypothesis.

$$K = \Sigma\Sigma\frac{m_{ij}^2}{m_{ij}^t} - n = \Sigma\Sigma\frac{(m_{ij} - m_{ij}^t)^2}{m_{ij}^t} = \chi^2_{1-\alpha(s-1)(t-1)}$$

Table 5. Test result of hypothesis # 3

Test Result	$\chi^2_{1-\alpha(s-1)(t-1)} = \chi^2_{0.95,7,1}$	χ^2 Calculated
Hypothesis H_0 is rejected	55.8	353.149

With the function of test sample being in the critical area and rejecting H_0, H_1 is confirmed.

2.5.3.4. Hypothesis #4

Blood group AB does not have an effect on group participation: H_0

Blood group AB has an effect on group participation: H_1

Pearson's chi-square test at probable level of error α=0.05 was used to examine the hypothesis.

$$K = \Sigma\Sigma\frac{m_{ij}^2}{m_{ij}^t} - n = \Sigma\Sigma\frac{(m_{ij} - m_{ij}^t)^2}{m_{ij}^t} = \chi^2_{1-\alpha(s-1)(t-1)}$$

Table 6: Test result of hypothesis # 4

Test Result	$\chi^2_{1-\alpha(s-1)(t-1)} = \chi^2_{0.95,7,1}$	χ^2 Calculated
Hypothesis H_0 is rejected	31.4	83.801

With the function of test sample being in the critical area and rejecting H_0, H_1 is confirmed.

Also possible to prioritize based on calculated χ^2.

Table 7: Test results of the hypotheses

Hypotheses	Calculated χ^2	Priority
Hypothesis # 1	3988.68	1

Hypothesis # 2	27.2738	4
Hypothesis # 3	353.149	2
Hypothesis # 4	83.801	3

2.5.4. Degree of correlation

Schuprow coefficient could be used for measurement of degree of correlation.

$$R=\sqrt{\frac{\chi^2}{n\sqrt{(s-1)(t-1)}}}=0\cdot 8764$$ Related to hypothesis # 1

$$R=\sqrt{\frac{\chi^2}{n\sqrt{(s-1)(t-1)}}}=0\cdot 0941$$ Related to hypothesis # 2

$$R=\sqrt{\frac{\chi^2}{n\sqrt{(s-1)(t-1)}}}=0\cdot 1817$$ Related to hypothesis # 3

$$R=\sqrt{\frac{\chi^2}{n\sqrt{(s-1)(t-1)}}}=0\cdot 2117$$ Related to hypothesis # 4

3. Results and Discussion

Implementation of group tasks are the expectations that lead individual role including one's expected behavior patterns people consider different roles that may be in conflict with each other or may be performed quite vividly,. Thus, managers must be aware of people personality and mentalities when they are forming group or performing some group tasks. This enables them to match people suitably and achieve maximum productivity for the organization. A large number of researches have been conducted about the impact of people blood groups on their personality features, which we presented in theoretical framework of this article. But in this scientific research the effective factors on group participation were identified and also their prioritization in the extent of group participation was performed based on Schuprow coefficient.

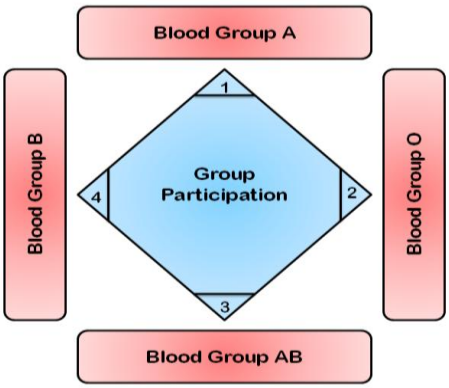

Figure 2: Result of examination of the relationship of blood groups and group participation

Thus in this study important alternatives regarding the determination of production line arrangement with the highest productivity are suggested, concerning the results of the research that showed . there is significant and positive relationship between blood groups and group participation, also the result show that blood group A has the highest participation in a group and blood groups B has the second highest rank in group participation blood group AB is ranked third in group participation and group B has the least tendency in group cooperation and in most cases has the tendency to work individually (singly) so the research results can be used as a scientific alternative to improve productivity in organizations.

Table 8: Result of examination of the relationship of blood groups and group participation

Hypotheses	Calculated χ^2	Priority
Hypothesis # 1	3988.68	1
Hypothesis # 2	27.2738	4
Hypothesis # 3	353.149	2
Hypothesis # 4	83.801	3

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