Brainstorming In Industrial Design Education: Is there Mediation Effect?

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Abstract

Since Osborn (1957) introduced the technique that was very valuable to create new ideas, the technique has been applied tremendously in various area and disciplines. Without exception, in industrial design practices, group brainstorming is also a tool that is much preferred by designers to elicit creative ideas. Undergraduates also are exposed with this technique to generate the creative ideas. This is because, they are always dealing with the problem of human everyday; make a better design for the sake of human. This technique emphasizes in the group. There are many factors have been determined by prior research. The prominent production loss that is disturbing this technique is Production Blocking. This study examines two main factors, personality traits and Ownership of the topic which influence Production Blocking in group brainstorming. Personality can be referred to as a consistent behavior pattern and intrapersonal processes within the individual. Ownership of the topic relates to the interest of individuals in engaging the brainstorming activities especially in industrial design. Production Blocking includes competition to speak among individuals. 115 groups which consist of 460 Industrial Design undergraduates across 6 public universities have participated in this study. The hypotheses are tested using analysis of Partial Least Squares (PLS) regression. Results show that personality of Extraversion and Openness are negatively significant related to the Production Blocking. However, Emotional Stability is not significantly related to Production Blocking. Results also reveal that Extraversion, Emotional Stability, and Openness are positively significant related to Ownership of the Topic. In accordance with the expectations, Ownership of the topic is positively significant related to Production Blocking. Results also demonstrate that Ownership of the Topic mediates the relationships between personality traits of Extraversion, Emotional Stability, and Openness and Production Blocking. In other words, groups that are high on these three personality traits would owned the topic given subsequently, reduce competition of speaking time during brainstorming session. The results are of potential interest to industrial design context, educators, and researchers.

***Keywords*: Brainstorming, Personality Traits, Ownership of the Topic, Production Blocking, Industrial Design Education**

INTRODUCTION

Industrial design is a discipline that offers the service of creating and developing the product concept to both users and manufacturers in order that the design is able to function, is valuable, and has desirable appearance of product and subsequently, beneficial to the users (IDSA, 2008). The term 'industrial design' that is used interchangeably with 'product design' involves both engineering and aesthetic design (Ekberg, 2005) but with more emphasis on users' consideration (Roozenburg & Eekels, 1995). Nevertheless, Industrial Designers are not the people who handle the things that are involved with engineering directly, but they deliver the idea to an engineer (Hannah, 2004). For instance, Alexander Graham Bell was the person who was credited with inventing the telephone, but Henry Dreyfuss as an industrial designer was the person responsible for giving the phone its modern form (Hannah, 2004). Nevertheless, knowledge about engineering and familiarity with materials and production techniques are needed by industrial designers (Muhamad Tamyez Bajuri, 1988).

The nature of the job of industrial designers is to deal with products that are to be used every day by consumers such as toothbrushes, computers, chairs and car models (Hannah, 2004). However, industrial design firms face the problem when the products that they produce are not feasible (Michalek, Feinberg & Papalambros, 2005). This shows that the role of industrial designers is to solve people's problems (Naveiro & Pereira, 2008). Hence, in industrial design practices, creativity is needed and it plays an important role to come up with ideas and solutions.

Industrial Design Education in Malaysia

In fulfilment of human needs in professional area, the country needs a good education. In addressing this issue, everyone agrees that quality education acts as the pulse of the civilization of a country and nation. The development of the education system of a country ensures that the citizens continue to herald a way forward thinking. Without exception, Malaysia's great concern for formal education gives emphasis on the product of high quality industrial designers. Therefore, the philosophy of Malaysian National Education clearly emphasizes on the developing knowledge

and competence, and of possessing both external and internal aspects of intellectuality, spirituality, emotional, and physical balance and harmony.

In most universities in the country, the industrial design education studies components offer the same programme approach and number of years of studies. Those universities that offer this type of programme aim to produce professional designers. In UiTM for instance, skills exposure has been given as early as in Diploma level. Besides UiTM, other institutions of higher learning education also introduce industrial design programme. To date, there are six universities that offer the program Bachelor related to Industrial Design. These six universities are International Islamic University, Malaysia (IIUM), Universiti Teknologi Malaysia (UTM), Universiti Sains Malaysia (USM), Universiti Malaysia Sarawak (UNIMAS), Universiti Teknologi MARA (UiTM), and Universiti Putra Malaysia (UPM). Generally, there are three areas of specialization in industrial design education in Malaysian institutions of higher education: transportation, furniture, and product design. Therefore, a quality education, in particular higher education, will thus bring about a significant influence on national industrialization. Based on the vital elements of education of this country, the field of industrial design flourishes in line with the national education policy.

Personality Traits

Personality traits are one of the diversities that should be explored in group research (Milliken, Bartel, & Kurtzberg, 2003). Recently, Paulus and Brown (2007) mentioned that to be more knowledgeable about this technique, integration between the discipline of brainstorming and other disciplines is needed. This is because personality traits of group members would always predict the group performance (Peslak, 2006).

One question always recurs, namely: is personality related to creativity? Feist (2003) in his discussion on personality and creativity provided the simple understanding that indeed, personality and creativity are always related. In group performance, Furnham and Yazdanpanahi (1995) revealed that the study of personality should be considered because personality traits have an impact on productivity in group creativity. In addition, researchers on personality and group performance such as Barry and Stewart (1997) and Halfhill, Sundstrom, Lahner, Calderone, and Nielsen (2005) said that the personality factor always influences group performance. It was also proven by Unsworth, Brown, and McGuire (2000) that personality traits always influence employees' innovation either directly or indirectly. Meanwhile in group tasks, researchers such as Driskell et al. (1987), Barry and Stewart (1997), and Halfhill et al. (2005) also agreed that personality traits always influence the group creativity. Hence, nowadays, organizations prefer to choose employees that possess the personality trait of being a team worker, as a mechanism to accomplish the work (Buchanan, 1998; Halfhill et al., 2005).

Ownership of the Topic and Production Blocking

There has been a strong emphasis in the study of group brainstorming on idea generation, also known as group process (Dennis & Valacich, 1993; Paulus, 2000). In other words, group process should be an important determinant of the group brainstorming performance. Although there are several processes as involved in brainstorming, most of the brainstorming researchers such as Kerr, Phaal, and Probert (2009), Diehl and Stroebe (1987), Shepherd et al. (1996), Bolin and Neuman (2006), and Nemeth et al. (2004) agree that three prominent factors of production loss always disturb the brainstorming performance: Production Blocking, Social Loafing, and Evaluation Apprehension. Nevertheless, Production Blocking s a prominent contributor to production loss in group brainstorming as proven by Diehl and Stroebe (1987) and Diehl and Stroebe (1991). Production Blocking is defined as competition for speaking time in the interactive group (Diehl & Stroebe, 1987).

There are certain external factors that could also influence the group brainstorming performance. Researchers should consider this issue in their study (Isaksen, 1998). One of these factors is Ownership of the Topic. The topics used in brainstorming research previously are quite general, such as 'the thumbs problem', in which the question is 'what would be the advantages and disadvantages of having an extra thumb on each hand?' (Bolin, 2002; Camacho & Paulus, 1995; Dzindolet, 1992; Gallupe, Bastianutti & Cooper, 1991; Paulus et al., 1993); role play about school and education (Coskun, 2005; Nijstad et al., 2004); and tourists and guests (Diehl & Stroebe, 1987; Nijstad et al., 2006).

Recently, a few researchers like Nijstad et al. (2006) and Barki and Pinsonneault (2001) have been focusing on the Ownership of the Topic given in the brainstorming study. For example, participants in brainstorming sessions felt that they would be more apprehensive if they were given a sensitive topic like AIDS or Violence compared to the usual topics such as parking or tourism (Barki & Pinsonneault, 2001). In addition, the topic should be parallel with the subjects' interests in brainstorming, so that participants could be more energetic to contribute creative ideas.

PROBLEM STATEMENT AND HYPOTHESES

The influence of personality traits such Extraversion, Emotional Stability, and Openness on group performance has been well established (e.g. Burke & Witt, 2002; Halfhill et al., 2005; Morgeson, Reider, & Campion, 2005; Peeters et al., 2006). These variations may be due to some factors such as the level of analysis and the issue of

Ownership of the Topic, which has received minimal interest yet. Therefore, it is important to understand how these personality traits affect group brainstorming performance through the process of group brainstorming (Bolin & Neuman, 2006). Past studies such as Diehl and Stroebe (1987), Diehl and Stroebe (1991), and Isaksen and Gaulin (2005) have identified that Production Blocking as a dimension of prominent production loss.

As mentioned earlier, the topics of brainstorming also play an important role in brainstorming study. As suggested by Isaksen (1998), researchers in brainstorming should pay attention to the topic given to the participants in the study on brainstorming sessions. Subsequently, participants in the study would be more responsive to the kinds of tasks and problems given to them if they felt a sense of ownership. Isaksen also suggests that future research should focus more on topic ownership because in a brainstorming session, the task or topic given is creative task. Ownership of the Topic could act as a mediator to explain the relationships among determinants and outcomes. It is essential to understand to what extent Ownership of the Topic can change, when the group of Industrial Design undergraduates has different types of personality traits, which in turn increase the group brainstorming performance. The potential of Ownership of the Topic as a mediating role to explain the relationship between personality traits and group brainstorming performance has yet to be tested. A clear gap in scholarly literature illustrates this point to be studied empirically.

The review of related literature further indicates that the proper role and function of group brainstorming performance in industrial design practices remains a matter of considerable debate today. The integration of personality traits, Ownership of the Topic and dimensions of Production Blocking to explain brainstorming performance also remains unclear. Specifically in industrial design practices it is important to answer the following research questions:

1. Are Personality Traits (Extraversion, Emotional Stability, and Openness) and Ownership of the Topic related to Production Blocking among Industrial Design undergraduates?
2. Is Ownership of the Topic related to Production Blocking among Industrial Design undergraduates?
3. Does Ownership of the Topic mediates the relationship between personality traits and Production Blocking among Industrial Design undergraduates?

Based on the discussion above we also developed the following hypotheses:

H1a: Extraversion is negatively related to Production Blocking among Industrial Design Undergraduates.
H1b: Emotional Stability is negatively related to Production Blocking among Industrial Design Undergraduates.
H1c: Openness is negatively related to Production Blocking among Industrial Design Undergraduates.
H2a: Extraversion is positively related to Ownership of the Topic among Industrial Design Undergraduates.
H2b: Emotional Stability is positively related to Ownership of the Topic among Industrial Design Undergraduates.
H2c: Openness is positively related to Ownership of the Topic among Industrial Design Undergraduates.
H3: Ownership of the Topic is negatively related to Production Blocking among Industrial Design Undergraduates.
H4a: Ownership of the Topic mediates the relationship between Extraversion and the Production Blocking among Industrial Design Undergraduates.
H4b: Ownership of the Topic mediates the relationship between Emotional Stability and the Production Blocking among Industrial Design Undergraduates.
H4c: Ownership of the Topic mediates the relationship between Openness and the Production Blocking among Industrial Design Undergraduates.

METHODOLOGY

Measures

i. BFI

BFI is used to measure three major domains of personality traits: Emotional Stability-8 items, Extraversion - 8 items, and Openness - 10 items. Items consist of 5-point Likert scale ranged from 'Disagree strongly' to 'Agree strongly'. Extraversion had an item such as "is talkative" and "generates a lot of enthusiasm". Emotional Stability included items such as "is relaxed, handles stress well", and "is emotionally stable, not easily upset". Finally, Openness had an item such as "is original, comes up with new ideas", "is curious about many different things", and "is ingenious, a deep thinker". Cronbach's alpha for *Extraversion* is.72, *Emotional Stability* is .70 and *Openness* is .77.

ii. Ownership of the Topic

Ownership of the Topic has been developed by authors. These items were measured based on five-point Likert scale that range from "strongly disagree" to "strongly agree". Ownership of the Topic included items such as "The problem in the brainstorming should suit with my area", "I feel that the brainstorming problem was related with my field", and "If such problem is going to be held in the future, I will be willing to participate". The internal consistency coefficient for Ownership of the Topic is also high (Cronbach's alpha = .93).

iii. Production Blocking

In this study, an adapted version of *Production Blocking* (Bolin, 2002; Bolin & Neuman, 2006) was used. These items were measured based on five-point Likert scale that range from "strongly agree" to "strongly disagree". *Production Blocking* included items such as the following: "It was hard to know when it was my turn to talk", "It was

hard to concentrate on my ideas while others in the group were talking" and the reverse item such as "I felt I could speak up whenever I had something to say". The internal consistency coefficients for *Production Blocking* is .84.

Sample and Population

Populations of the study were from public university which is locally known as *Institusi Pengajian Tinggi Awam* (IPTA). Overall, there are 20 public universities in Malaysia. Of the 20 universities, there are only six universities that offer the Bachelor programme related to Industrial Design. These six universities are the International Islamic University, Malaysia (IIUM), Universiti Teknologi Malaysia (UTM), Universiti Sains Malaysia (USM), Universiti Malaysia Sarawak (UNIMAS), Universiti Teknologi MARA (UiTM), and Universiti Putra Malaysia (UPM). Public university undergraduates were chosen because they have similar entry requirement into the Industrial Design programme. Students ought to also acquire the full curriculum from University requirement, Faculty requirement courses, and Program requirement courses and there are co-curriculum activities that should be fulfilled by them in some semesters. Based on six IPTA in this study, stratified random sampling was used to choose the subjects. Stratified random sampling is a good strategy to determine the subjects in the study.

DATA ANALYSIS

We used *Partial Least Squares* (PLS) to perform analysis. PLS is a second generation multivariate technique in data analysis (Haenlein & Kaplan, 2004). Generally, the limitation of traditional analysis technique such as *Multiple Regression* is: (1) In the real world, there are many variables influencing the outcomes in the study and by examining a few variables is considered not conclusive and (2) assumption that all variables have no random and systematic error and the technique such as *Multiple Regression* is only applicable when there is no random and systematic error (Haenlein & Kaplan, 2004). Using SEM with PLS needs us to perform two major steps: (1) assessing the measurement model in order to examine both convergent and discriminant validity and (2) assessing the structural model in order to examine the path coefficient (Hulland, 1999).

Assessing the Measurement Model

Standardized loading for convergent validity that is recommended in measurement model is .70 (Chin, 1998). Nevertheless, loading of .50 and .60 are still acceptable when the indicators within the same block or construct have high loadings (Chin, 1998). The loading of .50 and .60 are also still acceptable when the construct is the new construct and the model is still new (Imam Ghozali, 2006). In this study, we applied loading of .60 after taking into consideration that modeling using PLS is still new in personality traits and group performance research. All items show the loading exceed .60. Table 1 shows the crossloadings within the same construct and the other constructs.

TABLE I
CROSSLOADINGS

	EXTRA	ES	OPENNES	OWN	PB
ext 6	**0.80**	0.09	0.16	0.10	-0.23
ext 11	**0.63**	0.35	0.42	0.12	-0.18
ext 21	**0.74**	0.05	0.12	0.08	-0.19
ext 36	**0.70**	0.16	0.25	0.13	-0.17
es 9	0.13	**0.70**	0.34	0.14	-0.12
es 24	0.22	**0.81**	0.26	0.16	-0.21
es 34	0.17	**0.77**	0.35	0.23	-0.13
op 5	0.23	0.26	**0.71**	0.15	-0.16
op 15	0.29	0.31	**0.77**	0.20	-0.26
op 20	0.23	0.31	**0.65**	0.06	-0.13
op 25	0.21	0.41	**0.79**	0.16	-0.18
op 40	0.23	0.21	**0.71**	0.10	-0.18
own 1	0.05	0.11	0.07	**0.70**	-0.34
own 2	0.06	0.11	0.13	**0.79**	-0.34
own 3	0.06	0.20	0.17	**0.64**	-0.20
own 4	0.10	0.19	0.15	**0.80**	-0.37
own 5	0.17	0.27	0.17	**0.75**	-0.39
own 6	0.06	0.14	0.08	**0.75**	-0.36
own 7	0.12	0.15	0.17	**0.83**	-0.36
own 8	0.12	0.17	0.14	**0.77**	-0.38
own 9	0.07	0.21	0.18	**0.69**	-0.25
own 10	0.09	0.17	0.11	**0.62**	-0.25
own 11	0.10	0.13	0.11	**0.76**	-0.36
own 12	0.11	0.14	0.17	**0.76**	-0.37
own 14	0.24	0.26	0.24	**0.68**	-0.40
own 15	0.11	0.10	0.08	**0.64**	-0.36
pb 1	-0.26	-0.13	-0.23	-0.38	**0.79**
pb 2	-0.17	-0.14	-0.16	-0.29	**0.76**
pb 4	-0.24	-0.19	-0.22	-0.39	**0.82**
pb 6	-0.20	-0.17	-0.20	-0.36	**0.80**
pb 11	-0.16	-0.17	-0.20	-0.40	**0.73**

Note: EXT=Extraversion, ES=Emotional Stability, OP=Openness, OWN=Ownership of the Topic, PB=Production Blocking.

In PLS, discriminant validity is assessed by three criteria: (1) factor loadings for all items should be .60 and above (2) composite reliability should be .70 and above, and (3) Average Variance Extracted (AVE) must show the cut-off .50 indicating at least 50% of the measurement variance (Fornell & Larcker, 1981). Table 2 shows that the composite for constructs are greater than .70. The table also shows the value of Cronbach's alpha for all constructs. The results from the table indicate that all construct have

satisfactorily measured.. Table 2 also shows the Average Variance Extracted (AVE) for all constructs. Generally, we concludes that the AVE value for all constructs exceed .50. Hence, all the criteria as explained by Fornell and Larcker (1981) are met.

TABLE II
COMPOSITE RELIABILITY, CRONBACHS ALPHA AND AVE

	Composite Reliability	Cronbachs Alpha	AVE
EXTRA	0.81	0.69	0.52
ES	0.80	0.64	0.58
OPENNES	0.85	0.78	0.53
OWN	0.94	0.93	0.53
PB	0.89	0.84	0.61

Finally, In the case of discriminant validity, Table 1 also reflects the loadings of items on their own constructs. It shows that the loadings of all constructs within the same construct (indicated by **Bold**) are expected to be high on this construct, thus indicating high convergent validity. Meanwhile, low value loading on the other constructs indicates high discriminant validity. Table 1 gives a clear convergent and discriminant validity for all constructs. All items in their respective construct show higher loadings than the other constructs.

Assessing the Structural Model

In order to determine the statistical significance of the parameter estimates, a bootstrapping procedure with replacement using 500 sub-samples was used in this study. A bootstrapping has been used for two purposes: (1) to eliminate the assumption of normality and (2) recommended to the combination of mediation and moderation model (Edward & Lambert, 2007). Since all hypotheses are directional, this study used one-tailed t-test. This means that 90% level of confidence or $p < .10$ level of significant need t-value >1.283, 95% level of confidence or $p < .05$ level of significant need t-value >1.648, 99% level of confidence or $p < .01$ level of significant need t-value >2.334, and 99.9% level of confidence or $p < .001$ level of significant need t-value >3.107. Table 2 shows the summary of findings.

Based on prior studies in PLS analysis (Bass, Avolio, Jung, & Berson, 2003; Tiwana & McLean, 2005), full and partial mediation was assessed when the following condition are met: First, full mediation exists when a path from the independent variable to mediator and from mediator to dependent variable is significant. However, path from independent variable to dependent variable is not significant. Second, partial mediation exists when a path from independent variable to dependent variable and paths from the independent variable to mediator and from mediator to dependent variable are all significant.

Results

Results revealed that personality of Extraversion was negatively related to Production Blocking (β = -0.19, $p < .001$). This result indicated that H1a was supported Results also revealed that Emotional Stability was not negatively related to Production Blocking (β = -0.10, $p > .10$). This result indicated that H1b was not supported. Result showed that personality of Openness was negatively related to Production Blocking (β = -0.16, $p < .01$). H1c was supported. As hypothesized in H2, personality traits are positively related to Ownership of the Topic among Industrial Design undergraduates. Results revealed that personality of Extraversion was positively related to Ownership of the Topic (β = 0.08, $p < .10$). Emotional Stability was positively related to Ownership of the Topic (β = 0.18, $p < .001$). Openness was also positively related to Ownership of the Topic (β = 0.10, $p < .10$). Supported H2. Result revealed that Ownership of the Topic had negative significant to Production Blocking (β = -0.42, $p < .001$). Thus, providing support for H3. In the case of mediation analysis results show that partial mediation is occurring for the relationship between Emotional Stability and Production Blocking, mediated by Ownership of the Topic, supported H4b, while full mediation is occurring for the relationship between Extraversion and Openness and Production Blocking, mediated by Ownership of the Topic, also supported H4a and H4c.

DISCUSSION

Group with high personality of Extraversion, Emotional Stability, and Openness would reduce the level of Production Blocking. Results mostly demonstrated that there are negative relationships between personality traits and production Blocking. These findings are consistent as predicted previously. Group with high Extraversion that is talkative, out-going, and enthusiastic would reduce Production Blocking. Even though past studies such as Barrick et al. (1998) and Barry and Stewart (1997) have stated that people who are extravert tend to be a leader and conquer the group, this study has proven that the group with extravert tends to reduce the obstacles of group performance; Production Blocking. Overall, Industrial Design undergraduates in the group may also reduce Production Blocking when they are talkative and creative.

Expanding the discussion on the relationship between personality traits and Ownership of the Topic, personality trait of Extraversion, Emotional Stability and Openness significant related to Ownership of the Topic. The circumstances seem to see that the problem is overcome by these three personality traits when the Industrial Design undergraduates are in group. This could also be related to the topic has been given, when they are in the same line (industrial design issue) and the topic is also from prominent industrial designer and the problem is also concerning industrial design issue.

This study hypothesized that Ownership of the Topic is positively related to group brainstorming performance. According to Paulus and Brown (2007), people who have knowledge in their area would contribute the ideas even though they are less motivated in brainstorming session. In the other words, when they owned the topic that is given, they would contribute more ideas. Results revealed that Ownership of the Topic positively related to group brainstorming performance. This result clearly indicates that all participants in this study own the topic that is given in brainstorming session. Studies by Nijstad et al. (2006) identified that participants who are familiar with the topic would contribute more ideas compared to the participants who are not familiar with the topic or difficult topic. This result also supports the model of Semantic Networks and associative Memory (Paulus & Brown, 2003), when participants are familiar and they are in the area of interest they would contribute more ideas.

This study attempts to examine the mediation effect of Ownership of the Topic on the relationship between personality traits and Production Blocking. Groups that are talkative, emotionally stable, and high imaginative sense in creative activities would own the topic given subsequently; reduce Production Blocking in the brainstorming session.

Key Contribution

There are several contributions to the group performance research literature especially in the industrial design practices. First, the development of the model in this study that takes into account of both direct and indirect effect of variables of personality traits, Production Blocking, and Ownership of the Topic on group brainstorming performance.

Second, based on the established IPO model, this study extends such model to include Production Blocking and Ownership of the Topic simultaneously in brainstorming research. Production Blocking has been attempted to be examined by Bolin and Neuman (2006) but their findings of study were not significant. By integrating IPO model (Driskell et al., 1987) and extensive model in brainstorming research (see A Cognitive-Social-Motivational Model, Search for Ideas in Associative Memory (SIAM) Model, Semantic Networks and Associative Memory Model of Group Brainstorming) this study support the hypotheses that personality of Extraversion, Emotional Stability, and Openness as a unique predictor in group brainstorming activity.

Third, this result is consistent with the finding by Barki and Pinsonneault (2001) and Nijstad et al. (2006) n term of Ownership of the Topic. The positive correlation between Ownership of the Topic and Quantity of Ideas for current sample is similar to the findings from previous research that was establish that, the topic that participants own would produce better performance (Paulus & Brown, 2003). Expanding to the case of variable of Ownership of the Topic, the result also suggest that in order to enhance the group brainstorming performance, the topic that parallel with the participants' interests should be considered.

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Appendices

CROSSLOADINGS FOR ALL VARIABLES

	EXTRA	ES	OP	TOP	PB	QOI
ext 6	**0.67**	0.13	0.18	0.14	-0.27	0.00
ext 11	**0.75**	0.38	0.56	0.24	-0.19	0.04
ext 16	**0.74**	0.43	0.69	0.29	-0.21	0.22
ext 21	**0.64**	0.13	0.09	0.11	-0.21	0.07
es 9	0.36	**0.78**	0.53	0.13	-0.27	0.14
es 24	0.23	**0.80**	0.24	0.29	-0.26	0.22
es 34	0.43	**0.82**	0.59	0.29	-0.19	0.13
op 5	0.41	0.44	**0.73**	0.20	-0.17	0.07
op10	0.48	0.28	**0.66**	0.21	-0.11	0.19
op15	0.50	0.43	**0.80**	0.37	-0.35	0.12
op 20	0.32	0.38	**0.65**	0.10	-0.15	0.15
op 25	0.38	0.43	**0.73**	0.08	-0.12	0.12
op 40	0.45	0.38	**0.71**	0.06	-0.10	0.12
top 1	0.20	0.14	0.23	**0.74**	-0.32	0.10
top 2	0.24	0.14	0.23	**0.79**	-0.32	0.14
top 3	0.20	0.25	0.25	**0.75**	-0.20	0.26
top 4	0.24	0.23	0.14	**0.83**	-0.34	0.28
top 5	0.24	0.35	0.27	**0.77**	-0.47	0.25
top 6	0.26	0.24	0.22	**0.79**	-0.37	0.13
top 7	0.20	0.22	0.23	**0.86**	-0.33	0.25
top 8	0.32	0.26	0.25	**0.81**	-0.42	0.18
top 9	0.16	0.20	0.20	**0.73**	-0.28	0.26
top 11	0.25	0.23	0.27	**0.82**	-0.34	0.27
top 12	0.22	0.29	0.24	**0.77**	-0.41	0.30
top 14	0.19	0.25	0.27	**0.73**	-0.41	0.28
top 15	0.27	0.20	0.19	**0.69**	-0.46	0.09
pb1	-0.27	-0.15	-0.25	-0.36	**0.85**	-0.38
pb2	-0.23	-0.18	-0.23	-0.41	**0.85**	-0.38
pb4	-0.32	-0.37	-0.26	-0.40	**0.87**	-0.24
pb6	-0.23	-0.29	-0.20	-0.37	**0.83**	-0.34
pb11	-0.26	-0.28	-0.23	-0.41	**0.79**	-0.22
QOI	0.13	0.21	0.17	0.29	-0.37	1.00

Note: EXT=Extraversion, ES=Emotional Stability, OP=Openness, PB=Production Blocking, OWN=Ownership of the Topic, QOI=Quantity of Ideas.