

# ***PRISM* Brain Mapping**

**Factor Structure and Reliability**



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The 2014 validity study referred to in this paper was carried out by:

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Dr Viki holds a PhD in Psychology and is a university Senior Lecturer in Organizational Psychology. He also teaches Entrepreneurship and Research. His PhD thesis was awarded the British Psychological Society's Social Psychology Section Annual Award for the Most Outstanding Thesis in Social Psychology in 2003. During his early academic career, he was a Research Intern at the Dana Farber Institute, Harvard Medical School (Boston USA), a Research Assistant at Harvard University (USA), a Visiting Scholar at the University of Queensland (Australia), a Visiting Scholar at the University of Cape Town (South Africa), a Visiting Scholar at the University of Granada (Spain), and a Research Fellow at Stanford University (USA). He has published over 30 scientific papers.

Based on well-established findings within neuroscience, *PRISM* Brainmapping distinguishes four main colour dimensions (i.e. Gold, Red, Green and Blue). Each colour represents an element of a person's preferred behavioural style in the work environment. Individuals that are high in the *RED* dimension are driven to control their environment and successfully complete tasks regardless of the circumstances and relationships. The key characteristics of *BLUE* are that the individuals are driven to maintain good relationships with others and a collaborative work environment. Individuals that score high on the *GREEN* dimension are highly innovative, creative, free-spirited and fun loving. The key characteristics of *GOLD* are that the individuals are highly logical, perfectionist, thoughtful and analytical.

Within *PRISM*, each of the above colour dimensions is further split into two sub-categories, to provide a more nuanced view of the individual's preferred behaviour. For RED the subcategories are *Focusing* (authoritative, forthright) and *Delivering* (determined, self-reliant). For GREEN the subcategories are *Innovating* (inventive, imaginative) and *Initiating* (lively, jovial). For BLUE the subcategories are *Supporting* (helpful, caring) and *Coordinating* (consultative, collaborative). Finally, for GOLD the subcategories are *Evaluating* (analytical, prudent) and *Finishing* (thorough, perfectionist). These eight dimensions form the basis of the brainmap that is produced within the *PRISM* report.

The power of *PRISM* Brain Mapping is that it is not a classification tool in the traditional sense. In other words, the tool is not used to classify individuals into only one dimension. The *PRISM* model recognises that individuals will have characteristics from all eight dimensions to a greater or lesser extent. What is produced is a unique 'brain map' that shows the individual's preferred style of working, and also those behaviours they would rather avoid. In line with the principles of Gestalt Psychology, it is the whole of the brainmap that is greater than the sum of its parts.

The main goal of the current research project was to further establish the psychometric characteristics of the *PRISM* Brainmapping tool. An initial validation study was conducted in 2006-2007. Since that study, the tool has been refreshed in order to meet the demands of its growing international usage. Furthermore, while the tool has been getting used more and

more in international contexts, the initial validation study was conducted mainly in the UK. As such, the main goal of current study was to establish whether the revised version of *PRISM* was psychometrically valid in terms of the core eight dimensions. A second goal of the research was to conduct the study using a more diverse and larger sample compared to the initial validation study. All these are important improvements to *PRISM* Brain Mapping that make the tool more relevant for use in various contexts.

### Methodology

We conducted a large-scale study in order to reach the final scale reported in this paper. 1124 participants took part in the study. Of the participants, 590 were female and 534 were male. Their ages ranged from 15 years to 61 years, with 94% of the participants being 50 years old or younger. The ethnic mix of the participants ranged from Arabic, African, European, Chinese, Japanese, Indian and Pakistani. This ethnic mix is more diverse than the sample from our initial validation study.

**Table1: Participant Ethnicity**

<b>Ethnicity</b>	<b>Frequency</b>	<b>Percent</b>
Arab	108	9.6
Bangladeshi	49	4.4
Black African	49	4.4
Black Caribbean	55	4.9
Black Other	36	3.2
Chinese	114	10.1
Coloured African	43	3.8
Indian	126	11.2
Japanese	77	6.9
Mixed Race	2	.2
Pakistani	45	4.0
White	420	37.4

The sample was also diverse with regards to education levels, as shown in Table 2 below. This was different from the first validation study, which was conducted mostly among undergraduate students at a university in the UK.

**Table 2: Participant Education**

<b>Ethnicity</b>	<b>Frequency</b>	<b>Percent</b>
Non-Graduate	158	14.1
Bachelor Degree	566	50.4
Masters Degree	252	22.4
Professional Degree	133	11.8
Doctorate	9	0.8
Not Specified	6	0.5

During the research, participants were presented with the words and phrases in the *PRISM* Brain Mapping scale. They were requested to indicate the extent to which each word or phrase was an accurate description of their preferred behaviour in work environments (1 = *Least Like Me* to 5 = *Most Like Me*).

### **Findings**

Factor analysis was performed on the data using SPSS. We required the programme to search for eight factors using the Varimax rotation. This analysis produced the pattern of eight factors that are consistent with the *PRISM* model. Factor loadings ranged from .59 to .86 across all eight factors. As shown in Table 3 below, these factors are clearly identifiable as RED Focusing, RED Delivering, GREEN Innovating, GREEN Initiating, BLUE Supporting, BLUE Coordinating, GOLD Finishing and GOLD Evaluating. The word items assessing each colour are also clearly related to each subscale providing validity for the theoretical underpinnings of the *PRISM* model. The factor-loadings below are relatively high and the fact that the eight predicted factors emerged from this international data set provides further evidence of the validity of *PRISM* Brain Mapping.

**Table 3: Factor Analysis Data**

<b><u>Red Focusing</u></b>	<b><u>Factor Loadings</u></b>	<b><u>Green Innovating</u></b>	<b><u>Factor Loadings</u></b>	<b><u>Blue Supporting</u></b>	<b><u>Factor Loadings</u></b>	<b><u>Gold Finishing</u></b>	<b><u>Factor Loadings</u></b>
Demanding	.775	Innovative	.842	Sympathetic	.787	Detailed	.863
Pushy	.731	Produces Novel Ideas	.841	Compassionate	.764	Precise	.857
Outspoken	.728	Imaginative	.812	Kind Hearted	.763	Attentive To Detail	.849
Blunt Speaking	.722	Inventive	.812	Considerate	.757	Meticulous	.849
Confronts Others	.718	Original Thinking	.807	Kindly	.755	Exact	.838
Forceful	.717	Generates Ideas	.805	Gentle	.731	Thorough	.817
Forthright	.701	Lateral Thinking	.799	Helpful	.721	Accurate	.801
Assertive	.693	Creative	.789	Supportive	.709	Orderly	.780
Authoritative	.686	Radical Thinker	.782	Caring	.707	Systematic	.778
Aggressive	.676	Envisioning	.782	Unselfish	.697	Neat And Tidy	.776
Directing	.670	Fertile Minded	.766	Harmonious	.683	Painstaking	.763
Controlling	.666	Visionary	.765	Good Natured	.678	Well Organized	.763
Candid	.655	Ingenious	.760	Generous	.675	Perfectionist	.761
Categorical	.652	Experimental	.756	Accommodating	.649	Methodical	.755
Dominant	.648	Unorthodox	.731	Patient	.639	Quality Focused	.747
<b><u>Red Delivering</u></b>	<b><u>Factor Loadings</u></b>	<b><u>Green Initiating</u></b>	<b><u>Factor Loadings</u></b>	<b><u>Blue Coordinatng</u></b>	<b><u>Factor Loadings</u></b>	<b><u>Gold Evaluating</u></b>	<b><u>Factor Loadings</u></b>
Ambitious	.722	Entertaining	.857	Involves Others	.767	Judges Wisely	.751
Self-Sufficient	.703	Fun Loving	.837	Promotes Participation	.741	Questioning	.750
Determined	.675	Enthusiastic	.834	Promotes Cooperation	.739	Evaluating	.740
Entrepreneurial	.675	Lively	.818	Collaborative	.738	Watchful	.738
Self-Reliant	.664	Effervescent	.812	Confers With Others	.732	Prudent	.726
Self-Starting	.652	Playful	.806	All Inclusive	.717	Shrewd	.724
Self-Assured	.647	Jovial	.801	Cultivates Teamwork	.700	Analytical	.724
Venturesome	.645	Full Of Life	.798	Consultative	.699	Vigilant	.723
Takes Charge	.635	Vivacious	.790	Asks For Opinions	.694	Choosey	.721
Competitive	.634	High Spirited	.756	Open Minded	.668	Perceptive	.685
Independent	.632	Sparkling	.752	Encourages Others	.667	Appraises Data	.682
Takes The Lead	.629	Outgoing	.739	Seeks Agreement	.659	Weights Pros And Cons	.674
Self-Confident	.627	Animated	.730	Unprejudiced	.646	Selects Carefully	.665
Adventurous	.626	Light Hearted	.729	Broad Minded	.609	Assesses Accurately	.663
Tough-Minded	.623	Exuberant	.692	Consensual_	.599	Chooses Wisely	.658

We then ran correlational analyses on the data to examine the relationships among the eight dimensions. The findings of this analysis generally supported the PRISM model. The strongest positive correlations we obtained were between any two sub-scales that belonged to the same colour group within *PRISM* Brainmapping. These correlations are highlighted in red in Table 4 below. These findings offer support for the eight dimensions and also the four dimensions that the colours represent.

**Table 4: Correlations among the Eight Subscales**

		Correlations							
		Innovating	Initiating	Supporting	Coordinating	Focusing	Delivering	Finishing	Evaluating
Innovating	Pearson Correlation	1	.322**	.058	.205**	-.056	.156**	-.386**	-.140**
	Sig. (2-tailed)		.000	.053	.000	.060	.000	.000	.000
	N	1124	1124	1124	1124	1124	1124	1124	1124
Initiating	Pearson Correlation	.322**	1	.224**	.243**	-.067*	.001	-.343**	-.350**
	Sig. (2-tailed)	.000		.000	.000	.025	.970	.000	.000
	N	1124	1124	1124	1124	1124	1124	1124	1124
Supporting	Pearson Correlation	.058	.224**	1	.449**	-.352**	-.315**	.088**	.099**
	Sig. (2-tailed)	.053	.000		.000	.000	.000	.003	.001
	N	1124	1124	1124	1124	1124	1124	1124	1124
Coordinating	Pearson Correlation	.205**	.243**	.449**	1	-.280**	-.206**	-.047	.090**
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.116	.003
	N	1124	1124	1124	1124	1124	1124	1124	1124
Focusing	Pearson Correlation	-.056	-.067*	-.352**	-.280**	1	.528**	.056	.146**
	Sig. (2-tailed)	.060	.025	.000	.000		.000	.060	.000
	N	1124	1124	1124	1124	1124	1124	1124	1124
Delivering	Pearson Correlation	.156**	.001	-.315**	-.206**	.528**	1	-.118**	.109**
	Sig. (2-tailed)	.000	.970	.000	.000	.000		.000	.000
	N	1124	1124	1124	1124	1124	1124	1124	1124
Finishing	Pearson Correlation	-.386**	-.343**	.088**	-.047	.056	-.118**	1	.511**
	Sig. (2-tailed)	.000	.000	.003	.116	.060	.000		.000
	N	1124	1124	1124	1124	1124	1124	1124	1124
Evaluating	Pearson Correlation	-.140**	-.350**	.099**	.090**	.146**	.109**	.511**	1
	Sig. (2-tailed)	.000	.000	.001	.003	.000	.000	.000	
	N	1124	1124	1124	1124	1124	1124	1124	1124

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

As in the previous validation study, we also ran reliability analyses using Cronbach's Alpha. This analysis produced results indicating very high levels of internal consistency for the subscales. For the four main subscales the reliability scores were above .94. This is a very high level of internal consistency. We also analysed the data for the eight subscales, and these were also highly reliable with internal consistency scores above .92. Overall, these findings give us confidence about the internal consistency of the *PRISM* subscales and suggest that

PRISM is a highly reliable measurement instrument (see Table 5 and Table 6 below).

**Table 5: Internal Consistencies for the Four Colours**

<b>Factor</b>	<b>Cronbach's Alpha</b>
RED	.948
GREEN	.957
GOLD	.965
BLUE	.949

**Table 6: Internal Consistencies for the Eight Subscales**

<b>Factor</b>	<b>Cronbach's Alpha</b>
RED FOCUSING	.942
RED DELIVERING	.925
GREEN INNOVATING	.965
GREEN INNITIATING	.966
BLUE SUPPORTING	.947
BLUE COORDINATING	.938
GOLD EVALUATING	.949
GOLD FINISHING	.974

## **Conclusions**

The findings from this study provide strong support for the validity and reliability of the English version of the PRISM Brainmapping scale. These findings are further strengthened by the international and cross-cultural nature of the sample that was used in this study.

1. Factor analyses results were in line with eight dimensions of the PRISM model.
2. All the scales and subscale had high levels of internal consistency
3. Correlations revealed patterns that are generally in-line with the PRISM model.

Future work is still needed to examine the relationship between PRISM and several other individual difference measures. This research will provide further evidence of PRISM's convergent and discriminant validity.