AEM Cube® Validity Study 2021

How does the AEM-Cube compare to other globally used assessment tools?

A study of external validity

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Introduction

Several consultants, coaches, and practitioners working with the AEM-Cube have recently indicated an interest in how the AEM-Cube dimensions relate to dimensions of other frequently used instruments, such as the NEO-PI-3 (also known as Five-Factor Model, OCEAN or Big Five; Costa & McCrae, 1992), the Hogan Personality Inventory (HPI; Hogan & Hogan, 1992), and the DISC Theory (Marston, 2013). Investigating the relationship between the AEM-Cube and these questionnaires might provide valuable insight into the traits underlying the AEM-Cube dimensions.

The AEM-Cube

The AEM-Cube is a well-validated assessment instrument measuring how individuals naturally contribute to change and growth within a team or organisation (Robertson, 2005). It emerged from research into diversity management (Robertson, 1999) and is based on a strong theoretical foundation of concepts such as attachment theory (Ainsworth et al., 1978; Bowlby, 1969), feedback and feed-forward systems (Pribram & Merton, 1976), and complexity theory (Ashby, 1956). These concepts translate to the AEM-Cube dimensions of Attachment, Exploration, and Managing Complexity, which have been shown to predict team performance (Reynolds & Lewis, 2017, Reynolds & Lewis, 2018). As a result, the AEM-Cube is a popular tool in career and talent coaching, investor-start-up cooperation, and strategic Human Resources management (Robertson & Schoonman, 2013).
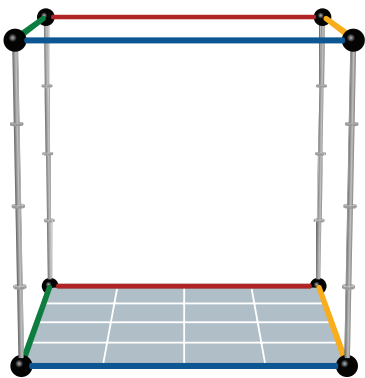

Figure 1. The AEM-Cube

It must be mentioned that the AEM-Cube is unique by itself since it is the only assessment tool that connects peoples natural tendencies to the strategic needs of an organisation. By doing so, it provides valuable information for composing optimal teams, restructuring an organisation, or enhancing one's personal contributions. Due to the AEM-Cube's uniqueness, it cannot be substituted by other questionnaires. Nevertheless, its correlations with other questionnaires can provide evidence for its underlying constructs, and its use in strategic growth and human resources management.

NEO-PI-3

The NEO-PI-3 is a personality inventory measuring the traits Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism (Costa & McCrae, 1992). These five traits have been discovered using factor analysis and are also known as the OCEAN model or the Big-5 (Goldberg, 1990). This five-factor model of personality is widely accepted, well-validated, and considered reliable in many different cultures (Costa & McCrae, 2008).

Hogan Personality Inventory (HPI)

The HPI was developed based on the Big-5, but measures seven primary scales, which are Adjustment, Ambition, Sociability, Interpersonal Sensibility (Likability), Prudence, Inquisitiveness (Intellectance), and Learning Approach (School Success) (Hogan & Hogan, 1992). It is a widely recognised and often used personality inventory (Anderson & Ones, 2003) and has been shown to predict business intelligence (Akhtar et al., 2015).

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DISC

The DISC Theory of Personality describes human personality in the four dimensions Dominance, Influence, Steadiness, and Compliance (Marston, 2013). It is frequently used in corporate and organisational settings (Reynierse et al., 2000) and can predict an individual's job success (Deviney, 2010).

The goal of this study is, to investigate the AEM-Cube's validity by assessing its convergent and divergent validity. Convergent validity is defined as the correlation between two dimensions that measure the same or a similar construct. For example, it would be expected that the AEM-Cube's Attachment dimension, with low scores representing a content focus and high scores a relationship focus, shows a positive correlation with the Extraversion dimension of the NEO-PI-3-IPIP since they both measure the degree to which someone enjoys socialising with people. Similarly, the Attachment dimension should also correlate positively with the

Sociability dimension of the HPI-IPIP. This would mean that individuals with a high relationship focus should also have high levels of Extraversion and Sociability. Likewise, the AEM-Cube's Exploration dimension is expected to show a positive correlation with the Openness to Experience dimension of the NEO-PI-3-IPIP, since they both measure how much someone seeks out new and stimulating experiences.

Divergent validity is defined by the absence of correlations between dimensions that measure unrelated constructs. For instance, since the Attachment dimension does not measure how creative, strategic and quick someone acts, it should not correlate with the Inquisitive dimension of the HPI-IPIP. In a similar way, the Exploration dimension does not measure how friendly, empathetic and tactful someone is and is therefore expected to not be correlated with the Agreeableness dimension of the NEO-PI-3-IPIP. No hypotheses are made regarding the Managing Complexity dimension since this dimension is unique in its learnable nature from the dimensions of other questionnaires.

Method

Data were collected by administering a web-based survey consisting of the AEM-Cube 36-item version, the NEO-PI-3 (IPIP version), the HPI (IPIP version), and the DISC questionnaire as described by Jones & Hartley (2013). 113 participants completed the survey for which they received a free AEM-Cube report and the possibility of winning a gift card. The participants represented a balanced sample of the general population, with 58 being female, 54 being male, and 2 preferred not to disclose their gender. 70% of participants were between 18 and 29 years old, 23% between 30 and 49, 5% between 50 and 69, and 2% older than 70. While most participants were from Europe, a few participants from Asia, North America, and the Middle East took part in the study.

To not artificially increase correlations, missing values were imputed with the mean of the respective question. As the assumptions of normal distributions and a linear relationship between both variables were met for all dimensions, Pearson's r correlation coefficient and their respective significance values were used to assess their associations. For all correlation coefficients, the 95% confidence interval was computed using bootstrapping with 1000 replications.

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Results & Discussion

AEM-Cube and NEO-PI-3

As hypothesised, individuals having a high relationship focus also score significantly higher on Extraversion, suggesting convergent validity since both dimensions measure how much someone is oriented towards social situations. As it was also hypothesised, exploratory individuals score significantly higher on Openness to Experience, which also provides evidence for convergent validity because both dimensions measure the degree to which someone seeks out novel experiences. Evidence of divergent validity is provided by the non-significant correlations. These suggest that the Attachment dimension is independent of the Conscientiousness and the Neuroticism dimension, that the Exploration dimension is independent of the Conscientiousness dimension and the Agreeableness dimension, and that the Managing Complexity dimension is independent of the Openness to Experience dimension.

Additionally, some non-hypothesised, but noteworthy correlations have been found. Individuals with a high relationship focus score higher on the Agreeableness dimension. As the Agreeableness dimension measures how kind, cooperative, considerate, and conflict-avoidant someone is, this indicates that the Attachment dimension measures these traits to some degree. This finding can be interpreted as evidence of convergent validity since these traits go well with a focus on personal relationships. Moreover, more generalist individuals score higher on Conscientiousness and lower on Neuroticism. This indicates that more generalist individuals are more self-disciplined, achievement striven, and dutiful, but less anxious, hostile and impulsive, while the opposite appears to be the case for specialists. Surprisingly, moderate correlations have been found between Exploration and Extraversion, and between Attachment and Openness to experience. This suggests that the Exploration dimension
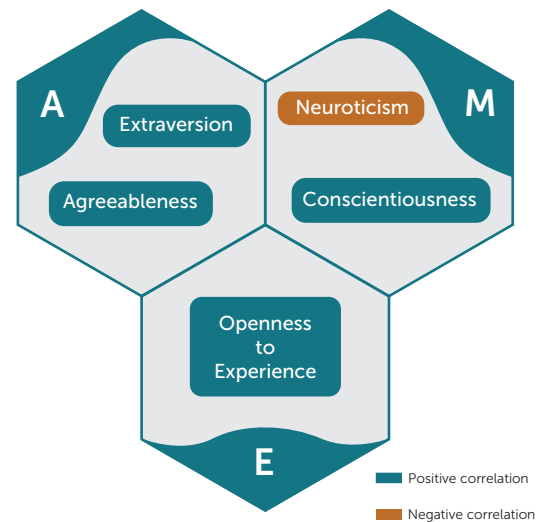

Figure 2.

measures to some degree how much someone enjoys seeking out contact with people, and that the Attachment dimension to some degree measures how much someone likes to make novel experiences. The correlation coefficients and their respective 95% confidence intervals can be found in Table 1.

These results provide evidence of convergent and divergent validity of the AEM-Cube questionnaire. They show that the Attachment dimension can explain an individual's levels of Extraversion and Agreeableness, while the Exploration dimension can explain one's level of Openness to Experience, and the Managing Complexity dimension one's level of Neuroticism and Conscientiousness.

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Table 1

Correlations between the AEM-Cube and the NEO-PI-3 dimensions

		AEM-Cube dimensions		
		Attachment	Exploration	Managing Complexity
NEO-PI-R (OCEAN)	Openness to Experience	.216* [.010, .403]	.325** [.157, .479]	-.076 [-.245, .091]
	Conscientiousness	-.073 [-.257, .122]	.011 [-.176, .189]	.636** [.520, .730]
	Extraversion	.407** [.216, .582]	.325** [.134, .477]	.219* [.012, .394]
	Agreeableness	.380** [.192, .539]	.060 [-.113, .231]	.244** [.073, .404]
	Neuroticism	-.159 [-.397, .101]	-.382** [-.522, -.224]	-.437** [-.583, -.261]

In each cell, the Pearson's r correlation coefficient and its 95% Confidence Interval are displayed in the format:
[lower boundary, upper boundary]

*Correlation is significant at alpha = 0.05
**Correlation is significant at alpha = 0.01

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AEM-Cube and Hogan Personality Inventory (HPI)

The hypotheses that a relationship focus can be associated with high scores on the Sociability dimension could be confirmed. Since being outgoing, talkative and attention-seeking, which is measured by the Sociability dimension, goes along well with being focused on personal relationships, this suggests convergent validity. Evidence for divergent validity is provided by the non-significant correlations of Attachment with Adjustment, Prudence, Inquisitiveness, and Learning Approach. Further, the non-significant correlations of Exploration with Interpersonal Sensitivity and Learning Approach, and of Managing Complexity with Sociability, Prudence, Inquisitive, and Learning Approach provide evidence of divergent validity since these dimensions should measure unrelated constructs.

Figure 3.

Additionally, individuals with a strong relationship focus also have higher levels of Interpersonal Sensitivity, while exploratory individuals score higher on the Inquisitive dimension and lower on the Prudence dimension. More generalist individuals are shown to have higher values on the Adjustment dimension. Since these dimensions measure similar constructs, their correlations provide evidence for great external validity. Interestingly, Ambition shows strong correlations with both the Managing Complexity and the Exploration dimension, meaning that being exploratory and generalist both goes along with high values on the Ambition dimension. The Learning Approach dimension of the HPI-IPIP appears to be independent of all AEM-Cube dimensions, meaning that the AEM-Cube does not measure the construct captured by this dimension. The correlations between the dimensions and their respective 95% confidence intervals can be found in Table 2.
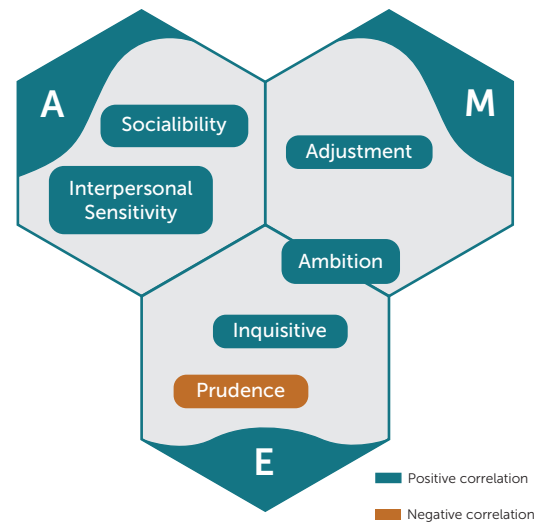
These results indicate that the Attachment dimension of the AEM-Cube measures to a moderate degree one's Sociability, and to a strong degree one's Interpersonal Sensitivity. The Exploration dimension can be used to represent one's scores on the Prudence and Inquisitive dimension, while the Managing Complexity dimension indicates one's level of Adjustment. The HPI-IPIP Ambition dimension can be explained together with the Exploration and the Managing Complexity dimension of the AEM-Cube.

Table 2

Correlations between the AEM-Cube and the HPI-IPIP dimensions

		AEM-Cube dimensions		
		Attachment	Exploration	Managing Complexity
Hogan Personality Inventory (HPI)	Adjustment	.060 [-.158, .262]	.299** [.122, .470]	.373** [.198, .512]
	Ambition	.196* [.002, .363]	.479** [.331, .603]	.466** [.315, .604]
	Sociability	.355** [.181, .520]	.239* [.055, .419]	.032 [-.177, .236]
	Interpersonal Sensitivity	.577** [.416, .711]	.178 [-.006, .353]	.275** [.099, .455]
	Prudence	-.094 [-.269, .103]	-.512** [-.618, -.395]	.079 [-.192, .331]
	Inquisitive	.002 [-.204, .198]	.462** [.287, .610]	.068 [-.091, .236]
	Learning Approach	-.076 [-.274, .120]	.178 [-.026, .365]	.181 [.034, .343]

In each cell, the Pearson's r correlation coefficient and its 95% Confidence Interval are displayed in the format [lower boundary, upper boundary]

*Correlation is significant at alpha = 0.05
**Correlation is significant at alpha = 0.01

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AEM-Cube and the DISC Model

The results displayed in Table 3 indicate that individuals with a strong relationship focus score high on the Influence dimension, suggesting convergent validity since relationship-focused individuals could be expected to be more friendly, sociable and communicative. Exploratory individuals score high on the Dominance dimension, indicating that the Exploration dimension also measures how independently minded and assertive someone is. Simultaneously, exploratory individuals score low on the Steadiness dimension. This indicates convergent validity since optimising individuals can be expected to prefer a constant and predictable environment. Besides this evidence for convergent validity, divergent validity is shown by non-significant correlations of Attachment with Dominance and Steadiness, and of Managing Complexity with Influence. Notably, the Compliance Dimension in the DISC model is negatively correlated with both the Exploration and the Managing Complexity dimension, meaning that individuals who are exploratory and generalists score low on Compliance. As a weakness, it must be pointed out that the Exploration dimension also shows a moderate to strong correlation with the Influence dimension. However, it cannot be said whether this means that the Exploration dimension measures influence or whether the Influence dimension measures exploratory behaviour.

These findings indicate that the Attachment dimension of the AEM-Cube partially explains the Influence dimension of the DISC model, while the Exploration dimension partially explains Dominance and Steadiness. Both the Managing Complexity and the Exploration dimension together can explain to some degree the Compliance dimension of the DISC model.
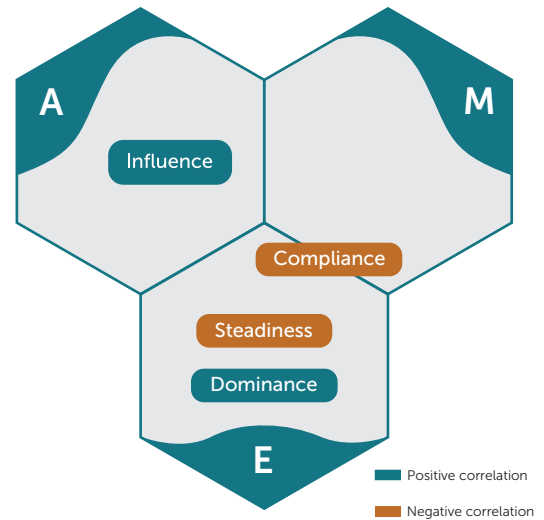

Positive correlation
Negative correlation

Figure 4.

Table 3

Correlations between the AEM-Cube and the DISC Model dimensions

		AEM-Cube dimensions		
		Attachment	Exploration	Managing Complexity
DISC	Dominance	-.111 [-.316, .112]	.401** [.242, .540]	.286** [.107, .453]
	Influence	.446** [.299, .572]	.403** [.240, .529]	.089 [-.067, .253]
	Steadiness	-.029 [-.235, .192]	-.322** [-.472, -.139]	-.226* [-.391, -.058]
	Compliance	-.222* [-.383, -.037]	-.599** [-.701, -.488]	-.331** [-.487, -.164]

In each cell, the Pearson's r correlation coefficient and its 95% Confidence Interval are displayed in the format [lower boundary, upper boundary]

*Correlation is significant at alpha = 0.05
**Correlation is significant at alpha = 0.01

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Conclusion

This study evaluated the AEM-Cubes validity by investigating how its dimensions correlate with the dimensions of other globally used assessment tools. Great convergent validity could be found as the AEM-Cube dimensions show moderate to strong correlations with the dimensions of other assessment tools which measure the same or similar constructs. Individuals with a high relationship focus also have high levels of Extraversion and Agreeableness (NEO-PI-3-IPIP), Sociability and Interpersonal Sensitivity (HPI-IPIP) and Influence (DISC Model). Exploratory individuals have high levels of Openness to Experience (NEO-PI-3-IPIP), score high on Inquisitive and Ambition, but low on Prudence (HPI-IPIP), and high on Dominance but low on Steadiness and Compliance (DISC-Model). Last, more generalist individuals score higher on Conscientiousness and lower on Neuroticism (NEO-PI-3-IPIP), higher on Adjustment and Ambition (HPI-IPIP), but lower on Compliance (DISC Model). This evidence of convergent validity indicates that the AEM-Cube dimensions indeed measure the constructs of Attachment, Exploration, and Managing Complexity. Further, evidence of divergent validity was found since the AEM-Cube dimensions did not correlate with dimensions that measure unrelated constructs, indicating the AEM-Cube dimensions do not measure constructs other than the ones they are supposed to measure. This evidence of external validity further justifies the use of the AEM-Cube as an assessment tool in an organisational context. Going beyond external validity, the associations found in this study can also be used to guide practitioners, coaches, and consultants who are familiar with other assessment tools. They can use these insights to create a more comprehensive understanding of an individual's personality based on one's AEM-Cube profile.

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