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Seven-Factor Model of Emotional Intelligence as Measured by Genos EI: A Confirmatory Factor Analytic Investigation Based on Self- and Rater-Report Data

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Abstract

In this investigation, a series of progressively more complex factor models was tested based on self-report and rater-report data derived from the workplace version of the Genos Emotional Intelligence Inventory (Genos EI). Based on a total sample of 4775 individual self-reports and 6848 rater-reports, a theoretically derived higher-order seven-factor model of emotional intelligence (EI) was found to be adequately well-fitting, in comparison to a competing global EI single-factor model and a five-factor model of EI. Internal consistency reliabilities associated with the total scale scores were approximately .95 and the subscale score reliabilities were approximately .80. The results are interpreted as largely supportive of a 7-factor model of EI as measured by Genos EI in both self- and rater-formats.

Keywords: emotional intelligence; confirmatory factor analysis; self-report data; rater-report data; Genos EI

Seven-Factor Model of Emotional Intelligence as Measured by Genos EI: A Confirmatory Factor Analytic Investigation based on Self- and Rater-Report Data

Emotional intelligence (EI) involves a set of skills relevant to how effectively we perceive, understand, reason with and manage our own and others' feelings (Palmer, Gignac, Ekermans, & Stough, 2008). Over the last couple of decades, several psychometric inventories have been developed to measure EI (Stough, Saklofske, & Parker, 2009). In this paper, the factorial validity and internal consistency reliability associated with a 70-item workplace relevant EI inventory, namely Genos Emotional Intelligence Inventory (Genos EI), was evaluated via confirmatory factor analysis (CFA) based on self-report and rater-report data.

Brief review of some existing EI models and measures

Researchers in the area of EI often distinguish between ability-based models of EI and mixed-models of EI (Mayer, Salovey, & Caruso, 2000; Petrides & Furnham, 2000). Ability-based models of EI are considered to represent a relatively homogenous set of emotionally relevant abilities, generally considered measurable by psychometric tests. An example of an ability-based EI measure is the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT; Mayer, Salovey, & Caruso, 2000). In contrast to ability-based models of EI, mixed-models of EI are considered to be more heterogenous in nature, combining several individual difference constructs, such as emotionally based competencies or skills, personality, and motivation. Mixed-models of EI tend to be measured via self-report and/or rater-report inventories. Examples include the Bar-On EQ-*i* (Bar-On, 1997) the Schutte EI (Schutte et al., 1998), and the Emotional Competence Inventory (ECI; Sala, 2002).

It has been asserted that ability-based EI model measures are superior to self-report measures, because they do not rely upon the insight of the respondent and are not susceptible to socially desirable responding (Mayer, Salovey, & Caruso, 2000). In response, it has been argued that self- and rater-report measures of EI may nonetheless offer some potential utility, as they may be designed to assess ‘typical performance’ rather than ‘maximal performance’ (Gignac, 2008a; Gignac, Palmer, Manocha, & Stough, 2005). It should be noted that the terms ‘typical performance’ and ‘maximal performance’ are used within the context described by Sackett, Zedeck and Fogli (1988), rather than Cronbach (1960). Thus, within the Sackett et al. context, maximal EI performance represents the highest level of EI ability that can be manifested by an individual at a particular time. In contrast, typical EI performance represents the level of EI behaviours an individual manifests on a regular basis (Gignac, 2008a). The distinction between typical performance and maximal performance should probably be considered a significant one, as human resource departments may be argued to be more interested in the assessment of typical performance, given that common performance appraisal indicators are typical performance in nature (e.g., supervisor ratings, annual sales, etc., Sackett & Devore, 2001).

The question as to whether typical EI performance can be measured validly outside a conventional task-based measurement approach is an important one. Several commentators have asserted that EI as measured via self-report is a necessarily invalid concept (e.g., Conte, 2005; Locke, 2005). Furthermore, the weak association between mixed-model self-report measures of EI and ability-based measures (e.g., r = .21; Brackett & Mayer, 2003) has been argued to be evidence for a lack of convergent validity (Brackett & Mayer, 2003). However, correlations in the area of .10 to .30 is what one would expect, based on the empirical research that has investigated the association between maximal performance and typical performance within the broader I/O literature. For example, Sackett, Zedeck and Fogli (1988) estimated correlations of .14 and .32 between maximal and typical performance in two large samples (Ns = 635 and 735) of cashiers engaged in the processing of supermarket items. Importantly, Sackett et al. did not interpret their findings as invalidity for either maximal or typical performance. Instead, the two constructs were viewed as modestly related, but largely distinct, approaches to the assessment of job performance.

Consequently, based on the above considerations, a specifically designed self-report and rater-report measure of 'typical EI performance' was considered a useful psychometric measure to develop for potential use in workplace settings (i.e., items which contained workplace contexts and/or wording). Attention was also placed upon the development of an inventory that measured EI relevant dimensions only, rather than an amalgamation of EI, personality, and competencies: a common criticism of current self- and rater-report measures of EI (e.g., Mayer, Salovey, & Caruso, 2000). Prior to the generation of the workplace relevant items, it was considered necessary to first determine theoretically and empirically the number and nature of genuine EI dimensions the typical performance EI inventory would encompass, where genuine EI dimensions were defined as emotionally relevant skills.

Genos EI: History and development

From 2000 to 2005, a comprehensive qualitative and quantitative examination of relatively well-known EI inventories was conducted. Based on the results of this comprehensive empirical and theoretical investigation (Gignac, 2005a; Gignac, Palmer, Bates, & Stough, 2006; Gignac, Palmer, Manocha, & Stough, 2005; Gignac, Palmer, & Stough, 2007; Palmer, 2003; Palmer, Gignac, Manocha & Stough, 2003; Palmer, Manocha, Gignac, & Stough, 2003; Palmer, Gignac, Manocha, & Stough, 2005; Palmer, Gignac, Ekermans, & Stough, 2008), five common ability-based EI dimensions were identified as unique across all existing inventories: (1) Recognizing and Expressing Emotions, (2) Understanding Emotions External, (3) Emotions to Direct Cognition, (4) Emotional Management (Self and Others) and (5) Emotional Control. A 64-item self-report inventory was developed by Benjamin Palmer and Con Stough to measure the five factors which became known as the Swinburne University Emotional Intelligence Test (SUEIT). Several empirical investigations have been published using the SUEIT, with some positive results relevant to predicting job performance, job satisfaction, and leadership (e.g., Downey, Papageorgiou, & Stough, 2006; Gardner & Stough, 2002; Palmer & Jennings, 2007).

Based on an extensive factor analytic investigation of the SUEIT, Gignac (2005b) concluded that the SUEIT factor structure was probably better represented by seven substantive EI factors (rather than five), whereby Emotional Recognition/Emotional Expression was more accurately represented by two separate factors (Emotional Recognition in the Self and Emotional Expression), and Emotional Management was also more accurately represented by two separate factors (Emotional Management of the Self and Emotional Management of Others). Gignac (2005b) also identified several items that needed to be deleted and/or revised.

In light of the results reported by Gignac (2005b), as well as industry-based focus groups (see Palmer, Stough, Harmer & Gignac, 2009 for further details), a revised 70-item version (self and rater) of the SUEIT was designed by Benjamin Palmer and Con Stough to measure seven positively inter-correlated dimensions of EI (10 items each): (1) Emotional Self-Awareness, (2) Emotional Expression, (3) Emotional Awareness of Others, (4) Emotional Reasoning, (5) Emotional Self-Management, (6) Emotional Management of Others, and (7) Emotional Self-Control. The name of the revised 70-item measure was changed from the SUEIT to the Genos Emotional Intelligence Inventory (Genos EI). Table 1 lists the seven Genos EI dimensions and their corresponding definitions. The inventory's Likert scale was developed on a 5-point continuum ('Almost Never', 'Seldom', 'Sometimes', 'Usually', and 'Almost Always'). Additionally, to reflect the typicality with which the respondents exhibit the EI relevant behaviours, respondents (or raters) are instructed to respond to the items based on their (or the target's) typical workplace behaviour across workplace situations during the preceding 4-6 months.

To-date, the seven-factor model that has been hypothesized to underlie the Genos EI inventory has not been tested, empirically. Factorial validity should be considered important, as it helps support the theoretical model a measure may be based upon, as well as justify the manner in which the scale or inventory is scored (Gignac, 2009). Consequently, it was considered beneficial to either confirm or disconfirm the Genos EI seven-factor model on both self-report data and rater-report data, as well as to estimate the reliabilities associated with corresponding subscale scores.

Method

Sample

The total self-report sample consisted of 4775 participants (52.9% female). The mean age of the participants was 33.5 (SD = 9.8). The primary countries of residence of the self-rated participants were Australia (60.5%), South Africa (8.8%), United States of America (7.8%), and Hong Kong (4.6%), Singapore (3.9%), India (3.6%) and the United Kingdom (2.0%). The mean age of the participants that were rated (i.e., targets) was 42.0 (SD = 8.0). Finally, the mean age of the raters was 42.3 (SD=9.6).The primary countries of residence of those who were rated and those who provided ratings was very similar to the country percentages reported for the self-report data. It will be noted that all of the participants that were rated were also participants in the self-report sample. The total rater-report sample consisted of 6848 ratings. The modal number of raters that provided ratings for a target was equal to 5. Information relevant to educational and occupational levels of the participants can be found in Gignac, (2008a).

Measure

The Genos EI 70-item inventory (self and rater) was designed to measure seven positively inter-correlated factors of EI: (1) Emotional Self-Awareness (e.g., ‘I fail to recognize how my feelings drive my behaviour at work.’(R)), (2) Emotional Expression

(‘When I get frustrated with something at work, I discuss my frustration appropriately.’), (3) Emotional Awareness of Others (‘I find it difficult to identify the things that motivate people at work.’ (R)), (4) Emotional Reasoning (‘I consider the way others may react to decisions when communicating.’), (5) Emotional Self-Management (‘I engage in activities that make me feel positive at work.’), (6) Emotional Management of Others (‘I am effective in helping others feel positive at work.’), and (7) Emotional Self-Control (‘I fail to control my temper at work.’ (R)). Each factor is measured by 10 unique items each (29% negatively keyed). Items are scored on a 5-point Likert scale from ‘Almost Never’ (1) to ‘Almost Always’ (5). The rater-report version of Genos EI consists of items that are identical to the self-report items, except that they are phrased in the third person. All data collected with Genos EI were derived from an on-line survey delivery system (20 minutes to complete).

Confirmatory Factor Analytic Strategy

Because the Genos EI 70-item inventory is based on a substantial amount of past research, a confirmatory rather than exploratory approach to data reduction was used to help determine the plausibility of the 7-factor model of EI hypothesized to underpin the Genos EI inventory. As CFA has been suggested to be most useful within the context of a model comparison approach (Joreskog, 1993), a series of progressively more complex models was tested to potentially confirm the 7-factor model of EI implied by Genos EI.

The first model (Model 1) was a global EI factor model defined by a single, general factor. The second model (Model 2) was a global EI model with the inclusion of a nested negatively keyed item factor (see DiStefano & Motl, 2006, for some discussion on negatively keyed item factors). The third model (Model 3) was a higher-order five-factor model defined by five-first order factors: (1) Emotional Recognition and Expression, (2) Emotional Awareness of Others, (3) Emotional Reasoning, (4) Emotional Management and (5) Emotional Self-Control, one higher-order global EI factor, and one nested negatively keyed item factor (i.e., the factor model implied by the original version of Genos EI). The fourth model (Model 4) that was tested was the theoretically and empirically derived 7-factor model defined by the following substantive factors: (1) Emotional Self-Awareness, (2) Emotional Expression, (3) Emotional Awareness of Others, (4) Emotional Reasoning, (5) Emotional Self-Management, (6) Emotional Management of Others, and (7) Emotional Self-Control, in addition to a higher-order global EI factor, and a nested negatively keyed item factor (see Figure 1). The final model (Model 5) that was tested was the corresponding direct hierarchical model (a.k.a., bi-factor model or nested factor model; but see Gignac, 2008b) of the preceding 7-factor higher-order model of EI (see Figure 1), as recommended by Gignac (2007a). The advantages of the direct hierarchical model over the Schmid-Leiman transformation of a higher-order model include the statistical significance testing of each factor loading, an often observed improvement in model fit, as well as potentially less misleading factor loading interpretations (see Gignac, 2006a; Gignac, 2008b).

Given that Bentler and Chou (1987) recommended that a maximum of 20 observed variables be included in a structural equation model (SEM), the application of the total disaggregation model (Bagozzi & Heatherton, 1994) was not considered feasible in this investigation (i.e., Genos EI consists of 70 items). Consequently, the partial aggregation model (Bagozzi & Heatherton, 1994) was used to evaluate the factor structure of Genos EI. Specifically, the 10 items hypothesized to measure a particular factor were parcelled into summed aggregates of 3-4 items. A legitimate concern with the application of item parcelling in SEM/CFA research is that elements of multidimensionality may be blurred or obscured by the creation of the parcels (Bandalos & Finney, 2001). To militate such a possibility, each of the seven factors of Genos EI was modeled via CFA, individually. In each case, the individual single-factor models were found to be well-fitting (as per Schweizer, 2010), with the addition of a negatively keyed item factor and one or two minor correlated residuals between items that had similar wording (full results available upon request). Thus, the items that formed each of the seven factors were considered to be substantively unidimensional. In light of the above, each of the seven factors were defined by three item parcels, where two of the item parcels were based on 3-4 positively keyed items, and the third item parcel was based on the negatively keyed items (usually 3-4 items) associated with that subscale. The positively keyed items were selected into each parcel on a quasi-random basis, with some consideration for items that were inter-correlated relatively strongly (i.e., they were placed into opposite parcels to reduce the chances of obscuring the possibility of multidimensionality).

All CFA analyses were based on a Pearson covariance matrices and Maximum Likelihood Estimation (MLE) via AMOS 7.0. Model fit evaluations were based on a close-fit perspective as per the guidelines described in Schweizer (2010). Additionally, as recommended by Gignac (2007a), differences in implied model TLI values equal to or greater than .01 were considered to be a practical improvement in model fit (e.g., .940 vs. .950).

Finally, as recommended by Gignac (2007a), the percentage of reliable variance that was unique to each lower-order factor was estimated by squaring the regression path associated with each respective residual variance term. In this paper, a somewhat arbitrary demarcation of 5% unique reliable variance was considered sufficient to consider a first-order factor acceptably unique from the higher-order factor (and the remaining first-order factors). Such a demarcation rule implies that none of the higher-order factor loadings would exceed .97. A maximum higher-order loading of .97 was considered defensible, in part, because previous CFA models accepted in the area of intellectual intelligence and EI have reported loadings as large as .97 (e.g., Gignac, 2006b; Palmer, Manocha, Gignac, & Stough, 2003).

Results

As can be seen in Table 1, all of the subscale scores across self- and rater-report data were associated with Cronbach's alphas in excess of .70. Furthermore, the Total EI scores were associated with alphas in excess of .95.

As can be seen in Table 2, for both the self- and rater-report data, the hypothesized seven-factor model (Models 4 and 5) was the best fitting model, in comparison to the five-factor model and the general factor model. In almost all cases, the TLI difference exceeded the practical significance criterion of .010. The exception was the lack of difference between the seven-factor higher-order model (Model 4) versus the corresponding direct hierarchical model (Model 5), which did not reveal a practically significant difference in model fit for both self- and rater-report data (i.e., ΔTLI = .004 and .000, respectively). Finally, as implied by the fact that all of the higher-order loadings were $\leq$ .97 (see Figure 2), each of the seven unique factors were associated with 5% or more unique true score variance. Thus, each of the seven lower-order factors was considered plausible. Overall, the factor solutions associated with both the higher-order and direct hierarchical models were supportive of the seven-factor model, as the loadings were all positive and statistically significant (see Figure 2 and Table 3). The Emotional Reasoning factor, however, was notably weaker and even non-existent in the rater-report data (see Table 3).

Discussion

The results of this investigation largely supported a seven-factor model conceptualization of EI, as measured by Genos EI. In both the self-report and rater-report workplace samples, the seven-factor higher-order model was acceptably well-fitting, as well as practically better fitting than the competing global EI factor model and the higher-order five-factor model. Thus, the model upon which the Genos EI inventory is based may be suggested to be largely supported, and the calculation and interpretation of the subscale scores appears to be psychometrically justifiable. Although there was a substantial amount of support for the seven-factor model of EI, there was noted weakness associated with the ER factor, as it did not emerge as a unique factor within the direct hierarchical model of the rater-report data.

Nunnally and Bernstein (1994) recommended internal consistency reliability levels of .95 and .80 for important decision making and basic research, respectively. As the Genos EI total EI scale reliabilities exceeded .90, it would appear that these scores may be used for purposes such as recruitment and selection, assuming predictive validity research was also provided for such a use. In contrast, the seven Genos EI subscale scores are probably more appropriate for learning and developmental contexts, as their reliabilities ranged from .74 to .87 (self-report).

The EI factors identified in this investigation are largely similar to those that would be found based on a qualitative review of the existing CFA and EI literature, which would be expected given that the generation of the inventory was based on a comprehensive review of existing measures of EI (see Introduction). However, no single inventory can be said to capture the seven factors measured by Genos EI, which does make the inventory unique in that sense. The ECI (Sala, 2002) is perhaps the only other self-report/rater-report inventory of EI that includes workplace context items. However, a possible limitation of the ECI is that it incorporates attributes such as Service Orientation and Teamwork, which are probably better conceptualised as outcomes of EI, rather than EI proper. Furthermore, the results of Byrne, Dominick, Smither and Reiley (2007) suggest that the ECI measures only a single, global EI factor, which renders interpretations of the subscale scores problematic. It is possible that the lack of factor differentiation within the ECI is due to the limited number of items that define each subscale (i.e., as few as 3 items).

In comparison to other EI inventories, perhaps the most unique factor within the Genos EI inventory is Emotional Self-Control (ESC). Gignac (2005b) distinguished ESC from

Emotional Self-Management (ESM) on a 'reactive' vs. 'proactive' basis. That is, ESC was viewed as immediate reactionary behaviours to intense emotional states; for example, losing one's temper when angry. By contrast, ESM involves more proactive and/or planned strategies to facilitate the development of a mood state within oneself. Future construct validity research may help further substantiate the distinction between ESM and EC.

The weakest factor amongst the seven-factor Genos EI model was Emotional Reasoning (ER). The ER3 parcel appeared to be particularly problematic. It should be noted that ER3 was not a parcel in the strict sense of the term, as it was defined by the single negatively keyed item within the ER subscale. Thus, comparisons between ER3 and the other negatively keyed item parcels are probably not justifiable. Nonetheless, the factorial validity associated with the ER factor in the rater data should probably be considered somewhat questionable at this stage. This comment is strictly relevant to ER items as indicators of Emotional Reasoning, independently of the Global EI factor, as the positively keyed ER item parcels exhibited non-negligible loadings onto the Global EI factor across both the self- and rater-report data. Gignac, Palmer, and Stough (2007) commented that emotional reasoning type factors across all EI inventories tend to be associated with weaker factorial validity. It remains to be determined why this is so.

Future Genos EI factorial validity research might involve an examination of the factorial invariance of the 7-factor Genos EI model across cultures, genders, and contexts, that is, workplace versus non-workplace versions of Genos EI (see Downey et al., 2008, for non-workplace use of Genos EI). Research currently underway is examining the degree of convergence between self and rater Genos EI scores, as well as the convergence between rater scores (i.e., inter-rater reliability). Of course, predictive validity and discriminant validity research is also required to more fully support the validity of the scores associated with Genos EI.

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Table 1

Hypothesized Genos EI seven-factor model: Definitions and example self-report items

		Self-Report			Rater-Report		
Subscale	Definition	Mean	SD	α	Mean	SD	α
Emotional Self-Awareness (ESA)	Perceiving and under-standing one’s emotions.	41.94	4.56	.83	39.90	5.32	.87
Emotional Expression (EE)	Expressing one’s emotions effectively.	39.53	4.85	.81	40.35	5.37	.82
Emotional Awareness of Others (EAO)	Perceiving and under-standing emotions of others.	40.22	4.79	.87	39.31	6.37	.92
Emotional Reasoning (ER)	Utilizing emotional information in decision making	39.29	4.44	.74	38.92	5.25	.82
Emotional Self-Management (ESM)	Managing one’s own emotions effectively.	38.36	4.72	.79	39.22	5.35	.85
Emotional Management of Others (EMO)	Managing the emotions of others effectively.	40.29	4.89	.86	40.00	6.46	.92
Emotional Self-Control (ESC)	Controlling one’s strong emotions.	39.51	4.80	.78	40.48	5.49	.83
Total EI	Overall emotional intelligence	279.13	27.76	.96	278.18	35.62	.98

Note. SD = standard deviation; α = Cronbach’s alpha.

Table 2

Model fit statistics and close-fit indices associated with the tested CFA models

	Model	χ^2	*df*	RMSEA	SRMR	CFI	TLI	ΔTLI
Self-Report (*N* = 4775)								
0	Null Model	63394.46	210	.251	.456	.000	.000	
1	Global EI	10160.14	189	.105	.059	.842	.825	
2	Global EI + Neg.	7922.69	182	.094	.049	.877	.859	.034
3	Higher-Order 5-factors	5533.14	177	.080	.043	.915	.899	.040
4	Higher-Order 7-factors	3972.40	175	.067	.041	.940	.928	.029
5	Direct Hierarchical 7- factors	3458.94	161	.066	.037	.948	.932	.004
Rater-Report (*N* = 6848)								
0	Null Model	127857.00	210	.298	.000	.000	.562	
1	Global EI	13397.30	189	.101	.045	.897	.885	
2	Global EI + Neg.	9632.33	182	.087	.034	.926	.915	.030
3	Higher-Order 5-factors	7085.35	177	.076	.031	.946	.936	.021
4	Higher-Order 7-factors	5514.80	175	.067	.030	.958	.950	.014
5	Direct Hierarchical 7- factors	5033.94	161	.066	.027	.962	.950	.000

Note. RMSEA = Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Residual; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; ΔTLI = difference in corresponding model TLI values.

Table 3

Completely standardized factor model solutions associated with the direct hierarchical seven-factor model (Model 5): Self-report and rater-report

	Model 5 Self-Report									Model 5 Rater-Report								
	Glob. EI	ESA	EE	EAO	ER	ESM	EMO	ESC	Neg.	Glob. EI	ESA	EE	EAO	ER	ESM	EMO	ESC	Neg.
ESA1	.66	.47								.80	.33							
ESA2	.71	.50								.82	.39							
ESA3	.64	.25							.34	.69	.15							.34
EE1	.80		.29							.86		.13						
EE2	.74		.40							.77		.56						
EE3	.55		.11						.46	.50		.11						.30
EAO1	.78			.33						.88			.27					
EAO2	.75			.44						.86			.29					
EAO3	.64			.31					.36	.76			.19					.42
ER1	.74				.18					.84				**.45**				
ER2	.74				.54					.85				**.14**				
ER3	.14				.07				.11	.08				**-.02**				.04
ESM1	.78					.27				.85					.32			
ESM2	.74					.09				.78					.13			
ESM3	.48					.44			.40	.56					.28			.45
EMO1	.80						.37			.90						.22		
EMO2	.72						.33			.84						.27		
EMO3	.70						.13		.39	.78						.10		.33
ESC1	.59							.54		.68							.53	
ESC2	.69							.27		.76							.22	
ESC3	.48							.34	.45	.61							.22	.44

Note. *N* = 4775 (self); *N* = 6848 (rater); Glob. EI = global emotional intelligence; ESA = Emotional Self-Appraisal; EE = Emotional Expression; EAO = Emotional Appraisal of Others; ER = Emotional Reasoning; ESM = Emotional Self-Management; EMO = Emotional Management of Others; ESC = Emotional Self-Control; factor loadings in bold were not statistically significant (p>.05)

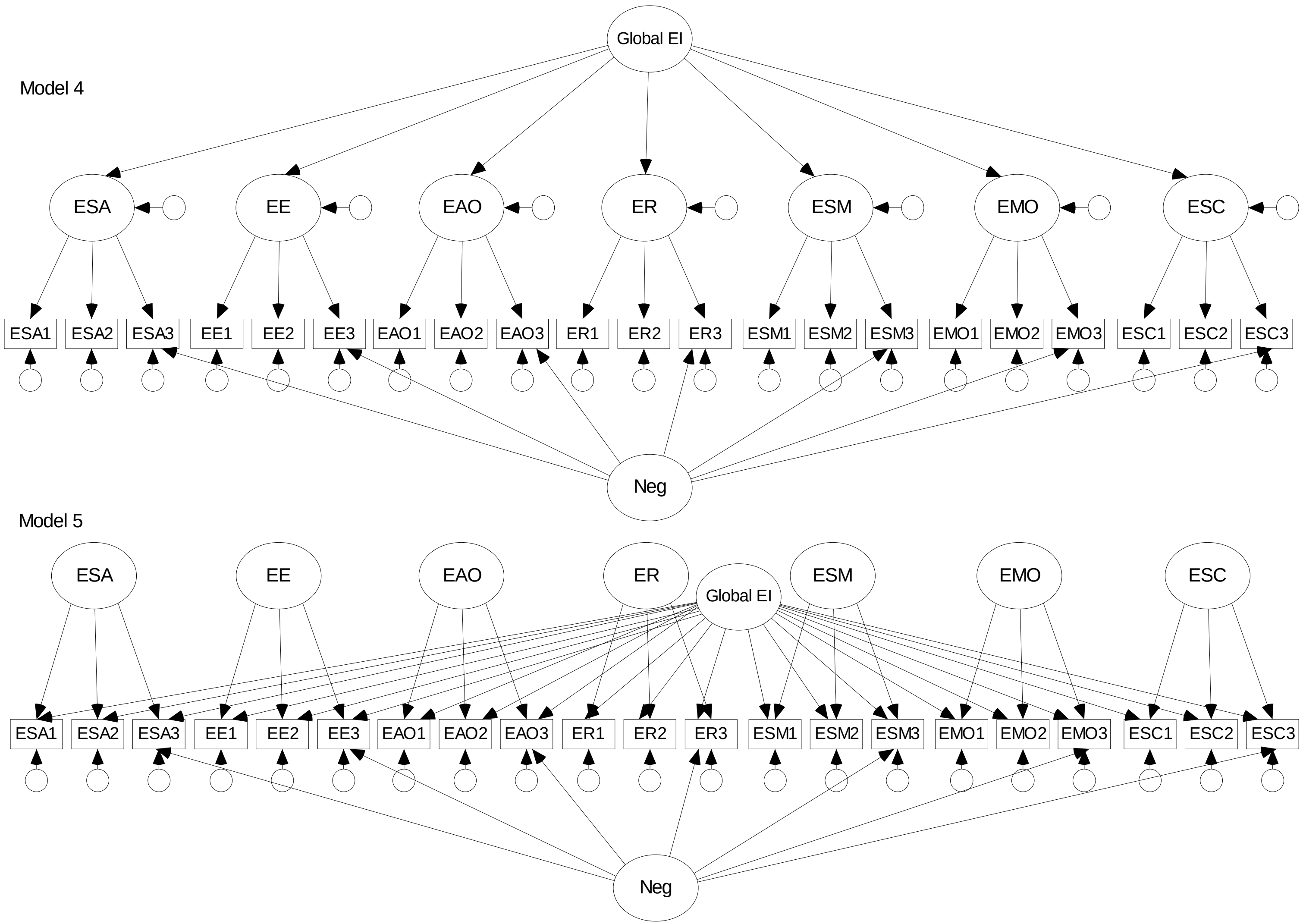

Figure 1

Hypothesized 7-factor higher-order model (Model 4) and corresponding 7-factor direct hierarchical model (Model 5).

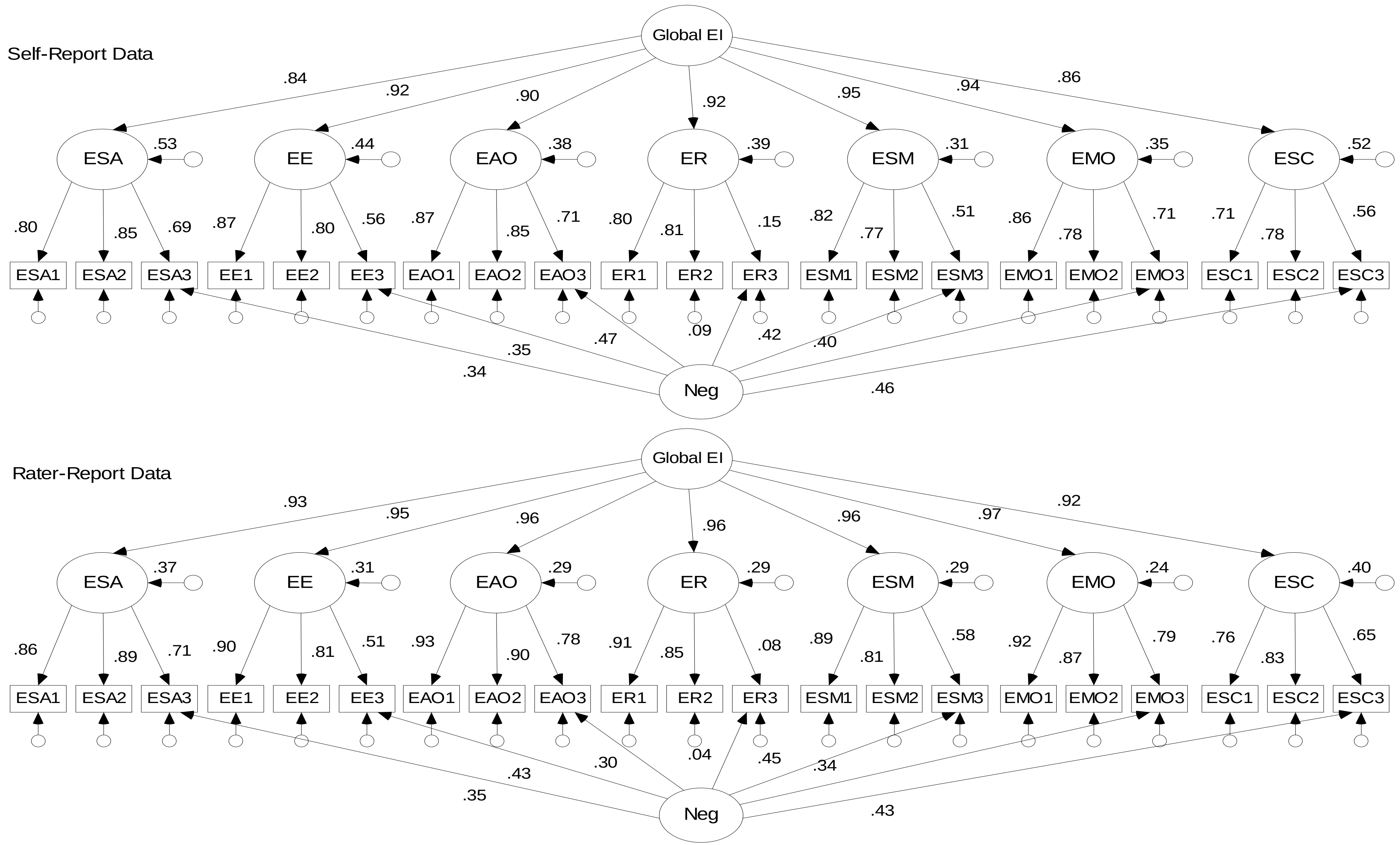

Figure 2
Completely standardized higher-order seven-factor model solution (Model 4): Self-Report and rater-Report