A method factor measure of self-concept

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Paper submitted for presentation at the 26th Annual Conference of The Society for Industrial and Organizational Psychology, Chicago, IL 2011

Poster

TITLE

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ABSTRACT

A method factor indicated by Big Five items was found to correlate negatively with a common measure of depression and positively with a common measure of self esteem. This suggests that the method factor, previously used to assess faking, may represent a more general characteristic of self-concept.

PRESS PARAGRAPH

Extant measures of self-concept are typically either direct measures with their own vocabulary or compendia of subscales of other measures explicitly involving self-concept. In this study, we showed how a well established measure of the Big Five can provide an indirect measure of self-concept via a method factor, independent of the Big Five factors. This measure of self-concept was negatively correlated with a measure of depression and positively correlated with a measure of self-esteem. The results suggest that the method factor may be a viable screening device for measurement of self-concept.

There is a slowly emerging trend in the study of faking of personality tests toward using confirmatory factor analysis models to assess faking. In these models, individual differences in faking are represented by factors analogous to method factors (Podsakoff, McKenzie, Lee, & Podsakoff, 2003) in the analysis of multi-trait method-method (MTMM) data. A major difference between recent models designed to assess faking and traditional MTMM data are the indicators of the factors. In the vast majority of traditional MTMM studies, indicators have been scale or domain scores, formed by summing or averaging responses to individual items. This averaging process has the negative consequence of preventing the comparison of within-dimension covariances to between-dimension covariances to allow estimation of method factors that might represent common influences on all items.

Figures 1 and 2 illustrate the primary problem associated with using a Big Five personality questionnaire with a single method factor. Both figures show a model of Big Five data with a single method factor. In Figure 1, Big Five scale/domain scores are indicators of the factors. The model illustrated in this figure is generally not identified. Covariances between the scale scores are a mixture of influences of the Big Five factors and the method factor, but those influences are not separable in the model illustrated in Figure 1.

In Figure 2, however, the influence of the method factor, M, is typically estimable separately from the influences of the Big Five factors because one of the sources of the within-dimension covariance – M – is the same across all items while the other sources of within-dimension covariances are different across the Big Five dimensions. This means that covariances between pairs of items from different Big Five dimensions are influenced directly by M, but only indirectly by the Big Five factors through inter-factor correlations. Thus the within-dimension covariance can be contrasted with the between-dimension covariances to allow estimation of loadings on both M and the Big Five factors. The only restriction is that if correlations between the Big Five factors are estimated, M must be assumed to be orthogonal to the Big Five factors. This restriction means that the influences of M that are estimated are those influences orthogonal to the Big Five or substantive dimensions.

One of the first suggestions that there might be a common source of variance influencing all items in Big Five questionnaires came in a study by Schmit and Ryan (1993) who found what they called an "ideal employee" factor in exploratory factor analyses of NEO-FFI item parcels created from applicant responses to the NEO-PI(R). Schmit and Ryan found that most items from this measure loaded on this factor. Following this, Cellar, Miller, Doverspike, & Klawsky (1996), estimated the model of Figure 2 and found that the common factor, M, significantly improved goodness-of-fit of the model to the data.

Other researchers have explored the viability of M as a factor reflecting the tendency to fake or dissimulate in situations in which faking was encouraged either through instructions or incentives (Bäckström, 2007; Bäckström, Björklund & Larsson, 2009; Biderman, Nguyen, Mullins, & Luna, 2008; Biderman & Nguyen, 2004, 2009; Kleha, Kleinmann, Hartstein, Melchers, & Konig, 2009; Ziegler & Buehner, 2009). These studies generally found that M significantly improved goodness-of-fit of CFA models in which either items or item-parcels were indicators, that M correlated highly with traditional measures of faking (Bäckström, Björklund & Larsson, 2009; Biderman & Nguyen, 2009), and that M predicted some performance criteria above and beyond predictions afforded by the Big Five factors (Biderman et al., 2008; Kleha et al., 2009).

These previous findings suggest that M represents individual differences in the tendency to enhance one's standing when such self-enhancement is encouraged through either instructions

or incentives. Because of its use of faking paradigms, the focus of much research in this area has been on a person's tendency to enhance as the primary source of this type of individual difference. According to research on psychological processes in survey responses (e.g., Tourangeau, Rips, & Rasinski, 2000), the self-enhancement in survey responses can be explained as follows: a respondent reads a questionnaire item for comprehension, evaluates the extent to which it applies through the retrieval of information from the memory relevant to the item, and then make a judgment concerning whether and how much to enhance that self-evaluation by an amount depending on the personal characteristics and goals of the respondent in the situation before selecting a response to the survey item.

Some persons might enhance responses in all situations. Others might enhance their responses in complying with the instructions to fake good but not if there were no such instructions. Others might exhibit little self-enhancement, preferring to respond in as veridical a fashion as possible. This view might even incorporate "negative enhancement" reflecting a tendency of respondents to manipulate their impression negatively. Regardless of the amount and direction, the enhancement view of faking is one that focuses mostly on individual differences in the positive end of the distribution of M, suggesting that much of the variance in the positive tail of the distributions comes from differences in a generally positive response enhancement tendency.

An alternative view of the individual differences represented by M must be considered, however. This view includes a focus on differences between respondents who score on the low end of the M-distribution. It is possible that persons in this region differ primarily in characteristics other than self-enhancement, perhaps something such as self-deflation, self-deprecation, or even something as serious as depression. Even in situations in which self-enhancing responses may elevate one's standing, it is possible that respondents with a self-deprecation/depressive tendency may be unwilling or unable to enhance their self-presentation. These respondents may define the left tail of the M-distribution in such a way that differences in a person's strength of self-deprecation/depressive tendencies may be apparent in one's level of agreement with all statements present in typical personality inventories (see Figure 3).

Extending this discussion further, M may represent stable (trait) or transient (state) individual differences in a respondent's conception of well-being at the time at which responses to the questionnaire are made. For example, if the respondent is characteristically "positive" or induced to feel positive because of having the opportunity to successfully fake for self-enhancement, this respondent might choose "high valence" responses – those that present the respondent in a positive light. Alternatively, if a respondent is characteristically "negative", his/her responses could be expected to be those with negative valence: - those that present the respondent in a negative light. Such possibilities are partially supported by Harris and Lucia's (2003) findings that self-reported negative mood states positively correlated with self-reported neuroticism.

If responses to scale items, such as those of the Big Five are to some extent influenced by the respondent's prevailing positivity or negativity, then this suggests that M might represent individual differences in those tendencies, and not simply a general tendency to self-enhance in all situations. It is important to note that the positive and negative responding tendency captured by M as proposed in this study are two ends of a continuum of self-concept, not two separate factors of negative wording vs. positive wording proposed and tested by other researchers (e.g., Schriesheim & Eisenbach, 1995; Magazine, Williams, and Williams, 1996). For example, one might respond positively or negatively depending on one's mood to a positively worded item

expressing negative valence, e.g., "I shirk duties". Likewise, one might respond positively or negatively to a negatively worded item expressing positive valence, e.g., "I do not shirk duties". The wording and valence are independent characteristics of personality questionnaire items. Whereas our conceptualization of M in this study captures both the positive and negative valence embedded in the Big Five factor model per Costa and McCrae (1995), wording factors capture only the item wording characteristics. Such factors will not be considered here.

In the present paper, we offer M as an alternative method for evaluating a person's self-concept, one that assesses self-concept in an indirect fashion, based the pattern of responses to all items in a widely used personality instrument. Since it is an indirect measure, without any unique indicators, it represents a different way of assessing self-concept from current measures (e.g., e.g., Marsh, 1986; Judge, Erez, Bono, & Thoresen, 2003). We demonstrate that M represents both negative and positive ends of the self-concept continuum.

The Present Study

The present research investigated what might be called the dark side of M in Figure 3 by administering a Big Five questionnaire to respondents along with two existing direct measures of elements of self-concept: Costello and Comrey's (1967) Depression (CCD) scale (for chronic depression) and Rosenberg's (1965) Self Esteem (RSE). The expectation for the present research was that M in Figure 2 would reflect individual differences in self-concept and that these differences would demonstrate convergence with self-reported depression and self-esteem scores. From these considerations, we present three hypotheses.

H1: M as an indicator of self-concept will be negatively correlated with self-reported depression.

H2: M as an indicator of self-concept will be positively correlated with self-reported self-esteem.

If support for H1 and H2 is found, then the relationship of M to the measures of self-concept will have the deleterious effect of upwardly biasing the strengths of relationships of Big Five scale scores with the self-concept measures through its influence on the Big Five items making up those scale scores. Thus removing that influence should lead to a reduction in the magnitude of relationship between the Big Five personality dimensions and the self-concept covariates. The influence of M can be removed by computing factor scores of Big Five items from a model including M. In such a model, the covariances of the items due to M are assigned to M, rather than to the Big Five traits and the correlations between them. Thus, we hypothesize:

H3: Correlations of Big Five factor scores from a model including M with both depression and self-esteem will be smaller in absolute value than correlations of raw scale scores.

Method

Participants

Participants were 206 undergraduates (64 male) at a medium sized southeastern university, participating for course credit. Mean age was 19.32 (*SD*=4.86). Percentage of Whites was 67.96, Black/African-American was 25.24, and Other was 6.80.

Measures

Big Five. The 100-item IPIP Big Five Sample Scale (www.ipip.ori.org) was administered to all respondents with the instruction to, "Circle the number that represents how accurately each statement describes you." No instructions or external incentives to fake good were presented. Participants responded to each item on a scale of 1="Completely Inaccurate" to 7="Completely Accurate". In order to facilitate comparisons with previous research conducted

using the 50-item Sample Scale, only the items on the 50-item scale were analyzed for the present project.

Depression. The Costello and Comrey (1967) Depression scale was used as the measure of depression. Sample items include: "When I wake up in the morning I expect to have a miserable day." and "I wish I were never born." Responses were on the same seven-point scale and higher scores reflected higher levels of chronic depression. Descriptive statistics and coefficient alpha of this and the other scales are presented in Table 1.

Self Esteem. The Rosenberg Self Esteem scale (Rosenberg, 1965) was taken from Carmines and Zeller (1979). Sample items include: "I feel I have a number of good qualities." and, "I wish I could have more respect for myself." Responses were on the same seven-point scale and higher scores reflected higher levels of self-esteem.

Indirect measure of self-concept (M). The method factor, M, was assessed by application of the CFA of Figure 2 to the IPIP Big Five items using M*plus* V 5.2 (Muthén & Muthén, 1998-2008). Factor scores for M were computed using the regression method (Muthén, 1998-2004). Positive M scores reflected positive self-concept.

Procedure

Participants completed the questionnaires in small groups of 2 to 15 at a time. After participants filled out an informed consent sheet, the Wonderlic Personnel Test (WPT) was administered, followed by the above mentioned scales. Three additional personality scales were included in the questionnaire. The WPT and the three additional personality scales are not included in these analyses, but are mentioned for the sake of completeness.

Results

Means, standard deviations, and correlations between all the study variables are presented in Table 1. Reliability estimates are provided along the diagonal. The diagonal value reported for M is the factor determinacy reported in M*plus*; this value is the estimated correlation of factor scores with the factor.

Table 2 presents the results of application of two CFA models to the data. The first is a model with only Big Five factors. The second is the model of Figure 2, with a method factor added as a second explanatory factor for all items. Both models converged to interior solutions. As is common in application of factor analysis models to data where items are indicators, common measures of goodness-of-fit were poorer than recommended values for each model.. Previous research (e.g., Lim & Ployhart, 2006) has handled this type of poor fit by forming parcels of groups of items and using the parcels as indicators of factors or by estimating correlated residuals between selected pairs of items (e.g., Marsh, Lüdtke, Muthén, Asparouhov, Morin, Trautwein, & Nagengast, 2010). Our experience has been that the key relationships (i.e., those involving M) have not been affected when items are used as indicators and for that reason we chose to use the results of the models with items as indicators.

Model 1 was included as a baseline against which to compare the fit of Model 2, the model of interest here. Inspection of the table shows that the inclusion of M in Model 2 significantly improved goodness-of-fit. Based on this comparison, factor scores for the six factors estimated in Model 2 were computed and added to a data file that included the depression and self-esteem scores.

H1 was tested by computing the correlation between M factor scores from Model 2 and depression scale scores. From Table 1, the correlation is -.41 (p<.001), confirming H1. Inspection of Table 1 shows that the depression scale scores were also significantly negatively correlated with the Big Five scale scores. However, the improvement in goodness-of-fit

associated with adding M to form Model 2 suggests that the Big Five scale scores are influenced by M and may be correlated with depression through that influence. The influence is accounted for in Model 2, and thus factor scores representing the Big Five from Model 2 should have the influence of M removed. If it is only M that is related to depression scores, the factor scores of the Big Five from application of Model 2 should be less strongly correlated with depression than are the Big Five scale scores. This expectation was tested by correlating the depression scale scores with the Big Five factor scores. These correlations were .06, -.10, -.26 (p<.001), .01, and -.12 for E, A, C, S, and O respectively. Thus, only the correlation of depression with conscientiousness remained significant after the influence of M was removed, partially confirming the first part of H3.

The correlation of M from Model 2 with self-esteem scores was .40 ($p < .001$) confirming H2. As was the case with depression scale scores, the raw Big Five scale scores correlated significantly with self-esteem scores. (See Table 1.) Again, removing the influence of M from the Big Five scale scores changed the correlations. In this case, the correlations of Big Five factor scores with the self-esteem scale scores were .07, .01, .31 (p<.001), .00, and .32 (p<.001). Thus, three of the five correlations were essentially zero when the influences of M was removed, partially confirming the second part of H3.

Discussion

The present results suggest that the M factor in the model of Figure 2 is not only a measure of faking or socially desirable responding as found by Bäckström, Björklund, and Larsson (2009) and Biderman and Nguyen (2009), but also a potential indirect measure of individual differences in self-concept. The correlations observed here involved a first order latent factor estimated to be orthogonal to the Big Five dimensions. This suggests that M represents a characteristic that is not one of the commonly studied Big Five but a separate factor with its own nomological net (Cronbach & Meehl, 1955). Further, we note that our indirect measure of self-concept is conceptually different from those proposed by other researchers (e.g., Marsh, 1986; Judge et al., 2003) that view self-concept as a second-order latent variable consisting of four core traits of self-esteem, locus of control, neuroticism, and generalized self-efficacy. Our conceptualization of M is based on generalizability theory (Cronbach, Gleser, Nanda, & Rajaratnam, 1972) that allows isolation and estimation of several sources of variance in test items. The higher order conceptualization of self-concept does not allow this estimation of M.

The positive correlations with self-esteem support previous results indicating that M measures individual differences in positive self-presentation, as would be expected from a measure of tendency to fake. Thus, it appears that our indirect measure of self-concept (M) measures a wide range of individual differences, ranging from strong negative response tendencies analogous to self-deprecation/depression to strong positive responses tendencies analogous to self-enhancement.

We are not suggesting that M should replace the Costello and Comrey (1967) depression and Rosenberg's self-esteem measures (the correlations are not strong enough to support such a conclusion), but these results do suggest that M could be used as a rough screening method in situations in which the inclusion of additional measures of self-concept such as depression and self-esteem is not feasible or desirable (e.g., due to time or space constraints). The approach demonstrated here might also be especially useful in situations involving defensive respondents who might be put off by the fairly explicit and transparent statements found in typical depression and self-esteem measures. According to the Center for Disease Control (CDC), depression

affects 20 million American adults and most depression symptoms start during the young adulthood (between 15 and 30 years of age). The majority of these people do not seek help (http://www.cdc.gov/family/college). An indirect measure of self-concept such as that considered in this study might help college administrators in the process of identifying those in need of help early enough to ensure proper treatment.

Similarly, such information could be useful in identifying applicants for occupational positions in which self-concept is a critical predictor of job performance (e.g., customer service, physician-patient care giving) or when a candidate's self-concept may serve as a risk-factor for negative occupational health and safety outcomes on the job (e.g., for highly interpersonally demanding or high-intensity occupations). Further, M could also be used as a separate indicator of depression or self esteem in studies utilizing structural equation modeling, for example in which multiple indicators of constructs are desired. As M is available from a simple re-analysis of Big Five data, without the addition of items, it is essentially a bonus predictor for those who have Big Five personal data and the requisite software and modeling know-how.

The large differences in correlations between raw Big Five scale scores and Big Five factor scores from Model 2 are an example of the effects of method factors on structural relationships that have been discussed in other contexts (Podsakoff et al., 2003). In Model 2, from the perspective of a person interested in the Big Five, M is a contaminant of the Big Five items uncorrelated with the Big Five factors. Although M is uncorrelated with the Big Five factors, M will affect correlations involving the indicators and scale scores composed of them. In the present instance, the effect of M was to cause spurious correlations of some of the raw Big Five scale scores with depression and self-esteem scores. In other instances, contamination by M might suppress the correlation between raw scale scores and a criterion, as found by Biderman, Nguyen, and Sebren (2008), for example.

The results of the present study illustrate the potential for analyses that employ modern CFA techniques. The bifactor model studied here (Chen, West, & Sousa, 2006) could not have been created without CFA procedures that make it possible to obtain estimates of M and the Big Five. These results certainly suggest that further investigations of models of Big Five data that include method factors will be useful and may lead to other results illustrating the utility of such factors.

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Figure Captions

Figure 1. Model with correlated trait factors and one general method factor with scale scores as indicators. Model is unidentified. Covariance due to method factor cannot be distinguished from covariance due to correlated traits.

Figure 2. Model with correlated trait factors and one general method factor. Model is identified.

Figure 3. Different sources of individual differences in M.

Figure 1.

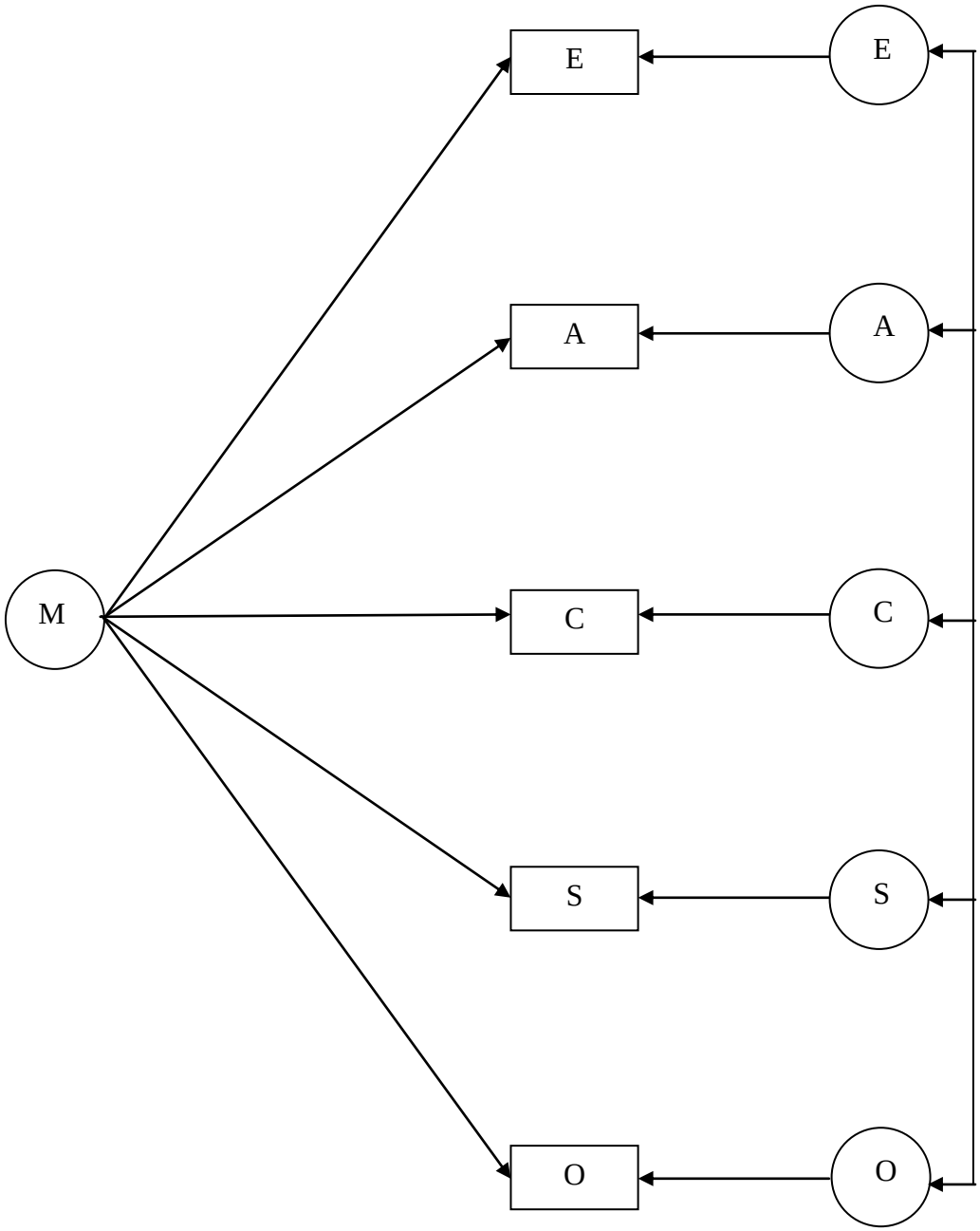

Figure 2.

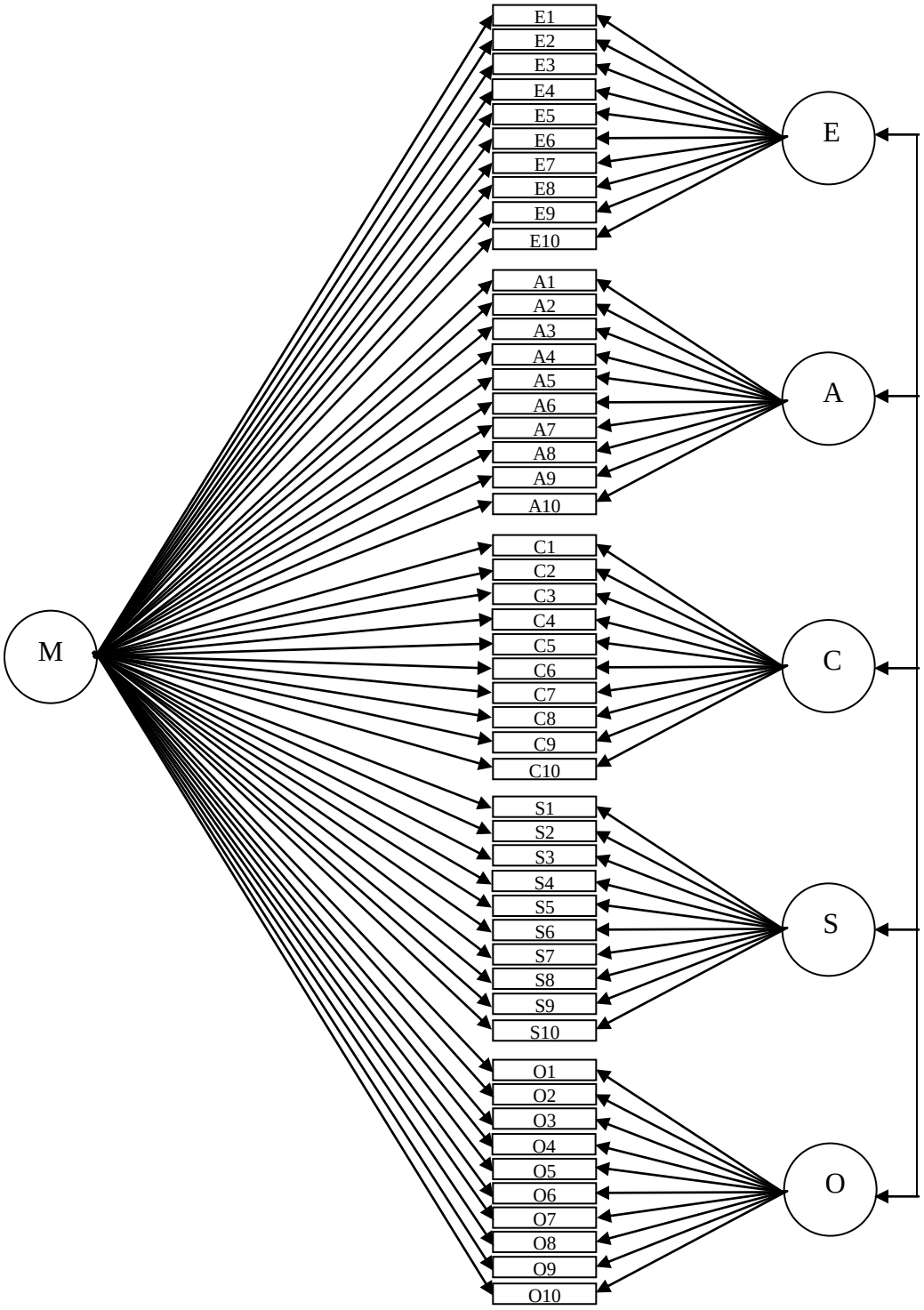
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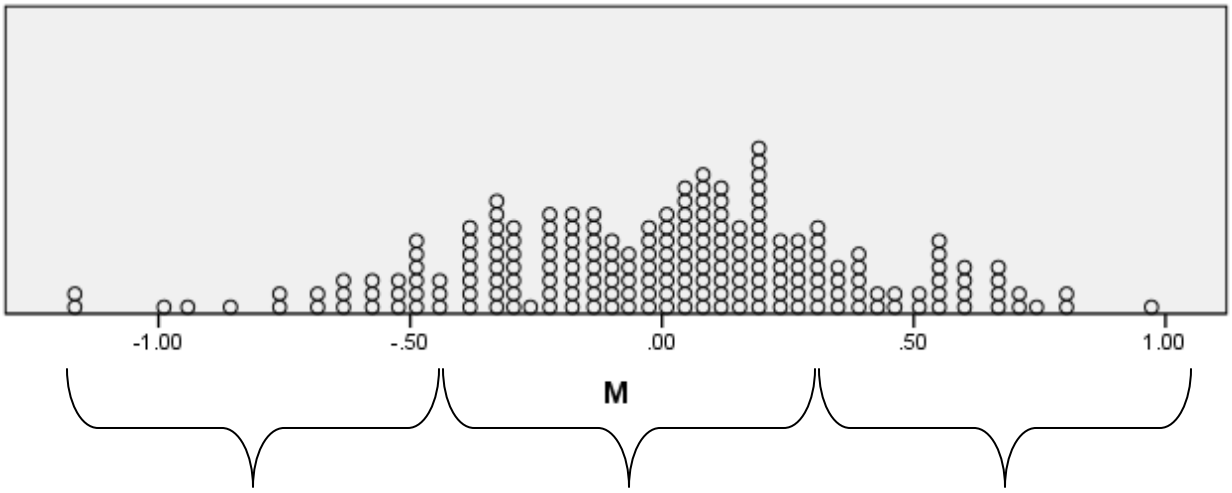
Figure 3.



Individual differences primarily due to self depreciation

Individual differences due to a mixture of causes

Individual differences primarily due to self enhancement

Table 1. Means, standard deviations, correlations, and reliability coefficients for study variables.

	Mean	*SD*	E	A	C	S	O	M	CCD	RSE
E	4.75	1.04	.885							
A	5.30	0.74	.317[c]	.789						
C	4.57	0.86	.007	.164[a]	.823					
S	4.24	0.99	.237[b]	.176[a]	-.021	.842				
O	4.85	0.82	.244[c]	.335[c]	.270[c]	.156[a]	.812			
M	0.00	0.38	.714[c]	.616[c]	.231[b]	.592[c]	.292[c]	.912		
CCD	1.84	0.83	-.202[b]	-.309[c]	-.330[c]	-.284[c]	-.192[b]	-.412[c]	.920	
RSE	5.65	0.87	.285[c]	.188[a]	.381[c]	.242[c]	.359[c]	.401[c]	-.674[c]	.847

[a] $p < .05$ [b] $p < .01$ [c] $p < .001$

Table 2. Results of application of CFA.

				RMSEA			
	Chi-square	df	CFI	LL	Value	UL	SRMR
Model 1	2224.634[c]	1165	.723	.062	.066	.071	.092
Model 2	1968.468[c]	1115	.777	.057	.062	.065	.072
Difference	256.166[c]	50					

	Factor				
	E	A	C	S	O
Mean Standardized Trait Loading	.482	.413	.547	.464	.530
Mean Standardized M Loading	.460	.343	.141	.349	.168
Mean R^2	.477	.360	.340	.374	.340

[c] $p < .001$