The Factor Structure and Concurrent Validity of the Early Maladaptive Schema Questionnaire: Research Version

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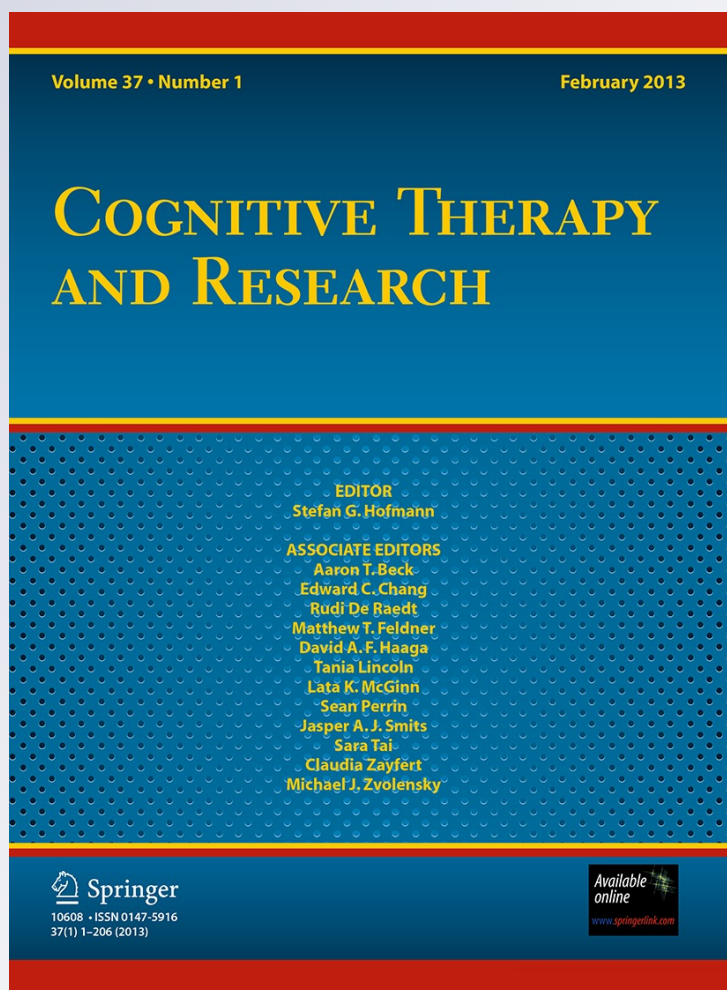ORIGINAL ARTICLE

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Abstract Early maladaptive schemas are stable, negative beliefs about oneself, others, or the environment that are formed early in life and subsequently organize an individual's experiences and behaviors. We evaluated the factor structure and validity of the self-report Early Maladaptive Schema Questionnaire—Research version (EMSQ-R) that assesses 15 maladaptive schema identified by Young (1991) within a sample of 908 individuals in treatment for substance use and personality pathology. We first employed confirmatory factor analytic techniques and found the data fit this expected model poorly. We then utilized exploratory factor analysis to examine the hierarchical structure of the EMSQ-R and then tested its concurrent validity using available chart data and another self-report questionnaire. In contrast with previous research, we concluded that the schemas do not have a replicable lower-order structure. However, we did retain a four-factor solution for the scales that demonstrated significant correlations with expected variables and provided partial support for the higher-order structure of EMSQ-R.

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Introduction

Within cognitive therapy, schemas are stable beliefs about oneself, others, or the world that serve to organize individuals' experiences and motivate subsequent behaviors (Beck, Freeman, & Associates, 1990). Early maladaptive schemas (EMS) are a subset of these broad cognitive themes that are learned early in one's life and then elaborated and perpetuated throughout adulthood at which point they can become dysfunctional to a significant degree and highly resistant to change (Young et al. 2003). These deeply entrenched schemas develop as an interaction between temperament and repeated early experiences with parents, siblings, peers, and other caretakers, but in adulthood can be triggered by everyday schema-relevant events or mood states. They also generate considerable negative affect that can impair self and interpersonal functioning. As part of schema therapy, Young et al. (2003) hypothesized that a set of EMSs were central to the case conceptualization and integrative cognitive behavioral therapy for a variety of psychiatric conditions, particularly personality disorders. Young identified a number of EMSs and developed the Young Schema Questionnaire (YSQ; Young and Brown 1990), a 205-item self-report questionnaire subsequently shortened to assess 15 EMSs (YSQ-SF; Young and Brown 1999). More recently, Ball and Young (2001) further revised this instrument to lower the reading level required and reordered and reversed some items to reduce potential response biases consistent with modern test construction standards (Early Maladaptive Schema Questionnaire—Research Version; EMSQ-R; Ball

and Young 2001). The EMSQ-R contains 75 self-reported items that are scored on a 4 point Likert-type scale onto 15 scales. The scales are unipolar with higher scores indicating maladaptivity.

Although there have been a number of studies utilizing the different versions of these scales (e.g., Petrocelli et al. 2001; Loper 2003), those examining the hierarchical structure have been primarily conducted within nonclinical, undergraduate samples. Because this scale was intended to be used within the context of psychotherapy, it is important to replicate these findings within clinical samples. Additionally, the extant literature on the structure of these measures has been potentially limited by analytic procedures that have been problematic in one or more ways (Cecero et al. 2004; Schmidt et al. 1995; Lachenal-Chevallet et al. 2006) and have not yielded a replicable higher- or lower-order structure. For example, all three of these investigations have been confined to exploratory factor analyses, whereas confirmatory methods would be preferable. In addition, the reliance on a visual analysis of scree plots along with Kaiser's (1961) rule of retaining eigenvalues >1 may have resulted in significant over extraction in the previous analyses (Hayton et al. 2004).

Schmidt et al. (1995) first examined the hierarchical structure of the longer version (205-item) of the YSQ. The YSQ was developed to assess 16 EMSs that were rationally sorted into the six higher-order domains of *instability and disconnection*, *impaired autonomy, undesirability, restricted self-expression, restricted gratification*, and *impaired limits*. Schmidt and colleagues investigated the higher- and lower-order structure of this instrument using exploratory principal components analysis (PCA) of the Pearson correlation matrix, with varimax rotation. A sample of 1,129 undergraduates was divided into derivation (n = 575) and cross-validation (n = 554) subsamples. The item-level analysis of the derivation subsample produced a total of 17 components, 15 of which corresponded to those originally proposed by Young (1991). Thirteen of the 17 components identified in the derivation subsample were replicated in cross-validation, which reflected 12 of the primary EMSs proposed by Young (1991). An additional factor, labeled *fear of losing control*, also emerged in this subsample.

In order to investigate the higher order structure, Schmidt et al. then combined the samples and subjected the correlation matrix of the 13 replicable factor scores to PCA with varimax rotation. They labeled the three higher-order factors that emerged as Disconnection, Overconnection, and Exaggerated Standards. Finally, Schmidt et al. (1995) conducted a PCA on a separate sample of 187 outpatients. This analysis yielded a 15-component solution, comparable to the derivation subsample from the undergraduate sample, with social undesirability again the only EMS proposed by Young that failed to emerge.

Lachenal-Chevallet et al. (2006) investigated the hierarchical structure of a French translation of the YSQ-short form (YSQ-SF), the precursor to the EMSQ-R, within a sample of 263 university students. Consistent with Schmidt and colleagues' methodology, they employed a PCA (varimax rotated) of the Pearson correlation matrix among the 75-items. They extracted 19 unrotated eigenvalues greater than 1.0. Thirteen of these components appeared to have clear correspondence to one of Young's (1991) 15 EMSs, but the *entitlement* and *insufficient self-control* scales loaded on a combined component. An additional five components were deemed unnecessary as they were defined by primary loadings of only one or two items. Thus, the authors concluded that there were 14 interpretable factors, with structural support for 13 of the 15 EMSs. Lachenal-Chevallet et al. (2006) did not investigate the higher-order structure of the YSQ-SF.

Finally, Cecero et al. (2004) investigated the hierarchical structure of the 75 EMSQ-R items within a sample of 292 university students. In contrast to the statistical methods used by Schmidt and colleagues, Cecero et al. employed principal axis factoring (PAF) of the Pearson correlation matrix with an oblique rotation (direct oblimin). Based on an inspection of the scree plot, they interpreted a 14-factor solution, which corresponded to all of the 15 EMSQ-R scales except *defectiveness/shame*. Further, Cecero and colleagues utilized the correlation matrix from these 14 factors to examine the higher-order structure, again using PAF with direct oblimin rotation. This analysis revealed a four-factor structure. The first factor included primary loadings for the *mistrust/abuse* (+), *social isolation/alienation* (+), and *emotional inhibition* (−). The second factor was defined by primary loadings for *vulnerability to harm, failure*, and *enmeshment*. The third factor included only a position loading for the scale *entitlement*, while the fourth factor had primary loadings for *self-sacrifice* (+), *unrelenting standards* (+), *dependence/incompetence* (−), and *insufficient self-control* (−). This higher-order structure was not discussed in reference to the findings of Schmidt and colleagues, but there were notable discrepancies (in addition to similarities) between the two solutions. For example, whereas Schmidt and colleagues 3-component model included *abandonment* within the first factor along with *emotional deprivation, mistrust,* and *emotional inhibition*, this scale loaded along with *enmeshment, subjugation*, and *vulnerability* in the fourth factor of Cecero et al.'s model.

Across these three studies, between 12 and 17 lower-order factors/components emerged. Although this would appear to indicate a relatively consistent lower-order structure, the same lower-order structures do not appear across the various studies with individual scales failing to emerge (e.g., *defectiveness/shame*) and/or combining with

others (e.g., *insufficient self-control*). As such, there does not appear to be a conclusive, replicable lower-order structure to the assessments of Young's EMSs. In addition, all three studies relied primarily upon non-clinical, undergraduate samples, with only a single insufficiently sized (i.e., 187 participants; 205 items) sample from Schmidt and colleagues investigating the structure within a clinical population. A similar criticism might also be made of the samples employed by Cecero et al. (2004) and Lachenal-Chevallet et al. (2006), which included fewer than 300 participants for a 75-item scale. A final set of limitations involved the analytic procedures employed within these studies. Cecero et al. (2004) was the only study to employ PAF, as opposed to PCA. Although, this is debated within the literature (Gorsuch 2003), PAF tends to be preferred for latent constructs, such as the EMSs, because it estimates the communalities along the diagonal of the correlation matrix as opposed to assuming perfect relations (Thompson 2004). A more important analytical limitation, though, was that all three studies conducted item-level structural analyses using the standard Pearson correlation matrices. This was problematic in that item-level data often violate assumptions of normality and produce spurious factors (e.g., Bernstein 1988; Nunnally and Bernstein 1994).

The current study sought to extend and improve upon previous efforts to elucidate the hierarchical structure of Young's EMS model. The current study examined the lower- and high-order structure of the EMSQ-R within a large clinical sample using first confirmatory and then exploratory factor analytic procedures using recommended statistical procedures (Gorsuch 1988; Panter et al. 1997). We then built upon these findings by testing the concurrent validity of the obtained factor solution against chart data and self-reported personality pathology.

Method

Participants and Procedures

We recruited adult and adolescent patients from a long-term residential treatment program for substance abuse in an urban area of the Northeastern United States. As part of the standard admission procedure, all patients completed the EMSQ-R. The current sample involved a total of 908 patients who were admitted to the facility between the years of 1999 and 2006. Of this total sample, chart data was abstracted for 327 individuals. In addition, a subset of 126 (of the 327 with chart data) participated in a randomized clinical trial comparing two individual therapies (Ball et al. 2011) in which they completed a variety of self-report and interview measures as part of their participation.

The total sample was predominantly male (82%), but further demographic information is not available for this larger (n = 908) sample. The subset (n = 340) with chart data were White (47%), African-American (32%), or Hispanic (16%). The majority were single (81%), with 10% divorced, and 7% were married. Their mean age was 28.0 (SD = 10.6) years. Research procedures were approved by the appropriate Institutional Review Board.

Measures

Early Maladaptive Schema Questionnaire: Research Version (Ball and Young 2001)

The EMSQ-R is a version of the Young Schema Questionnaire—Short Form (Young and Brown 1999) that was adapted to increase readability and make the scoring and format more consistent with modern test construction standards. It contains 75 self-reported items that are scored on a 4 point Likert-type scale (*very true, part true, part false,* and *very false*) and yields 15 scales. Table 1 includes the full list of the scales along with the means and standard deviations. Additionally, Cronbach's alpha values are listed for these scales and ranged from low of 0.39 (enmeshment) to a high of 0.72 (social isolation), with a median of 0.56.

Schedule for Nonadaptive and Adaptive Personality (Clark 1993)

The SNAP is a self-report inventory that includes 375 items rated as true or false. The instrument provides an

Table 1 EMSQ-R scales and descriptive statistics

	M	SD	α
Social isolation	1.28	0.68	0.72
Emotional deprivation	0.86	0.61	0.69
Defectiveness/shame	1.07	0.60	0.58
Emotional inhibition	1.44	0.49	0.42
Mistrust/abuse	1.42	0.57	0.50
Subjugation	1.08	0.55	0.56
Dependence/incompetence	1.07	0.56	0.55
Abandonment	1.30	0.67	0.64
Failure	1.04	0.60	0.64
Vulnerability to harm	1.31	0.68	0.61
Insufficient self control	1.33	0.55	0.45
Unrelenting standards	1.65	0.55	0.45
Self-sacrifice	1.78	0.62	0.68
Entitlement	1.48	0.58	0.54
Enmeshment	0.93	0.53	0.39

EMSQ-R = Early Maladaptive Schema Questionnaire—Research Version (Ball and Young 2001)

assessment of three broad temperaments (i.e., positive temperament, negative temperament, and disinhibition) and 12 maladaptive trait scales that assess aspects of personality pathology (e.g., mistrust, aggression, and impulsivity). Cronbach's alpha values for the temperament and trait scales ranged from 0.70 (dependency) to 0.92 (negative temperament), with a median value of 0.80.

Factor Analytic Procedures

Given that the EMSQ-R is explicitly organized into 15 scales, we first investigated how well the item-level data fit this a priori structure using confirmatory factor analytic (CFA) procedures. Specifically, we utilized M*plus 6.11* (Muthen and Muthen 2011), employing the maximum likelihood method (MLR), to estimate the 15 scale model as outlined by the scoring procedures. We utilized several fit indices including the comparative fit index (CFI) and Tucker-Lewis index (TLI), with values above 0.90 and 0.95 indicating acceptable and excellent fit, respectively (Hu and Bentler 1999). We also used the root-mean-square error of approximation (RMSEA) with values lower than 0.080 and 0.050 indicating close and reasonable fit, respectively, and the standardized root mean square residual where values below 0.050 indicating good fit (Marsh et al. 2004). Although previous research has also suggested 13 or 14 factor solutions, we were not able to investigate these using CFA because full factor matrices of these solutions were not available for comparison.

However, we recognized that strict assumptions of CFA might provide an unreasonable standard for measures of psychopathology/personality (e.g., Hopwood and Donnellan 2010) and so also utilized exploratory factor analysis at the item-level. Because exploratory factor analyses of the item-level Pearson correlation matrices often violate assumptions of normality and produce spurious factors (e.g., Bernstein 1988; Nunnally and Bernstein 1994) we elected to utilize the polychoric correlation matrix (Panter et al. 1997). The polychoric correlation matrix for the 75 EMSQ-R items was generated using MicroFact (Waller 2002) then subjected to EFA with principal axis factoring. Following the suggestion of Hayton et al. (2004), we examined the results of a parallel analysis and Velicer's (1976) minimum average partial (MAP) test for determining the number of factors to extract from the matrix.

Results

Confirmatory Factor Analyses (CFA)

Using the procedures outlined above, we implemented a CFA approach to determine how well the proscribed

15-factor solution fit our data. The resulting indices were CFI = 0.66, TLI = 0.64, RMSEA = 0.048, and SRMR = 0.075. Although the latter two were consistent with a moderate model fit, the CFI and TLI values suggested a poor fit.

Exploratory Factor Analyses (EFA)

A parallel analysis (Horn 1965) using O'Connor's (2000) syntax, indicated that the first ten eigenvalues were outside the 95% confidence interval (see Fig. 1). Further, Velicer's (1976) minimum average partial (MAP) test suggested eight factors. Given the lack of convergence across the decision rules, we investigated both solutions to determine their conceptual interpretability. Additionally, we compared 13, 14, and 15 factor solutions to the item-level findings reported by Cecero et al. (2004), Schmidt et al. (1995), and Lachenal-Chevallet et al. (2006). The eight factor solution accounted for 39% of the variance and the ten-factor solution accounted for 43%. The 13, 14, and 15-factor solutions accounted for 48, 50, and 51%, respectively (Fig. 2).

However, an interpretable structure did not emerge from any of these possible solutions using either orthogonal (varimax) or oblique (promax) rotations. The 14 factor structure did not correspond well with the Cecero et al. (2004) or Lachenal-Chevallet et al. (2006) findings nor did the 13 and 15 factor solutions match those reported by Schmidt and colleagues. Further, the other examined solutions did not neatly capture the EMSQ-R scales. There were substantial cross-loadings, and the items from individual EMSQ-R scales were often dispersed across factors. In sum, there did not appear to be a replicable item-level factor structure to the EMSQ-R.

We were also interested in the higher-order factor structure, so we conducted an additional EFA using
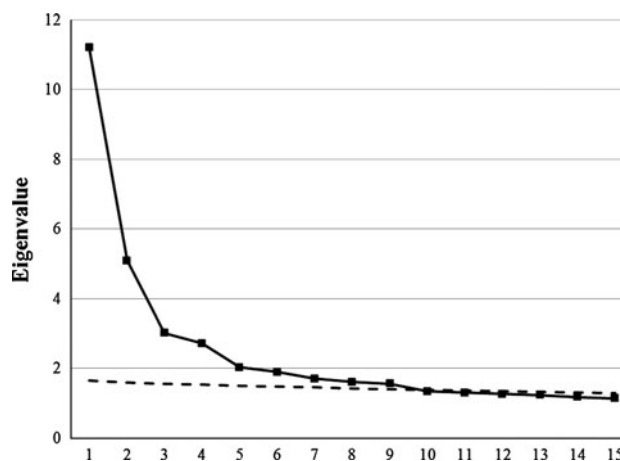

Fig. 1 Scree plot for principal axis factoring of the 75 EMSQ-R items. *Dashed line* indicates the upper value of the 95% confidence interval of the eigenvalues generated from a parallel analysis
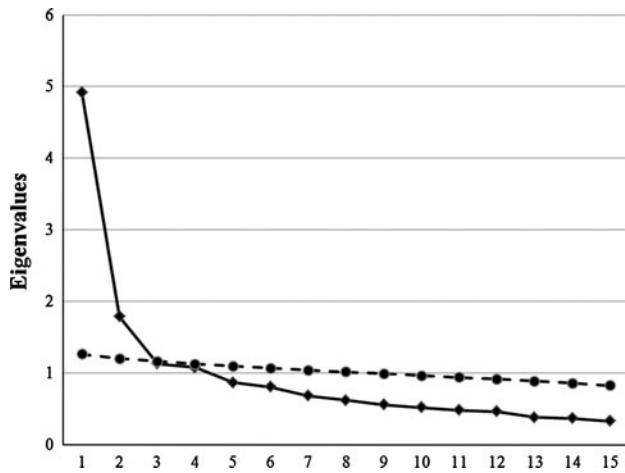
Fig. 2 Scree plot for principal axis factoring of the 15 EMSQ-R scales. *Dashed line* indicates the upper value of the 95% confidence interval of the eigenvalues generated from a parallel analysis

scale-level scores. The Pearson correlation matrix of the fifteen EMSQ-R scales was subjected to principal axis factoring. We chose varimax rotation to be consistent with past EFAs of this instrument (e.g., Cecero et al. 2004; Schmidt et al. 1995) and to ascertain the maximally distinct higher-order structure. We again used parallel analysis and the MAP test to determine the number of factors to extract (Hayton et al. 2004).

Velicer's MAP test suggested only two factors, and Horn's parallel analysis found only two eigenvalues greater than the 95% confidence interval of those expected by chance. However, the third and fourth eigenvalues were within this confidence interval so we investigated both the

two and four factor structures for conceptual interpretability. The two-factor structure, although parsimonious, failed to adequately capture important variance in some EMSQ-R scales, such as enmeshment with an initial extraction of only 0.065. Most importantly, the four-factor structure presented in Table 2 accounted for 59% of the variance and was largely consistent with the higher-order structure reported by Cecero et al. (2004) and the first three factors were similar in content to those identified by Schmidt et al. (1995). The first factor was defined by loadings for *social isolation*, *emotional deprivation*, *emotional inhibition*, *mistrust/abuse*, and *defectiveness/shame* and accounted for 33% of the variance. We labeled this factor interpersonal detachment. The second factor accounted for 12% of the variance and included *subjugation*, *dependence/incompetence*, *abandonment*, *failure*, and *vulnerability* to harm, and we labeled it interpersonal dependency. The third factor was defined by a negative loading for *insufficient self-control* as well as positive loadings for *unrelenting standards* and *self-sacrifice*, which appeared comparable to the construct of perfectionism. It accounted for an additional 8% of the variance. The fourth and final factor included relatively modest loadings (<0.40) for *entitlement* and *enmeshment* and accounted for 7% of the variance.

Only a single scale (*failure*) obtained a secondary loading that was greater than 0.40, but there were also a number of scales that evinced a loading >0.3 on a second factor. Although these secondary loadings might be considered problematic, we elected to retain all the scales in order facilitate a comparison with the previously reported factor structures. The correlations among these four factors

Table 2 EMSQ-R varimax rotated factor loadings

EMSQ-R scale	Factor I Interpersonal detachment	Factor II Interpersonal dependency	Factor III Perfectionism	Factor IV Impulsive exploitation
Social isolation	**0.80**	0.26	0.12	0.13
Emotional deprivation	**0.63**	0.22	−0.05	−0.04
Defectiveness/shame	**0.62**	0.37	0.05	0.04
Emotional inhibition	**0.52**	0.09	−0.20	0.30
Mistrust/abuse	**0.42**	0.32	0.36	0.16
Subjugation	0.31	**0.66**	0.16	0.01
Dependence/incompetence	0.15	**0.64**	−0.16	0.12
Abandonment	0.36	**0.60**	0.26	0.19
Failure	**0.42**	**0.50**	−0.18	0.19
Vulnerability to harm	0.34	**0.48**	0.29	0.34
Insufficient self control	0.23	0.35	**−0.52**	0.15
Unrelenting standards	0.01	−0.06	**0.48**	0.10
Self-sacrifice	0.03	0.20	**0.43**	0.00
Entitlement	0.28	0.07	−0.10	0.38
Enmeshment	−0.05	0.11	0.21	0.35

EMSQ-R = Early Maladaptive Schema Questionnaire—Research Version (Ball and Young 2001). Loadings > |0.40| are bolded

Table 3 Correlations among four-factor principal axis factor solution (varimax rotated) of EMSQ-R

	Factor I Interpersonal detachment	Factor II Interpersonal dependency	Factor III Perfectionism	Factor IV Impulsive exploitation
I	(0.85)			
II	0.20**	(0.85)		
III	0.01	0.04	(0.56)	
IV	0.15**	0.18**	0.04	(0.50)

EMSQ-R = Early Maladaptive Schema Questionnaire—Research Version. Values in parentheses along the diagonal indicate Cronbach's alpha values for the items from the scales with primary loadings on each factor

** $p < .01$ (two-tailed)

are provided in Table 3. Although some were significant, they were all small suggesting the factors were relatively independent despite the presence of some secondary loadings.

Concurrent Validity

We then saved the factor scores for the four-factor solution and examined their relationships with variables available from the clinical charts of a subsample of 327 participants. We also investigated the construct validity of the four-factor solution by correlating them with maladaptive personality scales from the SNAP administered to a subset of 126, who were enrolled in a treatment study (e.g., Ball et al. 2011). Because these analyses involved 152 correlations, we set alpha at .01 to reduce the possibility of Type I error. We did not correct further (e.g., Bonferroni) as we felt that our relatively large clinical sample warranted a more liberal threshold. Table 4 presents the correlations of the factor scores with the chart data. The magnitude of these effects was relatively modest, consistent with the fact they were derived from different assessment sources (e.g., Meyer et al. 2001). Nonetheless, several interesting findings emerged. For example, a maternal history of substance use correlated with factor II (dependency). In contrast, paternal psychiatric history correlated with factor I (detachment). Both factors I and II related to measures of general psychopathology as they each correlated significantly with the total number of psychiatric symptoms.

Factor III (perfectionism) evinced a positive correlation with years of education, but also correlated positively with the number of months incarcerated. One or both of these effects might be accounted for by the relationship of this factor with age. Factor III also correlated in the opposite direction with the frequency of using substances prior to entering treatment, specifically less use of marijuana or nicotine. Finally, high scores on factor III were also related

in a positive manner with treatment variables, such that higher scores related to fewer disciplinary consequences or negative behavioral events during residential treatment.

Table 5 reports the correlations of the EMSQ-R factor scores with the trait and temperament scales from the SNAP. Factors I (detachment) and II (dependency) both were strongly related to traits assessing the tendency to experience negative emotionality and, in the opposite direction, with traits assessing positive temperament. However, they also differed in important ways as factor I had a large (0.57) correlation with detachment, while factor II correlated highly with dependency (0.51). Factor III (perfectionism) related negatively with aggression and disinhibition, as well as positively with workaholism and propriety. Factor IV related to specific aspects of negative temperament, such as aggression and manipulativeness, as well as disinhibition.

Discussion

Comparison with Previously Published Hierarchical Structures

The current study was the first to analyze the hierarchical structure of the EMSQ-R in a large clinical sample, using recommended (O'Connor 2000; Panter et al. 1997) statistical methods. A confirmatory factor analysis indicated that the data did not fit well within the 15-factor model proscribed by the measure's arrangement. Further, although previous EFAs suggested a lower-order structure with between 12 and 17 factors, the results of an EFA in the current study did not provide compelling support for any of these previous solutions. In fact, no solution provided a readily interpretable structure. We thus concluded that the EMSQ-R does not have a replicable lower-order structure. This would also suggest that the individual schemas identified conceptually by Young et al. (2003) are not empirically distinct. Instead, a great deal of overlapping content is shared across the scales such that they cannot be neatly separated.

However, our results did reveal a four-factor higher-order structure that appeared largely consistent with previous research, suggesting that the maladaptive schemas do separate into relatively distinct domains. However, this empirical higher-order structure was less consistent with the conceptual organization proposed by Young et al. (2003). Specifically, we noted a first factor that included social isolation, emotional deprivation, defectiveness/shame, emotional inhibition, and mistrust/abuse. These loadings are quite comparable to the first factor identified by Cecero et al. (2004) that included all four of these except defectiveness/shame. However, defectiveness/

Table 4 Correlations of EMSQ-R factor scores with chart data variables

	Factor I Interpersonal detachment	Factor II Interpersonal dependency	Factor III Perfectionism	Factor IV Impulsive exploitation
Demographic and historical variables				
Age	0.06	0.13	0.22**	−0.25**
Marital status	0.11	−0.02	−0.09	0.15**
Lifetime # of arrests	0.12	0.17**	0.03	−0.12
Lifetime months incarcerated	0.05	0.11	0.16**	−0.13
Lifetime # of prior SA treatments	0.09	0.21**	0.05	−0.01
Lifetime # of MH treatments	0.13	0.11	−0.03	0.02
Maternal history of substance abuse	0.06	0.16**	0.06	−0.10
Paternal history of substance abuse	0.12	0.11	0.06	0.03
Maternal psychiatric history	0.00	0.04	0.02	−0.05
Paternal psychiatric history	0.18**	0.00	0.03	0.00
Childhood physical or sexual abuse	0.14	0.14	0.10	0.03
Adult physical abuse victim	0.13	0.11	0.12	−0.06
Adult physical abuse perpetrator	0.20**	0.06	0.02	−0.07
Highest grade completed	−0.02	−0.04	0.18**	−0.15**
Frequency of substances used in past 30 days				
Heroin	−0.06	0.04	−0.03	0.00
Alcohol	0.19**	0.08	−0.01	0.05
Cocaine	0.00	0.08	−0.01	0.10
Marijuana	0.04	−0.13	−0.21**	0.09
Benzodiazepines	0.00	0.07	0.02	0.02
Nicotine	0.04	0.13	−0.19**	0.07
Current treatment events				
Total # of psychiatric symptoms	0.22**	0.30**	0.13	0.03
Total # of consequences	−0.02	−0.08	−0.19**	0.10
Total # of treatment events	−0.05	−0.09	−0.19**	0.12

EMSQ-R = Early Maladaptive Schema Questionnaire—Research Version (Ball and Young 2001)

SA Substance abuse, *MH* mental health

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

Table 5 Correlations of EMSQ-R Factor Scores with SNAP Trait and Temperament Scales

	Factor I Interpersonal Detachment	Factor II Interpersonal Dependency	Factor III Perfectionism	Factor IV Impulsive Exploitation
Negative Temperament	0.40**	0.52**	0.03	0.38**
Mistrust	0.47**	0.38**	0.12	0.20
Manipulativeness	0.25**	0.21	−0.2	0.28**
Aggression	0.16	0.01	−0.26**	0.35**
Self-harm	0.57**	0.44**	−0.08	0.13
Eccentric Perceptions	0.30**	0.42**	0.25**	0.23
Dependency	0.19	0.51**	0.07	0.16
Positive Temperament	−0.40**	−0.03	0.21	0.01
Exhibitionism	−0.35**	−0.09	−0.01	0.07
Entitlement	−0.36**	−0.05	0.06	0.21
Detachment	0.57**	0.16	0.02	0.17
Disinhibited Temperament	0.23	0.23	−0.38**	0.24**
Impulsivity	0.31**	0.38**	−0.22	0.1
Propriety	−0.14	0.02	0.39**	0.1
Workaholism	0.05	0.16	0.43**	0.00

EMSQ-R = Early Maladaptive Schema Questionnaire—Research Version (Ball and Young 2001). SNAP = Schedule for Nonadaptive and Adaptive Personality (Clark 1993)

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

shame did not have a chance to load in the higher-order structure in that study as it did not emerge from the item-level analysis. Further, these loadings are also consistent with the findings from Schmidt et al. (1995) analysis of the longer YSQ version. In that analysis, the same five schema scales were implicated on the first component. As such, the results from these three studies converge on a primary first factor that is concerned with isolation from others. It appears to mostly support the conceptual domain of Disconnection and Rejection proposed by Young et al. (2003), except that it does not include abandonment (although this scale did obtain a relatively strong secondary loading), and adds emotional inhibition, which Young and colleagues classified elsewhere.

Additionally, the second factor from our analysis was defined by primary loadings for subjugation, dependence/incompetence, abandonment, failure, and vulnerability to harm. This factor again appeared largely consistent with the second higher order factor identified by Cecero et al. (2004), which included each of these except dependence/incompetence, but also added enmeshment. Similarly, Schmidt and colleagues also identified vulnerability to harm and dependence/incompetence within the same second factor, but in their analysis it was shared by enmeshment. Across these studies a clear pattern emerges of this second factor that concerns interpersonal dependency. This second factor shares several schemas (i.e., dependence/incompetence, failure, and vulnerability to harm) with a domain labeled Impaired Autonomy and Performance by Young et al. (2003). However, the empirical second factor was somewhat broader as it also included abandonment and subjugation. These two schemas appeared conceptually related to a heavy reliance on others and seemed consistent with Young's higher order domain.

A third factor, which was considerably smaller, that also emerged was defined by a negative loading for insufficient self-control and positive loadings for unrelenting standards and self-sacrifice. These same three schemas, along with dependence/incompetence, also comprised a higher-order factor identified by Cecero et al. (2004). Both unrelenting standards and self-sacrifice defined a component within Schmidt and colleagues' analysis (1995). However, within that study the insufficient self-control scale did not load within any higher order structure and instead was conceptualized as spanning all three components. Nonetheless, beyond this relatively minor inconsistency, the third factor, which Schmidt et al. (1995) labeled Exaggerated Standards, is stable across studies and does bespeak aspects of perfectionism. Although this factor appears relatively robust empirically, it does depart substantially from Young's theory, which organized each of these three schemas under separate domains.

Finally, our fourth factor obtained modest loadings (<.40) for both entitlement and enmeshment. Entitlement

has historically separated itself from other schemas and actually solely defined a separate factor identified by Cecero et al. (2004). Schmidt et al. (1995) reported that the entitlement scale was subsumed under insufficient self-control schema within the undergraduate sample, but loaded separately within the clinical sample. Thus, it appears that the content assessed by this scale is meaningfully different from most other content within the EMSQ-R. The finding that this factor was also defined by enmeshment is inconsistent with previous research and is difficult to explain. There is not an obvious conceptual connection between enmeshment and entitlement. In fact, enmeshment seems most similar to the aspects of Overconnection with others identified in factor II. These two scales are also inconsistent with the conceptual structure proposed by Young et al. (2003), which suggested that enmeshment would join the other schemas concerned with interpersonal connection and that entitlement would correspond mostly closely with insufficient self-control on a schema domain he labeled Impaired Limits. With this in mind, we would encourage future evaluation of the enmeshment scale to determine how it fits into the higher-order structure of the ESMQ-R.

Concurrent Validity of the Higher-Order Factors

The four factors we identified correlated in predictable ways with theoretically related variables. For example, factor I (detachment) correlated with maternal history of substance abuse, which may be related to Young's (1991) conception of EMSs as interactions between temperamental vulnerabilities and parental problems. In addition, factor I correlated with increased negative temperament and lower positive temperament that may relate to depression and isolation.

In contrast, factor II, which we interpreted as dependency, also correlated with negative temperament and total number of psychiatric symptoms. It obtained its highest correlation with the SNAP trait of dependency, which illustrated a reliance on others. This dependency factor related significantly with paternal psychiatric history, which again globally supported the conceptualization of EMSs as being related to both temperament and parental risk factors.

Our third factor was distinct from the others in that it tended to connote more adaptive functioning. For example, it correlated positively with highest grade completed. Additionally, it correlated significantly *negatively* with aggression and disinhibition as well as *positively* with workaholism and propriety from the SNAP. Finally, the negative correlations with nicotine and marijuana use suggested that elevations on this factor might be protective. In sum, it appeared that this pattern of correlations was

consistent with the perfectionism or what Schmidt et al. (1995) labeled Exaggerated Standards. The fourth and final factor was also difficult to understand based on these correlations. It correlated negatively with educational obtainment from the chart data and positively with disinhibition, aggression, and manipulativeness from the SNAP. This overall picture is of a factor that taps the impulsive exploitation of others.

Limitations

Our findings are limited by the lack of demographic information for the entire sample. However, there is no reason to expect that the demographics of the sub-sample with available information would be appreciably different from the total sample. In addition, the fact that our sample was drawn from a substance use treatment facility is a strength relative to other studies, but nonetheless indicates that our findings may not generalize to other samples that differ in terms of treatment setting or diagnostic composition. Finally, a number of the EMSQ-R subscales had Cronbach's alpha values that were below .50. Although this might be attributable to the brevity of these scales (i.e., only five items), it might also suggest that the items within each scale assess heterogeneous content. This is consistent with our CFA results that did not yield a good fit for the proscribed lower-level structure. In any event, the unreliable measurement of the scales places limits on the interpretability of our higher order structure. We chose not to remove items in an attempt to improve the alpha values of the scales as we sought to replicate previous findings using the full instrument. However, it might be useful for future research to do so and further investigate the hierarchical structure of the EMSQ-R.

Conclusions

Overall, the results of the current study support the validity of the EMSQ-R for assessing schemas that have a relatively robust higher-order structure and relate meaningfully to self-report measures of personality pathology and chart data. Nonetheless, our results also suggest that the primary schemas identified by Young (1991, 2003) do not assess structurally distinct entities. Instead, it would appear that most of the content of the EMSQ-R can be sorted into four relatively broad domains. The first two of these factors (detachment and dependency) are robust, with minor variations, across theory and the existing empirical research. These two dimensions accounted for the largest portion of the variance; however, there also appears to be substantial variance beyond these two broad factors. Our work suggests that at least one other interpretable and meaningful factor can be extracted which concerns the

(over)regulation of goal-directed behavior and appears well-captured by perfectionism. Finally, it should also be noted that insufficient self-control, while strongly loading on this factor, did obtain reasonably strong secondary loadings on additional factors. This is partially consistent with Schmidt et al. (1995) and indicates that perhaps this schema may share a core with many maladaptive schemas.

However, the precise location of the entitlement and enmeshment schemas within this hierarchical structure is not as clear. Both obtained decidedly weak loadings with the previously described three factors. In both cases, even their loadings on this fourth factor were modest with substantial variance unexplained, suggesting the fit was not strong. In particular, entitlement seems somewhat distinct from all the other schemas, as it tended to form its own factor within the larger solutions suggesting it may be a lower-order variance that is not shared or well-captured by other maladaptive schemas.

Given the concurrent validity with relevant clinical indicators and the model's conceptual similarity to previously reported structures, the four higher-order factors might be considered when scoring this measure in clinical settings. Nonetheless, future research should continue to investigate the hierarchical structure of the EMSQ-R to determine how best to organize this measure. Further, even if a four-factor structure is supported, it is not clear that the EMSQ-R represents the ideal measure for assessing these higher-order factors, as several other instruments exist that also provide an assessment of similar dimensional models of personality disorder (e.g., the Dimensional Assessment of Personality Pathology; Livesley and Jackson 2009). At the very least, our results suggest that the lower-order scales of the EMSQ-R need further refinement before they can be relied upon to provide specific diagnostic and treatment indications.

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