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Establishing reliability and construct validity for the revised Emotional Social Screening Tool for School Readiness (E3SR-R)

Lauren Koopman , Erica Munnik , Emma Wagener  and Mario Smith 

Department of Psychology, Faculty of Community and Health Sciences, University of the Western Cape, Cape Town, South Africa
emunnik@uwc.ac.za

School readiness assessments in South Africa still predominantly focus on the assessment of cognitive skills. The Emotional Social Screening Tool for School Readiness (E3SR) was developed to bridge the perceived gap in assessing emotional-social skills as a domain of school readiness. An emerging body of research reports exists on the psychometric properties and factor structure of the E3SR. An initial validation study recommended a 6-factor solution instead of the theoretical 9-factor model that was proposed in the development of the E3SR. The E3SR (Revised) was also reduced in length. We report here on a pilot study of which the aim was to establish the reliability and construct validity of the E3SR (Revised). A cross-sectional survey design was used to gather data from 9 pre-schools in Cape Town, South Africa. Pre-school teachers ($n = 24$) constituted the respondent group who completed the E3SR (Revised) screening questionnaires on Grade R learners ($n = 394$). Analysis was conducted on 321 completed screening questionnaires. With the data analysis we aimed to: a) summarise sample characteristics of teachers and children; b) establish reliability estimates; and c) establish construct validity and confirming the factor structure. Ethics clearance was given by the Humanities and Social Science Research Ethics Committee (HSSREC) of the University of the Western Cape. The study adhered to stipulated ethics requirements. Data failed to show multivariate normality; however, this violation of normality was expected and was theoretically supported. The sample size ($n = 321$) was sufficient for factor analysis of a 36-item scale. All subscales showed excellent reliability: Cronbach's alphas ranged between .939 and .971. CFA results demonstrated a good model fit. The E3SR (Revised) was found to be reliable and valid for use. The use of a rigorous methodological process including the decision-making matrix represent good research practice that can be used in instrument development across cultures.

Keywords: construct validity; emotional competence; Emotional Social Screening Tool for School Readiness (E3SR); pre-schoolers; reliability; school readiness; social competence; South Africa; teachers form; validity

Introduction

Pre-school represents the start of children's formal education (Benson, 2020). The age of school entry relates to whether a child is developmentally ready or has the age-appropriate skills to deal with the expectations of formal education (Kartal, Balantekin & Bilgin, 2016). Bakken, Brown and Downing (2017) emphasise that children benefit from being in high-quality early learning environments that encourage confident learning, independence, and social engagement (Parham, 2016). Children who receive high-quality learning during their early years are less likely to need extra support later in their schooling career and are more likely to complete high school (Van Heerden, 2016).

In South Africa, the need for high-quality early learning centres has been the focus of ongoing attention, especially for children from low-income families, children at risk, and children with disabilities (Munnik, 2018). The South African government recognises early childhood education (ECE) as a critical area for the development of children's competencies (Van Niekerk, Ashley-Cooper & Atmore, 2017).

Many risk factors impact ECE and children's readiness for school (Donald, Wedderburn, Barnett, Nhapi, Rehman, Stadler, Hoffman, Koen, Zar & Stein, 2019). A few key risk factors are poverty, which is linked to low socio-economic status; malnutrition, which could lead to developmental delays; social factors, such as the environment the child lives in (Du Toit, Van der Linde & Swanepoel, 2021). Similarly, the physical health of parents and their children constitute risk factors (Donald et al., 2019). The assessment of school readiness is one way to identify children at risk and to implement strategies to promote the development of skills needed to make them school-ready (Raniga & Mthembu, 2017).

School readiness assessments are used to establish whether children are ready for entry into mainstream education (Munnik & Smith, 2019). The purpose of these assessments is to give an indication of pre-schoolers' readiness in the areas of cognitive, emotional, and social development (Munnik, 2018). School readiness assessments aim to determine whether pre-school learners will cope with the Grade 1 curriculum and to identify learners who may benefit from additional learning support (Mtati, 2020). This author underscores the importance of psychometrically sound and contextually relevant instruments.

Literature Review

School readiness refers to whether a child is ready to successfully transition into formal schooling; it is measured by how prepared a child is to succeed in school (Jose, Banks, Hansen, Jones, Zubrick, Stafford & Taylor, 2019). Children need to develop the necessary skills in order to be regarded as ready for formal schooling (Munnik & Smith, 2019). Learners' level of school readiness may impact their school performance positively if their readiness

is at an appropriate level, or negatively if they are not school-ready (Pan, Trang, Love & Templin, 2019). School readiness can thus be considered a contributing factor to school performance (Mtati, 2020).

Children who enter mainstream education with prior experience in ECE and stimulation tend to adapt to school expectations and rules faster than those with no prior ECE (Kartal et al., 2016). Children's socio-economic backgrounds have a direct impact on their access to early stimulation or the lack thereof (Du Toit et al., 2021).

Parental involvement is believed to be crucial for children's early academic development (Liu, Sulaimani & Henning, 2020). Income poverty often limits parent-child interaction, as well as access to early childhood development centres (Ashley-Cooper, Van Niekerk & Atmore, 2019). The need for ECE is crucial to lay a solid foundation for children's success and well-being later in life (Richter, Daelmans, Lombardi, Heymann, Boo, Behrman, Lu, Lucas, Perez-Escamilla, Dua, Bhutta, Stenberg, Gertler, Darmstadt, Paper 3 Working Group & the Lancet Early Childhood Development Series Steering Committee, 2017).

As much as school readiness depends on scholastic ability, it also greatly depends on the cognitive, emotional, and social skills that children possess when they enter mainstream education at the age of 5 to 7 years (Van Zyl, 2011). Emotional competency, as defined by Munnik (2018), is behaviour driven by the child's inner self and contains a skills set that allows the child to deal with emotion-provoking circumstances, to understand those emotions, and be able to adapt to the social context (Mtati & Munnik, 2022). Social competency, as defined by Munnik (2018), includes the focus on external relationships, the interactions with others, and the skill of behaving in a socially acceptable manner. Social-emotional competency is defined as showing appropriate regulation of emotions, showing empathy, and social critical thinking skills (Murano, Sawyer & Lipnevich, 2020).

The assessment of children's competencies is one way to establish whether they are ready to enter mainstream education; this is typically accomplished through school readiness assessments. School readiness assessments include psychometric tests which measure a child's cognitive, social, emotional, and physical readiness for school (Munnik & Smith, 2019). These assessments can involve the child, parents, family, teachers, schools, and community to give an accurate picture of the child. School readiness assessments are usually done by the teacher and are built into their assessment practises (Jose et al., 2019).

Most established assessment batteries currently used in the South African context do not assess the emotional and social competencies of

children before entry into mainstream education (Mohamed, 2013). To this end, Munnik (2018) developed the Emotional Social Screening Tool for School Readiness (E3SR) to assess emotional and social competencies in pre-school children as a domain of school readiness. The aim with this measure was to produce valid and culturally appropriate screening of the emotional and social skills that children possess within a multicultural context. It was reported that the E3SR is valid and reliable, contextually sensitive, cost-effective, and easy to administer (Munnik & Smith, 2019).

The initial version of the E3SR consisted of 56 items in two subscales, namely emotional competence and social competence. The emotional competence subscale consisted of five domains, with a total of 31 items. The social competence subscale consisted of four domains, with a total of 25 items.

A pilot study demonstrated a promising fit to the theoretical model using confirmatory factor analysis (Munnik, 2018). The analysis showed that the proposed 9-factor structure should be accepted with caution. See Munnik (2018) for a comprehensive account of the analysis and findings. Based on these findings, Munnik (2018) recommends further investigation into the factor structure of the E3SR. To this end, Munnik, Wagenaar and Smith (2021) assessed the dimensional structure of the E3SR using principal axis factoring (PAF) and exploratory factor analysis (EFA). The results yielded a 6-factor solution and the E3SR was successfully reduced to 36 items without losing any essential content (Munnik et al., 2021). This analysis resulted in the E3SR (Revised version). These authors recommended that the 6-factor structure be validated with a new sample. In this article we report on the evaluation of the E3SR (Revised).

Theoretical Framework

The theoretical framework of this study is located in measurement theory. Measurement theory provides the basis for test evaluation, as well as a test's uses and interpretation (Linn, 2010). The fundamental concepts of measurement theory are validity and reliability. These concepts provide the foundation for analysing the technical quality and suitability of the uses and interpretation of test results (Linn, 2010). DeVellis (2016) designed a four-step test construction model that highlights the methodological decisions necessary to develop a comprehensive scale. The first step is to develop a theoretical foundation; the second step is test construction; the third step is test validation; and the fourth and final step is revision and ongoing refinement of the scale. This step entails writing up the manual, including a discussion of the administration and scoring, and technical aspects of validity and reliability, and allows for continuous

revision and refinement of the tool. Further research on the validity of the E3SR (Revised) was done in the study reported on here. Thus, this study was an operationalisation of the last step of the DeVellis (2016) model where the E3SR (Revised) was further refined and the reliability and construct validity were established.

Methodology

The aim of this study was to establish whether the E3SR (Revised) was a reliable and valid measure to use in the assessment of pre-school learners' emotional and social readiness to enter mainstream education.

Study Design

A cross-sectional survey design was employed in this study. Survey designs are a practical method for determining research variables and constructs (Ponto, 2015). A cross-sectional survey measures participants' exposure and outcomes at the same time, are easy to conduct with a large population, and can be economical (Setia, 2016). The data gathered by means of the E3SR (Revised) questionnaire was used to establish the reliability and construct validity of the E3SR (Revised).

Research Setting

The research setting was pre-schools that offer Grade R classes in the Cape Town Metropolitan area of the Western Cape. Stratified random sampling was employed to select nine pre-schools registered with the Western Cape Education Department (WCED). The sample was stratified based on socio-economic status, and where schools were based, e.g., in community, government, and private sectors.

Participants

A sample of 24 pre-school teachers was selected as the respondent group. The participants were required to complete the E3SR (Revised) based on their knowledge and observations of each child's behaviour in their natural class environment and on the playground. The teachers had to be full-time employees at their schools and be familiar with the learners' patterns of behaviour and abilities for at least 3 months (Munnik, 2018). The unit of analysis was the completed screens of pre-school learners between the ages of 5 and 7 years who were Grade R learners. The respondent group completed 394 E3SR (Revised) questionnaires that were subjected to data cleaning. Incomplete protocols with missing data and protocols that did not fit the inclusion criteria were removed. Thus, after data cleaning, the final sample of completed screening questionnaires was 321 ($N = 321$) profiles.

Teachers noted that the screening tool was difficult to complete due to the impact of the coronavirus disease (COVID-19) protocols. For example, at the time of data collection, the protocol prioritised social distancing and discouraged sharing

toys and implements, as well as physical contact between learners. Thus, items about social interaction and interactive play with peers, which were prohibited, made it difficult to screen for competencies related to these types of interactions and competencies.

Pre-school settings that met the inclusion criteria were identified and the schools contacted telephonically to enquire about their interest in participating in the study. An information sheet and a copy of the ethical clearance letter obtained from the Humanities and Social Science Research Ethics Committee were emailed to the schools that showed interest and willingness to participate in the study. While adhering to COVID-19 protocols, meetings were held with the individuals who confirmed participation to convey information about the study and the screening tool, and to answer any initial questions.

Data collection was scheduled for the third term of the academic school year. This ensured that the teachers had ample opportunity to gain an in-depth understanding of the learners' social and emotional skill sets. This contributed to more completed questionnaires based on knowledge obtained about each learner's skill set during the year. Learners also had the opportunity to mature and become accustomed to the formal curriculum in the pre-school setting before the evaluation. The data collection started in late August 2021 due to unanticipated delays in gaining access and was concluded in early November 2021. Thus, data collection took place in the last quarter of the year. The researcher and her supervisor were available telephonically and via electronic mail (email) to assist respondents with any questions that they might have had. No queries were received.

Instrument

The Emotional-Social Screening tool for School Readiness (Revised) developed by Munnik (2018) was used to collect the data. The E3SR is a pen-and-paper questionnaire that takes 10 to 15 minutes to complete. The questionnaire consists of two sections: a demographics section with questions pertaining to the learner (e.g., age, gender, home language) and the respondent (e.g., length of time that the teacher has known the learner, initial rating of the learner's social and emotional readiness for school). The second section comprises the E3SR questionnaire.

As mentioned before, Munnik et al. (2021) recommended a revised 6-factor structure instead of the original 9-factor structure for the E3SR. These authors recommended that the revised version be piloted on a new sample and the factor structure examined. The revised E3SR comprises a total of 36 items across six domains. The respondents were to rate each item on a 5-point Likert scale from 1 = *Never*; 2 = *Rarely*; 3 = *Some of the time*; 4 = *Most of*

the time; 5 = *Almost always*; and 0 = *Cannot assess*. Figure 1 shows a graphical representation of the construction of the E3SR (Revised) including the

two subscales: emotional competence (four domains) and social competence (two domains).

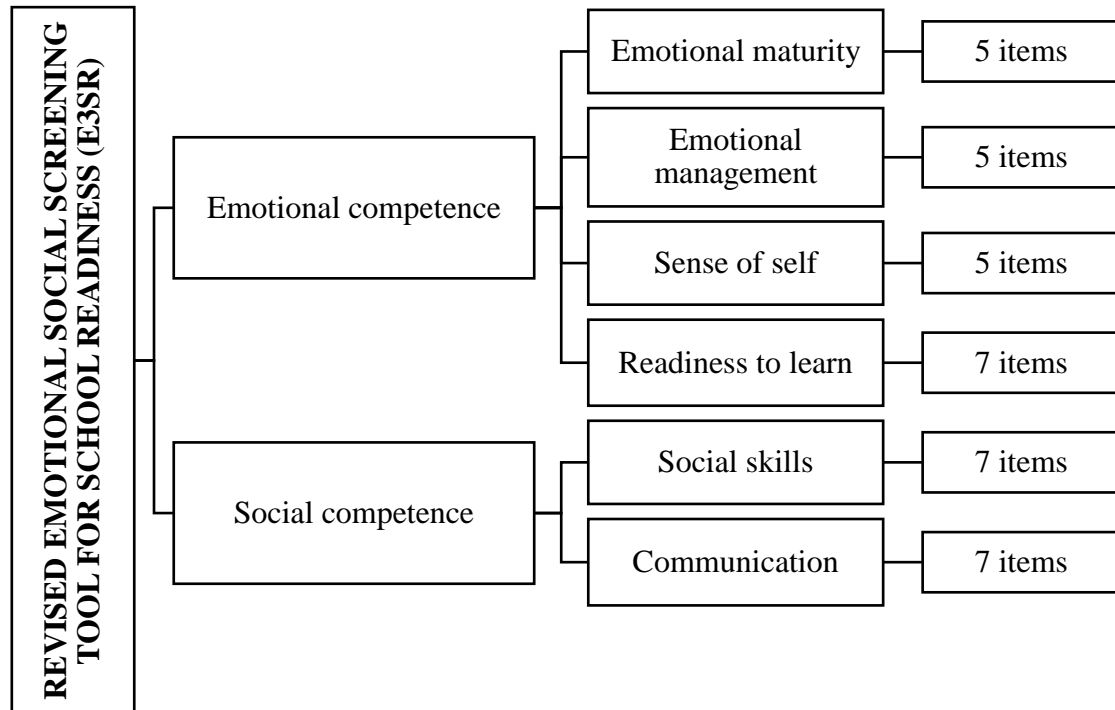


Figure 1 The structure of the E3SR (revised) screening tool (Koopman, 2022)

Data Analysis

Data were analysed using the IBM Statistical Package for the Social Sciences (SPSS) (V.28) and an extension of the IBM SPSS programme (IBM SPSS Analysis of Moment Structures [Amos]) for more robust results. As mentioned before, responses with any missing data on any of the E3SR items were removed. This included *Cannot assess*-responses which were assigned missing data status. One participant with a known autism spectrum disorder (ASD) diagnosis was removed from the analysis. The final data set included 321 questionnaires that were subjected to CFA. The aim with the analysis was three-fold, namely: a) summation of sample characteristics of the respondent group (teachers) and the target group (children); b) establishing reliability estimates using Cronbach's alpha; and c) establishing construct validity and factor structure through CFA.

We conducted a first-order CFA in which factorial validity and multidimensionality of a theoretical construct were tested as recommended by Byrne (2016). CFA is a type of structural equation modelling (SEM) that deals specifically with models in which the relationships between observed measures and latent variables (or factors) are described and theorised a priori, and the model is specified based on a previously theorised factor structure (Brown, 2015). In this case, emotional and

social readiness for school are theorised to have six related, but distinguishable domains: emotional maturity, emotional management, sense of self, readiness to learn, social skills, and communication (Munnik et al., 2021).

CFA was employed to test and report on a model fit for the 6-factor E3SR (Revised). The maximum likelihood (ML) estimation procedure was used for CFA. ML estimation requires that three basic assumptions are met: sufficient sample size, interval-level scale data, and multivariate normality (Brown, 2015). Kyriazos (2018) recommends that five to 10 cases were required per item to calculate the minimum sample size that would support the analysis. In this case, the E3SR (Revised) has 36 items which would require a sample size of 180 to 360. The data set comprised 321 cases, which was deemed sufficient for the proposed analysis. The E3SR uses Likert-type items that fulfil the assumption of interval-level data.

The third assumption, multivariate normality, was tested using Mardia's (1970, 1974) normalised estimate of multivariate kurtosis. Byrne (2016) recommends that, in order to display multivariate normality, the Mardia's coefficient should be below five (< 5). In this study, the Mardia's coefficient of 126.428 failed to show multivariate normality. Due to data collection taking place towards the end of the school year, as well as the contextual impacts of the

COVID-19 restrictions in place, this violation of normality was expected and was theoretically rationalised. The ML estimation technique is robust against deviations from normality, although larger deviations from normality may increase the risk of type 1 error (Kim & Millsap, 2014). The violation did not result from measurement error, but from a valid real-life representation. With this in mind, the decision was made to proceed with CFA to validate the factor structure of the E3SR, while being cognisant of this limitation.

The CFA was conducted in rounds or models. The first model tested the data against the theoretical structure of the E3SR. Subsequent models included re-specifications that were made using an iterative process. One error term was re-specified at a time followed by a re-examining of the modification indices, and making decisions regarding the covariance of additional error terms.

In the initial model (Model 1), re-specification was done by allowing for covariance between error terms, using the modification indices to guide covariance decisions, as suggested by Brown

(2015). In the second analysis (Model 2), specifications were made between error terms of items within the same factor. In the third analysis (Model 3), the decision was made to allow for covariance of error terms between items on different factors (emotional maturity, emotional management, etc.), but not between domains (emotional readiness and social readiness). This was a conceptual decision made not to conflate the error terms and over-specify the model.

To assess the CFA model, goodness-of-fit indices were used to determine whether the factorial structure of the E3SR (Revised) presented a well-fitting model for the data set obtained. Six goodness-of-fit indices were used to investigate model fit in this study; the threshold values for the six indices are presented in Table 1. These estimates were viewed in a dynamic way, as they cannot be seen as absolute estimates of model fit. Rather, goodness-of-fit estimates are reflective of a “relative” degree of misfit (Kim & Millsap, 2014:581). This decision-making approach was more conservative given the violation of normality.

Table 1 Criteria for fit indices

Indices	Symbol/ Acronym	General threshold decided upon
Chi-square	χ^2	Low χ^2 relative to degrees of freedom with a non-significant p -value ($p > .05$)
Root-mean-square error of approximation	RMSEA	< .06
Standardised root-mean-square residual	SRMR	< .08
Goodness-of-fit index	GFI	> .9
Comparative fit index	CFI	.90 - .95
Chi-square statistic	CMIN	< 5 indicates reasonable fit < 3 indicates acceptable fit

Note. Derived from Hu and Bentler (1999), Kline (2013) and Moss, Lawson, White and The Appearance Research Collaboration (2015).

The following decision tree matrix was adopted for our study:

For an *excellent model* fit, the CFA results must satisfy/fit *five* indices, namely, CMIN, SRMR, CFI, RMSEA and GFI.

For a *good model* fit, the CFA results must satisfy/fit *four* indices, namely, CMIN, SRMR, CFI and RMSEA, and it must *approach a fit* on GFI.

For an *acceptable* fit, the CFA results must satisfy/fit *three* indices, namely, CMIN, SRMR and CFI, and they must *approach a fit* on one of the following indices: RMSEA or GFI.

For a *reasonable* fit, the CFA results must satisfy/fit *two* indices, namely, CMIN and SRMR, and they must approach a fit on *two other* indices, namely, CFI and RMSEA.

Ethics

Ethics clearance was obtained from the HSSREC at the University of the Western Cape (Ref: HS21/6/8). Written permission was obtained from the Department of Education and consent was obtained and signed by all parties who participated in the study. An information sheet was provided,

explaining what participation entailed, as well as the rights of the participants and the responsibilities of the researcher. Permission to use the 6-factor E3SR (Revised) was obtained from the test developer. Learners' names were not disclosed in the study. Teachers completed the questionnaires based on the knowledge that they had gained on each learner in their natural school environment, after consent was granted by the learners' parents. The completion of each form was anonymous, and learners had no direct contact with the researcher as the study was merely based on the observations of the teachers. Throughout the study, the basic ethics requirements were strictly upheld.

Results

Teacher Characteristics

A total of 24 female teachers (aged 21–60 years) completed the E3SR forms. Of these, 14 teachers were employed in five government pre-schools located in all three socio-economic status (SES) areas, nine teachers were employed in three private pre-schools located in the middle and high SES areas, and one teacher was employed at a

community-based pre-school located in a low SES area. The participants' qualifications varied from a diploma, National Qualifications Framework ([NQF], level 5) to a degree (NQF level 7). Most of the teachers had been teaching for 10 years.

Child/Learner Characteristics

The responses for 321 children were included in this analysis. The age group cohort of 5- to 6-year-olds (5 years, 0 months to 6 years, 0 months) comprised the majority of the learners in the sample ($n = 265$, 82.55%) of which 55.7% were girls and 33.4% were boys. English was spoken as their home language by more than half of the sample of learners (55.5%),

followed by Afrikaans (29.3%), isiXhosa (10.0%), and 3.7% of learners spoke other primary languages. Most learners fell into the ethnic group classified as Coloured (48.9%), followed by White learners (16.2%), Black learners (15.9%), Indian learners (0.3%), and other (2.2%).

Reliability Analysis

Internal consistency was computed using Cronbach's alpha. Table 2 presents the results for the emotional and social competence scale, the emotional competence subscale, and the social competence subscale.

Table 2 Internal consistency of composite scale and subscales (Koopman, 2022)

	Number (No.) items	α	M	SD
Emotional and social competence	36	.981	143.22	23.49
Emotional competence	22	.971	86.94	14.75
Emotional maturity (EM)	5	.954	19.71	3.81
Emotional management (EMX)	5	.939	20.08	3.58
Sense of self (SOS)	5	.948	19.20	4.00
Readiness to learn (RTL)	7	.961	27.95	5.51
Social competence	14	.962	56.28	9.46
Social skills (SS)	7	.946	27.88	5.00
Communication (COM)	7	.970	8.23	9.46

Table 2 shows that the full scale, as well as the two subscales, obtained excellent Cronbach's alphas of .981 (36 items), .971 (22 items), and .962 (14 items) respectively. The Cronbach's alpha values for the six factors, the two broader sub-domains, and the E3SR scale total were all above .90. Thus, the reliability of the scale can be considered to be

excellent and it is appropriate for use in psychological research (Tavakol & Dennick, 2011).

Confirmatory Factor Analysis

The resultant model fit indices of each analysis stage are presented in Table 3.

Table 3 Summary of index results (Koopman, 2022)

	χ^2	df	Sig	CMIN	CFI	RMSEA	SRMR	GFI
Model 1 (original)	2630.187	579	.000	4.543	.869	.105	.0734	.661
Model 2 (after specifying covariance within factors)	1588.679	550	.000	2.889	.934	.077	.0605	.775
Model 3 (after specifying covariance within domains)	1310.429	521	.000	2.515	.950	.069	.0593	.817

The initial analysis (Model 1) had mixed results. A significant chi-square statistic was found, which indicates lack of exact fit in the observed theoretical model ($\chi^2 (579) = 2630.187$, $p < .01$). However, the chi-square statistic has been criticised as being overly strict, and is not the only requirement that should be considered when determining whether or not a model is useful (McNeish & Wolf, 2023). We note that the CMIN (4.543) was below the upper limit of 5 indicating acceptable fit. The other indices did not indicate that the model was a good fit (CFI = .869; RMSEA = .105; SRMR = .0734; GFI = .661).

In Model 2, the re-specification did improve the fit indices. The results suggest that there was still room for improvement. In Model 3 a dramatic improvement in the model fit indices were noted. The chi-square was much improved, but remained

significant indicating a lack of exact fit. The remaining indices improved and suggest that the E3SR comprises the six factors as specified. The fit indices were inputted into the decision-making matrix mentioned before. Table 4 reflects the application of the matrix to reach a conclusion about model fit leveraging across the indices for a more robust result.

Table 4 The results relative to the criteria for the types of fit (Koopman, 2022)

Indices	Value	Threshold	Fit
CMIN	2.515	< 3.00	*
SRMR	.0593	< 0.08	*
CFI	.950	> 0.95	*
RMSEA	.069	< 0.06	^
GFI	.817	> 0.90	^

Note. *fit; ^approaching fit.

As highlighted in Table 4, three of the model fit indices indicated a well-fitting model. The CMIN value (2.515) falls below the lower threshold of 3, indicating good model fit. The SRMR value (.059) falls well below the suggested threshold of .08, indicating good fit. The CFI value (.95) meets the target value of .95 to indicate a well-fitting model. Two indices, the RMSEA (.069) and the GFI (.817)

are approaching the expected values for a well-specified model. The decision matrix presented in Table 4 illustrates the results relative to the criteria for the types of fit. Using the decision tree matrix, the results indicate a good model fit. The final model is presented in Figure 2, indicating standardised coefficients and covariances of errors.

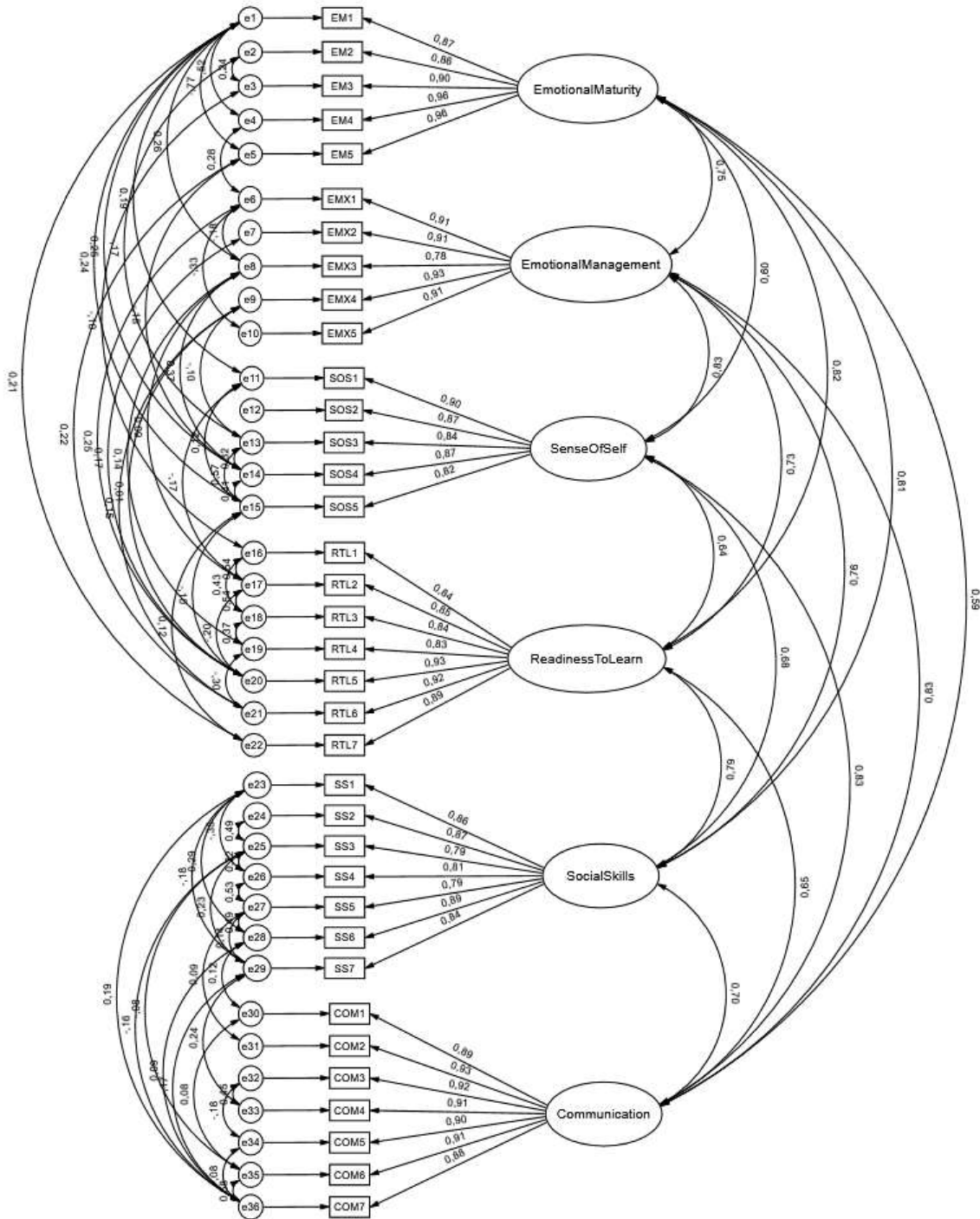


Figure 2 Final model of the E3SR after re-specification (Koopman, 2022)

Discussion

Assumption testing revealed multivariate non-normality which may increase the risk of making a type 1 error. The violation of normality was explained theoretically. The non-normality was attributed to the timing of the data collection towards the end of the reception year resulting in reduced variation in the skills set of pre-school learners. Thus, the non-normality was an accurate reflection of the cohort rather than a statistical anomaly or measurement error. In addition, the ML estimation techniques used in the data analysis reportedly are robust against minor deviations from multivariate normality (Zygmunt & Smith, 2014). These two considerations were thought to be sufficient to proceed with the analysis. The results of this study should be considered cautiously bearing in mind contextual and methodological factors that may have impacted the distribution of data. For example, the use of Amos for the analysis limited the use of bootstrapping and correction procedures that could be applied to the data in the presence of multivariate non-normality (Byrne, 2016).

The COVID-19 pandemic adversely impacted children's lives (Statistics South Africa, 2020). The already fragile educational institutes in South Africa were negatively impacted by the South African national lockdown, which led to a higher percentage of children not attending school in 2020 compared to 2019 (Statistics South Africa, 2020). The pandemic negatively impacted children's healthy social and emotional development through the restricted social interaction and the stress and anxiety surrounding the pandemic (Li, Flynn, DeRosier, Weiser & Austin-King, 2021). One needs to keep in mind that the data collection took place during the COVID-19 pandemic. Physical and social distancing measures were still in place, and children as well as teachers were encouraged to adhere to distancing measures. These practical implications of COVID-19 restrictions limited the behaviour that teachers were able to observe, such as physical play, sharing of toys, physical affection, etc. At least three of the questions in the E3SR directly relate to the observation of these behaviours. For example, "EMX3: *Physically demonstrates emotions (e.g., hugs to express affection)*", "SS5: *Willingly shares his/her possessions with others his/her own age*", "SS6: *Is able to give peers a turn to go first or play with a toy.*" This may explain the variation in responses, and the resultant lack of multivariate normality. This response pattern also led to many teachers responding "Cannot assess" to these questions, resulting in an increase in missing data. Taking the above into consideration, it is recommended that in future research the study should be replicated with a new and larger sample earlier in the school year.

The results of the internal consistency indicated that the E3SR (Revised) was a reliable

measure in this sample despite the normality violations. The strength of the Cronbach's alphas were indicative of excellent internal consistency. The internal consistency coefficients suggest sufficient stability for the measure to be used in psychological research.

Confirmatory factor analysis indicates that the 6-factor, theoretical model of the E3SR (Revised) was supported. Three indices (CMIN, SRMR and CFI) suggest a model fit while two indices suggest that the data approached an acceptable model fit (RMSEA and GFI). The use of a decision matrix contributed to a more robust and stringent decision-making process about the model fit and factor structure of the revised E3SR. The application of the decision matrix suggests that the E3SR (Revised) achieved a good model fit. Thus, the E3SR (Revised) is a valid instrument.

The refinement of the E3SR makes three important contributions. Firstly, the use of a rigorous methodological process including the decision-making matrix represents good research practice that can be used in instrument development across cultures. Secondly, the study provides empirical support for the factor structure of the E3SR which can inform scale development, especially in developing countries.

Thirdly, the E3SR (Revised) is a reliable and valid outcome-based assessment that identifies areas of growth in the emotional and social domains. Teachers and parents can work collaboratively to develop and further hone the identified emotional and social skills in the child. Lastly, the availability of locally developed screening tools with sound psychometric properties will foster closer collaboration between other stakeholders such as government, principals and teachers, and other assessment practitioners, to work together to build a framework to develop emotional and social skills in children as pre-requisite to enter mainstream education. The brevity of the measure and ease of administration by the respondent group may provide a template for the development of similar measures or adaptation of the E3SR for use in other contexts.

Limitations and the Way Forward

The pandemic limited teacher's ability to observe learners in the classroom context as social distancing was enforced. Respondents reported awarding lower scores on social skills that they were not able to observe in the same way that they were able to pre-pandemic. The resultant dataset thus was more conservative and truncated. The assumption of normality was violated. The data were collected in the fourth term when it was reasonably expected for all learners to have mastered the requisite skills in the emotional and social domains. Most learners achieved mastery as indicated by the ratings thus skewing the data set. The data set accurately reflected the state of skills acquisition in the sample

rather than being a measurement error. The subsequent analysis was more conservative which offsets any potential impact of the violation of the assumption of normality. Future studies must be conducted in terms one to three to avoid the violation of the assumption of normality as a result of maturation. A further limitation of this study was the inclusion of schools mainly from one urban area in the Western Cape. The inclusion of samples from a broader geographical area including rural areas could improve the representativeness of the sample. Further research should explore the inclusion of a sample spread over a broader geographical area, including schools in both urban and rural areas. The geographical limitation also impacted the demographic profile of the sample in terms of language and ethnicity. A more representative sample in terms of ethnicity should also be considered.

Conclusion

The E3SR (Revised) is a reliable and valid measure to use in the assessment of pre-school learners' emotional and social readiness to enter mainstream education in South Africa. The refinement of the E3SR was theoretically and empirically supported which contributes to good practice in instrument development and research locally. The methodological rigour and coherence applied in the development of the E3SR can serve as a framework for theoretically and empirically grounded instrument development in the assessment of emotional-social competence as a domain of school readiness. The E3SR successfully augments the available instruments for school readiness assessment. The E3SR is as a contextually relevant, locally developed measure that promotes access to instrumentation and easy adoption into assessment practices that lends itself to a greater national, continental and global relevance. Studies like this contribute to the call issued by Shonkoff, Radner and Foote (2017) for the expansion of evidence to drive early childhood investments. Findings from studies like this can contribute to the up scaling of early childhood development objectives reflected in the United Nations' Sustainable Development Goals (Britto, Lye, Proulx, Yousafzai, Matthews, Vaivada, Perez-Escamilla, Rao, Ip, Fernald, MacMillan, Hanson, Wachs, Yao, Yoshikawa, Cerezo, Leckman, Bhutta & Early Childhood Development Interventions Review Group for the *Lancet* Early Childhood Development Series Steering Committee, 2017).

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Authors' Contributions

All authors contributed to the writing of the article.

Notes

- i. This article is based on the master's thesis of Lauren Koopman.
- ii. Data are available from the corresponding author.
- iii. The views and opinions expressed in this article are those of the authors and do not necessarily reflect the official policy or position of any affiliated agency of the authors.
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