Research Project

Early Learning Outcomes Measure (ELOM) Psychometry: Test-Retest Reliability of the
ELOM Direct Assessment and Concurrent Validity of the ELOM Teacher Assessment

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Abstract

The Early Learning Outcomes Measure (ELOM) is the first age-standardised and culturally fair tool in South Africa used to assess early learning programme outcomes in children aged 50-69 months. ELOM includes two instruments. Direct Assessment tests the child's Gross Motor Development; Fine Motor Coordination and Visual Motor Integration; Emergent Numeracy and Mathematics; Emergent Literacy and Language and Cognition and Executive Functioning. Teacher Assessment (TA) is used to rate Emotional and Social Functioning. This project consists of two psychometric studies. In study 1, 49 preschool children (aged 55-69 months) were tested approximately seven days apart in their home language to establish the test-retest reliability of the ELOM Direct Assessment. It was found that the instrument has an excellent test-retest reliability ($r = .90$, $p < .001$). Study 2 examined whether the ELOM TA has concurrent validity with the Strength and Difficulties Questionnaire (SDQ), measuring similar constructs. Participants included 59 preschool children (aged 50-69 months). Concurrent validity was established between: SDQ Total and TA Emotional Functioning ($r = -.48$, $p < .001$); and SDQ Total and TA Social Relations ($r = -.53$, $p < .001$). Concurrent validity was also established between: TA Emotional Functioning and SDQ Emotional Problems ($r = -.58$, $p < .001$), and arguably Prosocial ($r = .39$, $p = .003$) scales; and TA Social Relations and SDQ Conduct Problems ($r = -.49$, $p < .001$), Hyperactivity ($r = -.51$, $p < .001$) and Prosocial ($r = .47$, $p < .001$) scales.

*Keyword*s: concurrent validity, ECD, ELOM, test-retest reliability

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Early Childhood Development (ECD) includes socio-emotional, physical and mental development, in the first eight years of life (World Health Organization, 2019). South Africa's National Development Plan (NDP) has prioritised ECD by recommending two years of quality preschool attendance for children aged four to five to be compulsory by 2030 (National Planning Commission, 2012). The NDP is aligned with the United Nations' Sustainable Development Goals aiming to ensure children have access to quality early education and care in preparation for primary school (United Nations, n.d.). The state's acknowledgement of the importance of ECD is also evident in ECD policy and the National Early Learning Development Standards (NELDS; Republic of South Africa, 2015a). The NELDS indicate what children should know and be able to do in the preschool years (UNICEF, 2016). An aim, thus, includes ensuring that early learning programmes are tailored to the needs of children, such as those living in severe poverty (Republic of South Africa, 2015a). Most people of colour are still in lower economic positions, which limits their access to educational resources and affordability of pre-grade R classes. The legacy of apartheid, therefore, continues to compromise the development of children of colour (Atmore, van Niekerk, & Ashley-Cooper, 2012). Finally, national ECD policy aims to transform service delivery, prioritising opportunities for learning (Republic of South Africa, 2015b).

Prior to the development of The Early Learning Outcomes Measure (ELOM), there had been no test for young children standardised on the range of cultural and economic backgrounds of the South African population. The Wechsler Preschool and Primary Scale of Intelligence – Fourth Edition (WPPSI-IV) tests similar factors to the ELOM including measures of working memory, visual spatial ability, vocabulary acquisition, and processing speed (Wechsler, 2012). However, it has not been locally standardised and may not be culturally fair for many South African children. This problem is evident in other non-Western countries. For example, a study adapting the WPPSI-III to children from rural Pakistan demonstrates that a third of pictures in the Matrix Reasoning section were changed because they were not culturally appropriate (Rasheed et al., 2018). The test then had to be translated into the local language. However, cost is a limitation for South Africa, therefore standardisation is difficult (Dawes, Biersteker, Girdwood, Snelling, & Tredoux, 2019a).

Therefore, an appropriate instrument to fulfil these functions is needed in South Africa. The ELOM was developed in South Africa for this purpose and is the first standardised and age-validated instrument for the 50 - 69 months age group (Dawes et al., 2019a). The construction of the ELOM drew upon the NELDS of the National Curriculum Framework and a range of existing tests and was standardised on preschool children in this

age group (Snelling, Dawes, Biersteker, Girdwood, & Tredoux, 2019). The ELOM consists of two assessments: The Direct and Teacher Assessments.

The Direct Assessment measures children's development in five developmental domains [Gross Motor Development (GMD), Fine Motor Coordination and Visual Motor Integration (FMC & VMI), Emergent Numeracy and Mathematics (ENM), Cognition and Executive Functioning (CEF) and Emergent Literacy and Language (ELL)]. The Direct Assessment is a broad developmental assessment and does not seek to comprehensively measure each of the above domains, as would be the case in a test specifically designed to measure, for example, receptive vocabulary e.g. the Peabody Picture Vocabulary Test (PPVT-IV; Xu, Chin, Reed, & Hutchinson, 2014).

Additionally, children have essential emotional regulation, self-control and cooperative needs upon entering Grade R (Darling-Churchill & Lippman, 2016). As social and emotional functioning is difficult to assess in a test situation, the ELOM Teacher Assessment was devised. It involves teacher ratings of the child using the Emotional Functioning (EF) and Social Relations with Peers and Adults (SR) scales (Dawes et al., 2019a).

Although the ELOM does fill the gap for a culturally relevant and inexpensively administrable instrument, the concurrent validity of both the Teacher and Direct Assessments and the test-retest reliability of the ELOM Direct Assessment have not been established (Snelling et al., 2019). These psychometric properties are vital in developing psychological tools (Aldridge, Dovey, & Wade, 2017). The ELOM is discussed further in the method section to follow.

Test-retest reliability involves administering one test to the same participants on two occasions and correlating the two scores (Price, 2017a). This estimation yields a coefficient of stability (Price, 2017a). It is reliant on the assumptions of stability (i.e. scores being constant) and equal variances (i.e. the same error variances) being upheld in both trials (Furr & Bacharach, 2014). These assumptions provide the foundation for ascertaining whether a child is likely to achieve a similar score on two administrations of the same test (i.e. scores reliably correlate) over time (Price, 2017a; Furr & Bacharach, 2014). However, when there are extraneous variables, i.e. memory, fatigue and practice effects, and or temporary sources of variance that are related to the constructs being measured, such as developmental effects (i.e. between the two times of assessment), the test-retest coefficient can misrepresent the true relationship between the two scores (Schneider, 2013).

Concurrent validity is a type of criterion-related validity and assesses the extent to which a scale can relate to an already established measure (Price, 2017b). The appropriate criterion comparison must be measuring the same construct with the goal of finding a high correlation between the two measures administered to the same person at close intervals (Price, 2017b). To establish its concurrent validity, the Teacher Assessment must be compared to a measure of the same constructs. The Strengths and Difficulties Questionnaire (SDQ) is a potential culturally relevant instrument that explores these attributes (Hoosen, Davids, de Vries, & Shung-King, 2018). Like the ELOM Teacher Assessment, it is a measure comparable in format and content. It is also a standardised tool with established reliability and validity (Hoosen et al., 2018).

This project includes two studies. Study 1 examines the test-retest reliability of the ELOM Direct Assessment. It was hypothesized that test scores will be significantly correlated between two administrations of the ELOM Direct Assessment. Study 2 investigates the concurrent validity of the ELOM Teacher Assessment with the Strengths and Difficulties Questionnaire. It was hypothesized that scores on the SR and the EF rating scales of the Teacher Assessment and scales of the SDQ will be significantly correlated.

Study 1: The Test-Retest Reliability of the ELOM Direct Assessment

Method

Participants.

Sample size calculation.

G-power 3.1.9.4 was used to calculate a sample size for correlation. After data cleaning, a final sample of 49 children was realised. This is sufficient to detect an effect of .50 with power set at .80 ($p = .05$). A higher effect size would have resulted in a smaller sample, which was regarded as a threat to the confidence that could be placed in the findings.

Participant information.

As the ELOM is an assessment for children aged 50 to 69 months, only children within this age bracket participated in this study i.e. children aged 55 to 69 months ($M = 60.77$ months). Only English and isiXhosa-speaking children were included, as seen in Table 1. All 49 children participating were from one of two purposefully selected preschools situated in Athlone. The socio-economic status of the children was not assessed. However, they reside in areas served by fee exempt Quintile 3 public schools. Quintiles range from the poorest areas in Q1 to the wealthiest in Q5 (Snelling et al., 2019). Children in the specific age ranges in these preschools, were selected using purposive sampling (Huck, Beavers, & Esquivel, 2010).

Table 1

Test-retest reliability participant demographics

	Males	Females	Total
isiXhosa-speaking	9	10	19
English-speaking	15	15	30
Total	24	25	49

Following the ELOM Direct Assessment guidelines the following children were excluded from the final sample: children with learning disabilities; children outside of the age bracket; incomplete, duplicated and or compromised assessments; having a Total ELOM score of < 15 with a Task Orientation score of zero; not being assessed in home language; if the assessor made an error that undermined the data; having a score of zero for more than one domain total score; and if the child had a low score with both an observed reason from the assessor and observed score of less than four (Dawes, Biersteker, Girdwood, Snelling, & Horler, 2019b).

Instruments.

The ELOM Direct Assessment is described by Snelling et al. (2019) and Dawes et al (2019a). It measures five domains of ability relevant to readiness to learn in school.

ELOM Direct Assessment items, furthermore, align with the NELDS across learning dimensions, reflecting the physical, cognitive and linguistic behaviours of the age group (Department of Basic Education, 2009). The GMD domain uses the standard that children can use their large muscle skills. The FMC & VMI domain draws upon the standard that children can use their small muscle skills. This accompanied by visual-motor integration is associated with an increased performance in mathematics and reading at a later stage (Dinehart & Manfra, 2013). The ENM domain is in accordance with the standard of children showing an understanding of numerical concepts, space, symbols, shapes and size. It is important for preschools to be aware of this, as research has shown inadequacy in early numeracy at age five, which is associated with greater difficulties in Mathematics upon entering formal schooling (Toll & Van Luit, 2014). The CEF domain draws upon the standard of whether children are being taught how to solve problems, form concepts and

think critically. It further draws upon the standard of children improving their capability to control their impulses when doing a task, attending to and remembering instructions. The development of this lays the foundation for cognitive capacity during preschool (Snelling et al., 2019). Finally, the ELL domain is in accordance with the standard of children having the ability to use language and the effectiveness of their communicative skills.

All domains are one-dimensional and have proven to be internally consistent, and the items reliably discriminate between children of different ability levels and those from different socioeconomic and cultural backgrounds but equivalent levels of ability. The ELOM also has established construct and content validity (Dawes et al., 2019a; Snelling et al., 2019). Furthermore, it is the only ECD measure to consider South Africa's wide range of languages, as it was standardised in English, Afrikaans, isiXhosa, Setswana and isiZulu. It has now been translated into all eleven official languages and is applicable in a range of socio-cultural environments (Snelling et al., 2019). The test can be administered by trained assessors, who are non-professionals, thereby reducing costs and takes approximately 45 minutes.

Table 2 provides examples of items assessed in each of the domains (Snelling et al., 2019):

Table 2.

The Direct Assessment Domains and Indicators

Domains	Indicators	Examples
Gross motor development (4 items)	The child displays good control and ability to coordinate larger movements.	Item 2 involves the child catching a beanbag with two hands, only with their dominant hand and then only with their other hand.
Fine motor development and visual motor integration (4 items)	The child competently uses their small muscles and shows visual-motor integration.	Item 6 involves the child copying a triangle using a pencil

Emergent numeracy and mathematics (5 items)	The child can "count with one to one correspondence" (p. 260) and perform simple calculations involving subtraction and addition. The child can sort, categorise and match shapes. The child understands spatial and measurement vocabulary.	Item 9 involves counting marbles in classes.
Cognition and executive functioning (4 items)	The child shows flexible cognition, auditory discrimination, concentrated attention, working memory, and control of their inhibitions. The child also shows short-term memory and problem-solving capability.	Item 14 involves switching and sorting first between six colour cards and then between six shape cards.
Emergent literacy and language (6 items)	The child can speak using full sentences and relate logical accounts of events with the correct use of language. The child can name everyday objects, displays understanding of stories and can identify	Item 20 involves the child describing their morning routine.

sounds with which words
begin.

Procedure.

The participating preschools were first contacted with all of the information pertaining to the study requirements (see Appendices A and B). Once they agreed, they were briefed on the study and the time frame was discussed with teachers and/or principals. As per the inclusion guidelines, the class lists were examined to ensure that all the children were in the relevant age bracket. Consent forms then went out to parents.

For test-retest reliability in developmental tests such as the ELOM, having short time periods between testing times is recommended to ensure that the likelihood of error is due to chance and not actual changes in the child's characteristics (Multon, 2010). Although there is usually a period of two to four weeks with older children between tests for test-retest reliability, a shorter period is required for pre-schoolers as they develop at a faster rate (Briggs-Gowan, Godoy, Heberle, & Carter, 2016). Health researchers typically use a one- or two-week period in test-retest studies (Polit, 2014). To control for possible practice effects (Multon, 2010), the test-retest of the Direct Assessment involved a seven-day period between the test and retest of each child, as seen in Figure 1. Two days leeway was allowed in the case of absences or a public holiday. The ELOM Direct Assessment was administered by trained and certified ELOM assessors (Dawes, Biersteker, Girdwood, & Snelling, 2016; Snelling et al., 2019).

Each child was tested separately at their respective preschools. At one school, two children were tested by two different assessors in the same hall. Each test took approximately 45 minutes to an hour to complete. To control for the extraneous variable of fatigue (Furr, & Bacharach, 2014), children were tested earlier, between approximately 8:30 am - 12:30 pm.
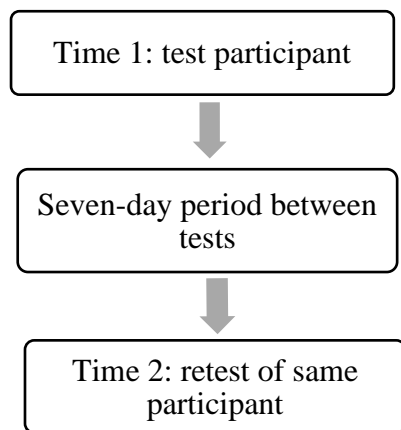
Figure 1. Test-Retest Procedure

The assessors electronically captured the children's information and scores with SurveyCTO (2016), which is a mobile data collection platform, using a pre-programmed tablet (Snelling et al., 2019). ELOM Total and domain scores were automatically calculated and stored on a password protected central server, accessible only by the project and data managers. At the end of the testing period, the ELOM data manager sent the raw data to the researchers.

Ethical considerations.

The study was approved by the University of Cape Town's Humanities Faculty Ethics Committee (PSY2019-024), as seen in Appendix C.

Prior to testing, parents or guardians of the children were requested to give written consent for their child's participation by signing the tailored ELOM informed consent form, as seen in Appendix D. The preschools were given the *ELOM: Innovation Edge Briefing Document*, which describes the tool and can be found at: http://elom.org.za/wp-content/uploads/2017/07/ELOM-Briefing-Document.pdf. They were all provided with the researchers' contact information. As there was a high likelihood of parents forgetting to return the forms, to get sufficient data, passive consent was used where necessary. Parents could choose not to involve their children in this study. The child could withdraw from the study at any stage without consequence and they were able to take breaks whenever they wanted. Confidentiality was and will be maintained for the school and children except if a serious health problem was detected, in which case the teacher would have been informed. Furthermore, the benefits of the study include the preschool receiving a group profile, to aid in informing programme improvement (Dawes, Biersteker, Girdwood, Snelling, & Tredoux, 2018). However, individual information about children will not be provided. The data

provided will only be used in this project. All participants were treated equally and with respect. There were no foreseeable risks for the child.

Data analysis.

Once data was collected, it was cleaned in Excel, as per the exclusion criteria. It was then imported into the software programme IBM SPSS for data analysis (Version 25.0; IBM Corp., 2017).

In terms of study design, this is a psychometric correlational study. Thus, a Pearson product-moment correlation coefficient (Rust & Golombok, 2014), i.e. Pearson's *r*, was used for the correlation between the test and retesting occasions (Warner, 2013).

In the development of the WPPSI-IV, test-retest reliability (Pearson's *r*) ranged from .75 to .87 for the subtest level (considered to be acceptable and good respectively); between .84 and .89 for the composites (considered to be good); and .93 (considered to be excellent) for the Full-Scale Intelligence Quotient (Syeda & Climie, 2014). Therefore, this study followed Syeda and Climie (2014) in regarding .75 as an acceptable coefficient for test-retest reliability. This is supported by the test-retest reliability scale scores in the Mccarthy's Scales of Children's Abilities ranging from .71 to .85 (Bryant & Roffe, 1978), which is seen as comparable to the WPPSI.

Results

In terms of bivariate analysis, the assumptions of linearity and normality must be met (Field, 2013; Swank & Mullen, 2017). As seen in Figures 2-7 in Appendix E, the assumption of linearity is fairly upheld but weakly, for GMD and FMC & VMI. It also needs to be ascertained if there are outliers (Swank & Mullen, 2017). As seen in Figures 18 and 19 in Appendix E, there were outliers for Total ELOM Test, Total ELOM Retest and the FMC & VMI Test Scores. Figures 9-11, 14 and 16, as seen in Appendix E, show that the GMD Retest and FMC & VMI Test, FMC & VMI Retest and ELL Test Scores are skewed to the left and the CEF Test Score is skewed to the right. The Shapiro-Wilk statistics for the FMC & VMI Test ($p = .003$), FMC & VMI Retest ($p = .017$) and CEF Test ($p = .015$) Scores are significant, $p < .05$. Thus, normality is violated. To address these challenges, the data was bootstrapped and confidence intervals for each domain were established (Field, 2013, how2stats, 2019).

Table 3

Test-retest Reliability Correlations for Early Learning Outcomes Measure Direct Assessment

ELOM Direct Assessment	Test-retest reliability
Gross Motor Development	$r = .50$ ($p < .001$) 95% CI [0.29, 0.68]
Fine Motor Coordination & Visual Motor Integration	$r = .79$ ($p < .001$) 95% CI [0.63, 0.89]
Emergent Numeracy & Mathematics	$r = .76$ ($p < .001$) 95% CI [0.57, 0.89]
Cognition & Executive Functioning	$r = .64$ ($p < .001$) 95% CI [0.44, 0.83]
Emergent Language & Literacy	$r = .74$ ($p < .001$) 95% CI [0.58, 0.86]
ELOM Total	$r = .90$ ($p < .001$) 95% CI [0.83, 0.95]

A test-retest correlation of .75 and above was considered to be acceptable in this study. As is evident from Table 3, ELOM Total Score, FMC &VMI, ENM and arguably ELL either exceed or meet the criterion. The ELOM Total Score, furthermore, exceeds the test-retest coefficient of .80 which is put forward for group-level analysis by Cronbach (as cited by Polit, 2014). GMD and CEF did not meet the criterion of .75.

None of the confidence intervals cross zero. Therefore, this may be interpreted as there being a genuine effect in the population (Field, 2018). All *p* values are significant at $p < .001$.

Discussion

The ELOM Total for the Direct Assessment has an excellent test-retest reliability ($r = .90$) over a seven-day period. This is in line with test-retest reliability established for the WPPSI-IV Full Scale IQ (.93). Moreover, Syeda & Climie (2014) report test-retest reliabilities ranging from .84-.89, on the WPPSI composite Scores, while Soares and McCrimmon (2013) report a range of .82-.92 for the same composites.

The current study has demonstrated that the ELOM Total Score has a similar level of stability to the Full Scale IQ as measured in a gold standard psychometric test (Syeda & Climie, 2014). The FMC & VMI, and ENM and arguably ELL domains met the criterion for

acceptable test-retest reliability chosen for this study (.75). CEF and GMD were marginally below this level.

FMC & VMI had the highest test-retest reliability of all the domains, which indicates that performance on its items were the most stable over the seven-day interval. This ELOM domain tests the same construct measured in the Bruininks-Oseretsky Test of Motor Proficiency's (2nd Edition) fine manual control composite score, specifically measuring fine motor coordination using similar tasks to ELOM. It had a test-retest reliability of .88 (Wuang & Su, 2009).

The ENM test-retest reliability finding is similar to that of Weiland et al. (2012), who found a test-retest reliability of .79 for the Research-based Early Mathematics Assessment (REMA) on a sample of preschool children. The REMA tests spatial imagery, which is assessed on the spatial vocabulary item of the ELOM.

ELL has an arguably significant test-retest reliability. This is lower than the test-retest reliabilities found using the Test of Preschool Early Literacy (TOPEL) with reliabilities of .81-.91 and the PPVT-IV with reliabilities of .92-.96 (Xu et al., 2014). These assessments test similar phonological awareness, vocabulary and literacy to the ELOM. However, they both had larger sample sizes and tested these constructs more comprehensively in comparison.

CEF ($r = .64$) is lower than the acceptable value of .75 but still significant in measuring some of the goal-directed behaviours and attention critical during the preschool period (Bernier, Beauchamp, Bouvette-Turcot, Carlson, & Carrier, 2013). The dimensional card sorting task (item 14), for example, requires the child to be able to switch and sort between different shapes and colours (Snelling et al., 2019). The lower correlation may be due to them paying attention to and holding the assessor's first prompt example of the colour-game in mind but having had difficulty switching to shape-sorting by themselves as they are never explicitly told to do. This may be caused by an inability to inhibit their first automatic learnt response, as they are not told when they have made a mistake, which may have increased the rate of error (Bernier et al., 2013). Hence, the slightly lower correlation.

GMD had the lowest test-rest reliability and indicates that the use of their larger muscles in catching and jumping were the least consistent over time. This is a similar finding to the Early Childhood Longitudinal Survey-Kindergarten Cohort (ECLS-K) assessing the same gross motor skills with an equally moderate test-retest reliability of .51 (Grissmer, Grimm, Aiyer, Murrah, & Steele, J. S., 2010).

However, most findings were highly significant with the ELOM Total for the Direct Assessment being excellent and it is, therefore, a reliable psychometric measure. This

correlation falling within the 95% confidence interval [0.83, 0.95], further signifies that the results do represent the population sampled. Confidence intervals for the ELOM Total and all the domains are narrow with a difference of less than .4 (Cumming, 2012).

Test-retest reliability was thus established. The Direct Assessment is, therefore, a locally applicable and standardised early education instrument of evaluation. It does not unfairly discriminate between children and thus fills the gap of such a measure within the Southern African context.

In terms of limitations, random sampling was not used, which produces good samples in terms of being representative of the population (Johnson & Christensen, 2012). Thus, the findings may not be generalisable to the rest of the population. Furthermore, the study sample is from the isiXhosa and English language groups. The properties of language can change the meaning of items. However, this is unlikely as metric equivalence was taken into account (Dawes et al., 2016).

Study 2: The Concurrent Validity of the ELOM Teacher Assessment and Strengths and Difficulties Questionnaire (SDQ)

Method

Participants.

Sample size calculation.

G-power 3.1.9.4 was used to calculate a sample size for correlation. After data cleaning, a final sample of 59 children was realised. This is sufficient to detect an effect of .40 with power set at .80 ($p = .05$). The sample size is greater than required, therefore, increasing power (Lachenicht, 2013). This study follows Drummond et al (as cited in Swank & Mullen, 2017) in regarding .40 as an acceptable correlation for concurrent validity.

Participant information.

Preschools in Quintile 3 (as in Study 1) and Quintile 5 areas were approached for participation using convenience sampling (Salkind, 2010). Children in the specific age ranges in these preschools, were selected using purposive sampling (Huck et al., 2010). In terms of exclusion criteria, children who were above 69 months old and below 50 months old were excluded, as per the age range focus of the study. Demographics of participants are seen in Table 4.

Table 4

Concurrent Validity Demographics

	Males	Females	Total
Quintile 3 school	18	22	40
Quintile 5 school	10	9	19
Total	28	31	59

Instruments.

The Teacher Assessment, which is not in the public domain, compliments the measurement of the Direct Assessment domains and requires the child's teacher to rate the child's social and emotional functioning. The SR Scale (6 items), and the EF Scale (6 items) are relevant to dealing with the school environment. The reliability of both the SR ($\alpha = .78$) and EF ($\alpha = .80$) scales were established (Dawes et al., 2019a). The Teacher Assessment includes one Self- Care item, i.e. toileting maturity, which was not included in this study.

SR items were drawn from Child Trends Teacher Rating (2014) and the California Desired Results Developmental Profile (California Department of Education, 2015). In the development of the Child Trends Teacher Rating, study reviews identified core skills, which aids learner's academic achievement over time including self-control and academic self-efficacy (Child Trends, 2014). Items including interactions, furthermore, reflect positivity in seeking assistance and taking initiative (Dawes et al., 2016).

The EF scale items relevant to learning, on the other hand, focus on the appropriateness of the regulation and expression of children's emotions and feelings (Dawes et al., 2016). Items were drawn directly from the Birth to Twenty South African Child Assessment Scales (Barbarin & Richter, 2001), which was based on the Achenbach and Rescorla (2000) Child Behaviour Checklist (CBCL) for ages one to five. It similarly assesses their interactions and how they respond to, express, and shift between emotions (Dawes et al., 2019a).

The Strengths and Difficulties Questionnaire for 4-17-year olds, is a brief screening questionnaire measuring child behaviours. It consists of five scales measuring prosocial behaviour, emotional symptoms (i.e. emotional problems), hyperactive inattention (i.e. hyperactivity), peer problems and conduct problems (Goodman, 1997; Youth in mind, 2016). It is utilized in this study as these scales are similar to those in the Teacher Assessment. The

Prosocial and Emotional Problems scales are, therefore, most likely to correspond to the ELOM Teacher Assessment scales. It is of note that the SDQ Total Difficulties Score excludes the Prosocial scale.

Parents or teachers rate a child's behaviour on a three-point scale on the SDQ (Goodman, 2005). For example, item 17, "Kind to younger children" (Youth in mind, 2016, p. 1) is rated as either Not, Somewhat or Certainly True. The English SDQ was used in this study and rated by teachers (Goodman, 2005). For the ELOM Teacher Assessment, the SR scale requires teachers to rate the child on a four-point scale. For example, item 3 of SR, "Does the child cooperate with peers without prompting?" (Dawes, et al., 2019a, p.10) is rated as none, a little, most or all of the time. The EF scale has three points (Barbarin & Richter, 2001). For example, item 2, "Does the child express needs and feelings appropriately?" (Dawes, et al., 2019a, p.11), is rated as not, sometimes or always true.

The SDQ was developed in response to the educational focus on strengthening children's abilities rather than identifying their weaknesses as previously done in the Rutter Questionnaire (Goodman, 1997), which uses the four emotional and behavioural difficulty-related scales to reliably identify and predict psychiatric disorders in children (Goodman, 1994). Therefore, as the items on the Rutter questionnaire focused on the child's undesirable traits, Goodman (1994) decided to revise those items and add the more desirable prosocial scale. This adaption is in line with the finding that there is very high concurrent validity between the teacher-rated SDQ Total Difficulties Score (excluding the prosocial score) and Rutter Questionnaire Total with a correlation of .92 (Goodman, 1997).

The SDQ Total Difficulties Score, excluding the prosocial scale, furthermore, has a concurrent validity coefficient of .71 with The Parenting Stress Index-Short Form (McSherry, Fargas, & Weatherall, 2018) and .87 with the total of the CBCL (Goodman & Scott, 1999). Furthermore, the SDQ Total Difficulties Score has good concurrent validity in terms of having meaningful Pearson correlations with the parent versions of the Revised Children's Manifest Anxiety Scale (.72); the ADHD Questionnaire (.67); and the Child Depression Inventory (.73) (Muris, Meesters, & van den Berg, 2003). The present study provides the first opportunity to assess the concurrent validity of the SDQ against a South African measure.

Procedure.

The participating preschools were first contacted with all the information pertaining to what was required for the study (see Appendices A, B and F). Once they agreed, they were briefed on the study and the requirements from teachers. The time frame was discussed with teachers and/or principals. As per the inclusion guidelines, the class lists were examined to

ensure that all the children were in the relevant age bracket. Consent forms then went out to parents. Teachers were given teacher consent forms as well. The study then began, as teachers filled out forms.

It was necessary to control for bias resulting from the order of scale completion. To this end, half the children were randomly assigned via simple random sampling (May, 2017) for their teachers to complete the Teacher Assessment first ($n = 30$) and the other half to have the SDQ completed first ($n = 29$). Alphabetical class lists were numbered and then reordered by the researchers using an online generator (May, 2017), found at: https://www.random.org/sequences/?min=1&max=100&col=1&format=html&rnd=new.

Simultaneous completion of the two measurements was key in enabling a fair comparison (Price, 2017b), both of which are scored using paper scoring sheets (Youth in mind, 2012b). The scoring sheets were given in numerical order from, as to make it easier for the teacher to identify the child's corresponding number on the form from the class list.

In all three schools, teachers familiar with the children rated them on both scales. On a seven-point scale of familiarity, the minimum was four. The teachers were instructed to number the class lists (which was done for one teacher by the researchers) and complete it in that order. Teachers were instructed to complete the two instruments at the same time for each child (see Appendices A and F), however, it is not clear if all teachers actually did this. Teachers could pose any queries. Both measurement's scoring sheets provided, had to be hand-scored by the teacher. Each scale was added for a scale total in Excel.

Ethical considerations.

This study was approved by the University of Cape Town's Faculty of Humanities Ethics Committee (PSY2019-024) as seen in Appendix C.

Prior to the completion of the Teacher Assessment and SDQ, parents/guardians were sent the informed consent forms tailored to this study (seen in Appendices D and G). As this study poses no risk and there was a possibility of them forgetting to return the forms, to get sufficient data, passive consent was used where necessary. They could, however, choose not to involve their children in this study. The preschools were also given the Innovation Edge Briefing Document (http://elom.org.za/wp-content/uploads/2017/07/ELOM-Briefing-Document.pdf).

Additionally, the Teachers were requested to give their informed consent (see Appendix H). They were all provided with the researchers' contact information. Furthermore, due to the nature of these two measurements, only the researchers and teachers knew the children's names, but confidentiality was upheld for teachers and children in the research

report, as no names were used. The data provided will only be used in this project. All participants were treated equally and with respect. While there are no benefits for the schools, there were no foreseeable risks for any of the participants.

   Data analysis.

   Once data was collected, it was entered into Excel and imported into IBM SPSS (Version 25.0; IBM Corp., 2017) for analysis.

   In terms of study design, this is a psychometric correlational study. Therefore, a Pearson product-moment correlation coefficient (Rust & Golombok, 2014), i.e. Pearson's *r*, was used for the correlation between the instruments (Warner, 2013). For the concurrent validity, the subjective rating totals for each of the sub-sections completed by the teachers was compared across the two instruments. Drummond et al. (as cited in Swank & Mullen, 2017) conducted a review on guidelines for validity correlation coefficients and summarized that .50 or higher was considered very high; .40-.49 as high; .21-.40 as moderate and .20 or lower, as not acceptable. This study followed these guidelines, using .40 as the criterion for acceptable concurrent validity.

Results

   As seen in the matrix scatterplot in Figure 20 in Appendix E, the assumption of linearity is fairly upheld. The boxplots in Figures 21-24 in Appendix E shows that normality is upheld for SR, however, EF, Prosocial and Hyperactivity Scores are skewed to the left. Peer Problems, Emotional Problems, Conduct Problems and Total SDQ Scores are skewed to the right, shown in Figures 25-28 in Appendix E. The skewness statistics for, Emotional Problems Score ($S = 1.537$) and Conduct Problems Score ($S = 1.243$) are not within the acceptable range of -1 and 1 (Leech, Barrett, & Morgan, 2013). As seen in Figures 21, 22, 24, 26 and 27 in Appendix E, there are outliers for SR, EF, Hyperactivity, Emotional Problems and Conduct Problems Scores. The Shapiro-Wilk statistics for EF ($p < .001$), Conduct Problems ($p < .001$), Prosocial ($p < .001$), Peer Problems ($p < .001$), Emotional Problems ($p < .001$), and Hyperactivity ($p = .007$) Scores are all significant, $p < .05$ (Field, 2013). Therefore, the assumption of normality was violated so the data needed to be bootstrapped.

Table 5

Correlations between Strength and Difficulties Questionnaire Scores and the ELOM Teacher Assessment Scores

SDQ Categories	ELOM Teacher Assessment Emotional Functioning Score	ELOM Teacher Assessment Social Relations Score
Emotional Problems Score	$r = -.58$ ($p < .001$) 95% CI [-0.75, -0.38]	$r = -.11$ ($p = .418$) 95% CI [-0.40, 0.19]
Conduct Problems Score	$r = -.30$ ($p = .020$) 95% CI [-0.55, -0.10]	$r = -.49$ ($p < .001$) 95% CI [-0.66, -0.32]
Hyperactivity Score	$r = -.13$ ($p = .333$) 95% CI [-0.37, 0.10]	$r = -.51$ ($p < .001$) 95% CI [-0.68, -0.27]
Peer Problems Score	$r = -.26$ ($p = .333$) 95% CI [-0.51, 0.07]	$r = -.25$ ($p = .059$) 95% CI [-0.46, -0.02]
Prosocial Score	$r = .39$ ($p = .003$) 95% CI [0.11, 0.64]	$r = .47$ ($p < .001$) 95% CI [0.25, 1.66]
SDQ Total Difficulties Score (excluding Prosocial Score)	$r = -.48$ ($p < .001$) 95% CI [-0.63, -0.31]	$r = -.53$ ($p < .001$) 95% CI [-0.68, -0.38]

Table 5 shows that none of the confidence intervals straddle 0. Therefore, this may be interpreted as there being a genuine effect in the population (Field, 2018). With the exception of the SDQ Prosocial and Teacher Assessment SR and EF correlations, all coefficients are negative. This is a function of the manner in which the measure subscales are scored. For example, a high rating on the Teacher Assessment Emotional Functioning Scale indicates positive functioning, while the reverse is the case for the SDQ (a higher score indicates more difficulties). Scoring is in the same direction for SDQ Prosocial and Teacher Assessment Social Relations scales.

As per the .40 acceptable criterion, the Teacher Assessment SR Score has a high negative correlation with the Total SDQ Difficulties Score and high positive correlation with the SDQ Prosocial Score. This is as anticipated and indicates that on these dimensions, acceptable concurrent validity of the Teacher Assessment with the SDQ is evident. As would be expected, the Teacher Assessment SR Score is negatively correlated with the SDQ Hyperactivity Score and SDQ Conduct Problems Score, which are a very high and high correlation, respectively. The Teacher Assessment EF Score has a high negative correlation with the Total SDQ Score. The highest correlation was between the Teacher Assessment EF Score and SDQ Emotional Problems Score, which was a very high negative correlation.

Acceptable concurrent validity of the Teacher Assessment EF with its SDQ Total Difficulties construct counterpart is evident. All these correlations are in the expected direction, as all SDQ scores related to behavioural or emotional issues are negatively correlated with the positive aspects in children's Social and Emotional Functioning on the Teacher Assessment. Additionally, the positive prosocial behaviours are positively correlated with the positive aspects on the Teacher Assessment.

According to Drummond et al. (as cited in Swank & Mullen, 2017), the negative correlation between the SDQ Conduct Problems Score and Teacher Assessment EF Score and positive correlation between the SDQ Prosocial Score and Teacher Assessment EF Score is moderate and acceptable. However, these correlations do not meet this study's acceptable criterion of .40. The correlation between the SDQ Conduct Problems Score and Teacher Assessment EF Score is, however, arguably acceptable at .39. These correlations are also in the expected direction.

All the aforementioned p values are significant at $p < .05$. Exceptions, as seen in Table 5, includes the insignificant correlations between the Teacher Assessment SR Score and SDQ Emotional Problems, Hyperactivity and Peer Problems Scores. The correlation between the Teacher Assessment EF Score and Peer Problems Score is also not significant.

Discussion

The Teacher Assessment SR score is highly correlated with the SDQ Prosocial scale. The items in both scales assess the child's relationships with their peers and adults. The reason this finding is only considered high instead of very high as per Drummond et al. (2016 as cited in Swank & Mullen, 2017) could be due to the difference in focus of the two scales. The SR scale focuses on the child's independence and initiative (Dawes et al., 2019a) in comparison to the Prosocial scale, which more so focuses on their ability to work with others. This is in line with Goodman's (1997) aim for the SDQ to be an indication of their pro-

sociability. Still, the significance of this relation does indicate that an increase in prosocial behaviour is associated with an increase in social relationships.

SR has a highly negative correlation with the Hyperactivity scale. As Hyperactivity focuses on restless and inattentive behaviours (Goodman, 1997) it evidently has a higher likelihood of decreasing their ability to maintain or initiate social relations during that period.

Similarly, the relationship between SR and the Conduct Problems scale is highly negative as social relations are likely to be affected by negative conduct (Goodman, 1997). This is in line with Goodman, Lamping, and Ploubidis's (2010) finding that Hyperactivity and Conduct Problems items could be combined as an indication of external symptoms. This is further aligned with the finding that Hyperactivity and Conduct Problems had a high correlation of .47 (Goodman, 1994).

However, it is possible that this comparatively lower result – compared to Hyperactivity – may be because the Conduct Problem items are strongly linked to help-seeking behaviours (Stone et al., 2015). Thus, this negative relationship seems due to the Teacher Assessment focusing on more self-initiated behaviours in comparison.

The relationship between the SDQ Prosocial and Teacher Assessment EF scale, on the other hand, is significantly more moderate than its relation to SR. The EF scale focuses on emotional understanding and expression (Dawes et al., 2019a), which the prosocial scale does not. The relationship is, however, positive which further supports the relationship between EF and SR overall. As these three scales are interrelated, it is not surprising that the relationship between EF and Conduct Problems is also lower. This reinforces these findings.

The EF and SDQ Emotional Problems scale was found to have the highest Teacher Assessment-Strength and Difficulties correlation (Swank & Mullen, 2017). The negative nature of this relationship is in line with how the two scales are scored. The Emotional Problems scale assesses negative emotional symptoms found in clinical disorders; whereas the EF scale focuses on emotional competency (Goodman, 1997; Dawes et al., 2019a). Hence a higher score on the EF scale would be significantly associated with a lower score on the Emotional Problems scale and vice versa.

The Peer Problems scale was not correlated with the Teacher Assessment scales. This is similar to findings by Mellins et al. (2018) who had monitored preschool children in KwaZulu-Natal for five years using the SDQ. They aimed to assess its psychometric properties in South Africa and had also found the Peer Problems scale performance to be significantly poorer in comparison to the other SDQ scales.

Ultimately, other than Peer Problems, the rest of the correlations were acceptable and significant as per the guidelines specified by Drummond et al. (as cited in Swank & Mullen, 2017). Overall, there were significant correlations between the Teacher Assessment SR and EF scales and four out of the five SDQ scales. Therefore, concurrent validity between the ELOM Teacher Assessment and Strength and Difficulties Questionnaire has been established.

Notably, the confidence intervals are narrow, with a difference of .45 and less; except the SDQ Prosocial scale's correlation with the SR and EF scales, with a difference of .53 and 1.41 respectively. This indicates more variation for the Prosocial scale correlations (Cumming, 2012). This could be because the Prosocial scale is looking at both emotional and social aspects, e.g. being considerate of others' feelings (item 1) and being helpful if someone is hurt (item 9), which may have resulted in more random item responses.

In terms of limitations, random sampling was not used. Therefore, the findings may not be generalisable to the rest of the population (Johnson & Christensen, 2012). Furthermore, the SDQ is also used for clinical assessment with established cut-off points (Youth in mind, 2016). However, the Teacher Assessment has not been assessed for its clinical assessment capability. This was not investigated, as there were too few children in the sample for the study to explore this question. Therefore, it is recommended for future research.

For the preschools involved in either study, should it be requested, findings from the completed study will be made available but individual information will not be provided.

Conclusion

Overall both psychometric studies were successful in filling the ELOM psychometric gap. The ELOM Direct Assessment was found to have excellent test-retest reliability ($r= .90$). The Teacher Assessment was found to have concurrent validity with equivalent constructs measured in the Strength and Difficulties Questionnaire. In particular, concurrent validity was established between the Teacher Assessment EF Score and Total SDQ Score ($r= -.48$) and between the Teacher Assessment SR Score and Total SDQ Score ($r= -.53$).

Acknowledgements

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    Education Journal*, *42*(5), 295-304. doi: 10.1007/s10643-013-0613-6

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    17 or 18+*. Retrieved from https://www.sdqinfo.com/py/sdqinfo/c0.py

Appendix A: Email to Quintile 3 preschools where both Studies 1 and 2 were conducted.

Good afternoon _____,

We, Jasmin Roxanne Moonsamy and Tiffany Joy Henning, are conducting our Honours thesis in Psychology at the University of Cape Town under the supervision of Professor Andrew Dawes. Elizabeth Girdwood has previously been in touch and has forwarded your school's contact details to us.

Professor Dawes and his team recently developed the Early Learning Outcomes Measure (ELOM), which is being used around the country to assess children's development and also the effects of ECD programmes on their development. For further information please see: elom.org.za

We attach the ELOM briefing document that outlines the nature of the ELOM. There are two components:

· Direct Assessment of the child: requires the Direct Assessment of the child's development through administering various tests. The children's coordination of movements; ability to understand instructions and solve simple problems; language development; and ability to count will be measured.

· Teacher Assessment of the child's social and emotional functioning on short rating scales.

Our research project is focusing on whether the ELOM Direct Assessment has test-retest reliability, which involves testing the _same child_ on _two occasions,_ a week apart. It further focuses on whether the ELOM Teacher Assessment has concurrent validity with another rating scale completed by teachers, the Strengths and Difficulties Questionnaire (SDQ). Our research seeks to establish the concurrent validity of the two measures by comparing the teacher's ratings on the same child on the two measures.

Our request

1. We would like to assess 30 children _aged 55 to 69 months_. Each child will be tested on two occasions one week apart. It will take us approximately 4 weeks to assess all the children. We hope to assess 4 each morning.

When the research is completed, we will provide the school with a group profile of the children's performance on the ELOM. This can be used to inform the design of your curriculum. However, information about individual children will not be provided. All children will be screened for disabilities and if we pick up any problems that indicate that the child may need referral for a full assessment, we will notify the teacher. Testing will occur prior to mid-August. We can schedule the specific times, but Elizabeth has informed us that your school is expecting us in July.

2. We are also requesting that your teachers complete both the ELOM Teacher Assessment and the SDQ on each child in their class. Please find the SDQ attached.

It is important to note that we will not be testing any children.

The two instruments must be completed at the same time for each child. However, the exercise c*an extend over several weeks* and teachers can complete the instruments for their children at any time convenient prior 23 July 2019 (one child after the other until all are done). We are hoping to gather assessments on up to 15 children from your school *aged 55 to 69 months* for this part.

The estimated time to fill out both forms is 10 minutes. There are no foreseeable risks or benefits to teachers or the children in this exercise.

The teacher's themselves will not be assessed in any way but simply be rating the children on the scales provided.

We would be happy to provide information on the ELOM and SDQ.

We will request consent from parents/guardians prior to the assessment. No child's name will appear in the research project. All information will be confidential, as will the name of your school and teachers.

We would like to set up a brief meeting with you if possible, at your earliest convenience. This will allow us to show you the ELOM Teacher Assessment and provide any further clarification needed.

Our contact details:

Tiffany Henning: 082 750 0608 HNNTIF001@myuct.ac.za

Jasmin Moonsamy: 072 560 8122 MNSJAS001@myuct.ac.za

Looking forward to your response.

Kind Regards

Jasmin Moonsamy and Tiffany Henning

Appendix B: Follow-up email to preschools for Study 1 and 2

Good afternoon _____

We realised we may need to clarify one or two things from our earlier email. First, consent forms will be printed and brought to the school by us and then will need to be distributed to children by teachers. We will collect the forms from the teacher. Only once the forms have been returned to the teacher, will we begin testing. Consent forms can be provided electronically as well, if you would like to see them, or if that is easier for you to manage.

The children will only be tested for the test-retest reliability component of the study, in which the full ELOM is administered. Children will not be involved in the concurrent validity study, in which the teacher rates the children on their social and emotional functioning.

Contact details

Tiffany Henning 0827500608 HNNTIF001@myuct.ac.za

Jasmin Moonsamy 0725608122 MNSJAS001@myuct.ac.za

Kind Regards

Tiffany Henning and Jasmin Moonsamy

Appendix C: Ethical Approval from the University of Cape Town Faculty of

Humanities Ethics Committee

UNIVERSITY OF CAPE TOWN

Department of Psychology

University of Cape Town Rondebosch 7701 South Africa
Telephone (021) 650 3417
Fax No. (021) 650 4104

03 June 2019
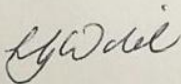
Jasmin Moonsamy and Tiffany Henning
Department of Psychology
University of Cape Town
Rondebosch 7701

Dear Jasmin and Tiffany

I am pleased to inform you that ethical clearance has been given by an Ethics Review Committee of the Faculty of Humanities for your study, *Early Learning Outcomes Measure (ELOM) Psychometry: Test-Retest Reliability of the ELOM Direct Assessment and the Concurrent Validity of the ELOM Teacher Assessment.* The reference number is PSY2019-024.

I wish you all the best for your study.

Yours sincerely

University of Cape Town
ΨPSYCHOLOGY DEPARTMENT
Upper Campus
Rondebosch

Lauren Wild (PhD)
Associate Professor
Chair: Ethics Review Committee

Appendix D: Informed Consent Form for parents/guardians for Study 1 and 2

UNIVERSITY OF CAPE TOWN FACULTY OF HUMANITIES: INFORMED CONSENT

Early Learning Outcomes Measure (ELOM) Study: Test Retest Reliability

Contact numbers to call should you want further information:

Tiffany Joy Henning HNNTIF001@myuct.ac.za 082 750 0608

Jasmin Roxanne Moonsamy MNSJAS001@myuct.ac.za 072 560 8122

Supervisor: Professor Andrew Dawes adkinloch1@gmail.com 082 422 9940

If you have any complaints, please email rosalind.adams@uct.ac.za as a point of contact with the Psychology Department at UCT.

Instructions:

Please read carefully. Ask somebody to help if you cannot understand.

We are conducting our honours thesis in Psychology at the University of Cape Town. We are trying out a new way of measuring children's development. We are going to measure a lot of children at your child's school. The study requires the same children to be tested twice at two different times one week apart. The University of Cape Town Ethics Committee has given their approval for this study.

We are going to measure:

1. Their coordination of movements;
2. Their ability to understand instructions and solve simple problems;
3. Their language development;
4. Their ability to count.

This will take about 45 minutes for each child. All children will be told that they can stop the assessment at any time if they do not want to continue. Our study also involves teachers providing feedback about your child's social and emotional functioning. Your child will not have to do anything for this part. You may choose for your child not to participate without any penalties or consequences. Your child's participation is also voluntary, and they may also choose not to participate or withdraw at any point. We will ask the children whether they agree to participate and if they say no, we will not continue. There are no foreseeable risks or benefits for the child. We will not report the results of the tests to anyone and everything will

be kept confidential. However, if we see that there is a serious health problem with a child, we will inform the teacher so that you can get help for your child. At the end of the research we will write a research report, but no child's name will appear in that report. The child's scores will be used for research purposes only and will remain confidential. On the next page we ask you whether you agree that your child can be assessed or not and if their information can be used in our study.

Thank you very much for completing the form.

PLEASE DO NOT FORGET TO GIVE IT TO YOUR CHILD TO BRING TO SCHOOL!

CONSENT FORM

VERY IMPORTANT: PLEASE SEND THIS FORM BACK TO SCHOOL WITH YOUR CHILD ON THE NEXT SCHOOL DAY. IF YOU DO NOT SEND IT BACK, WE SHALL ASSUME THAT YOU HAVE NO OBJECTIONS TO YOUR CHILD'S PARTICIPATION.

PLEASE PRINT THE NAME OF YOUR CHILD'S SCHOOL HERE: ……………………………………….   PLEASE PRINT YOUR CHILD'S NAME HERE: …………………………………………….
PLEASE READ: I understand that the tests will not harm my child and that they will measure the child's height, language ability, counting, and ability to solve some problems. I understand that the teacher will be providing information about my child's social and emotional functioning. I understand that the results of my child's tests will remain confidential. I understand that the child scores will be used for research purposes. I understand that I am not being forced to give permission for my child to be assessed. I also understand that my child will not be forced to participate, and nothing will happen to him or her if they do not want to. I also understand that neither I nor my child will be given anything for participating in the research.

PLEASE PRINT YOUR NAME HERE:	
IF YOU **AGREE** THAT YOUR CHILD CAN PARTICIPATE, MAKE AN **X** HERE:	

IF YOU **DO NOT AGREE** THAT YOUR CHILD CAN PARTICIPATE, <u>MAKE AN **X** HERE:</u>	

<u>PLEASE SIGN HERE:</u>

PLEASE FILL IN TODAY'S DATE HERE: DAY…………. MONTH ………………………. 2019

	YES	NO
Did <u>this</u> child attend a preschool (an 'ECD/Educate centre' or crèche) for the whole of last year? (Make an **X** in the block that applies to your child)		
Tiffany Joy Henning and Jasmin Roxanne Moonsamy's signatures		

Appendix E: Graphs for Study 1 and Study 2 assumptions

Study 1
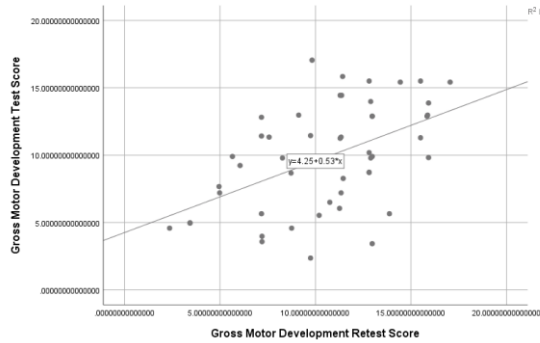
Figure 2. Gross Motor Development Test and Retest scatterplot
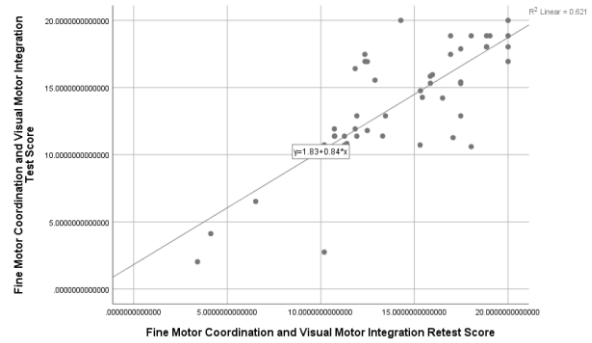
Figure 3. Fine Motor Coordination and Visual Motor Integration Test and Retest scatterplot
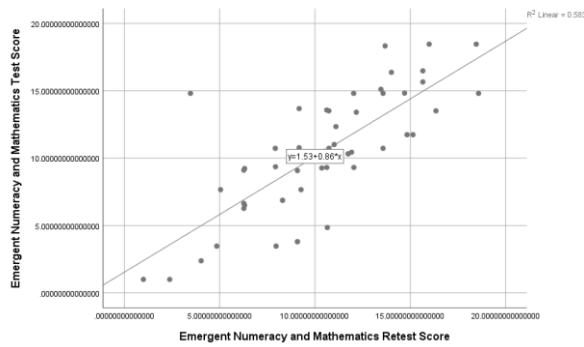
Figure 4. Emergent Numeracy and Mathematics Test and Retest scatterplot
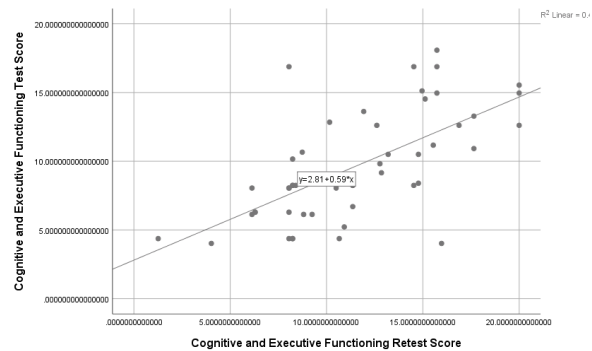
Figure 5. Cognitive and Executive Functioning Test and Retest scatterplot
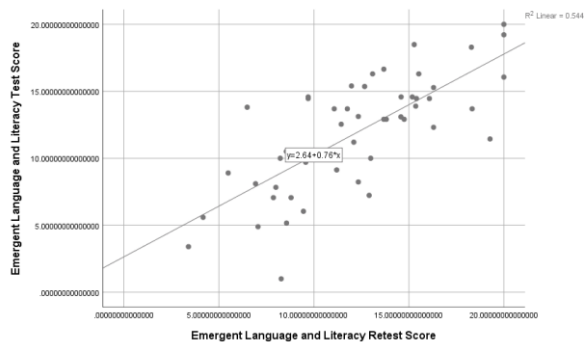
Figure 6. Emergent Language and Literacy Test and Retest scatterplot
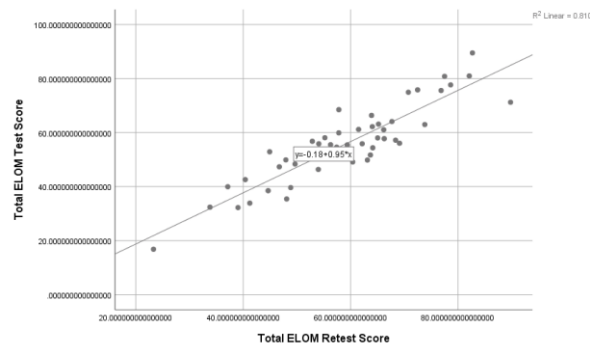
Figure 7. Total ELOM Scores Test and Retest scatterplot
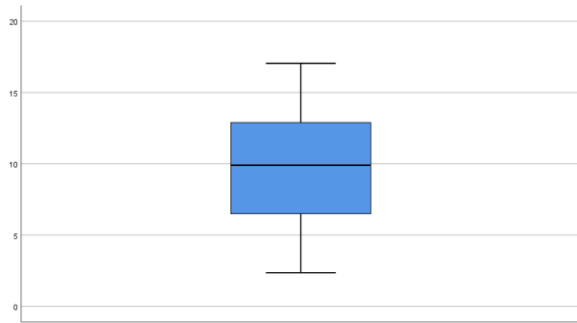
Figure 8. Gross Motor Development Test Score boxplot
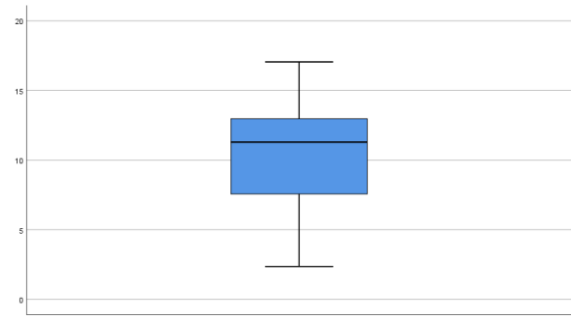
Figure 9. Gross Motor Development Retest Score boxplot
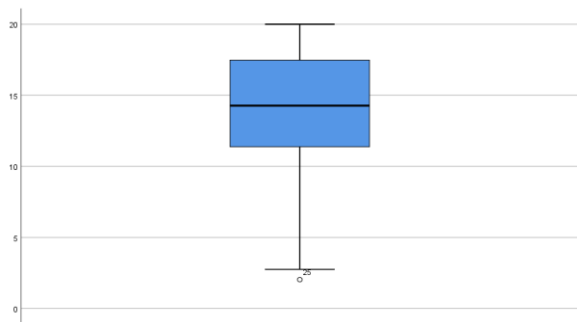
Figure 10. Fine Motor Coordination and Visual Motor Integration Test Score boxplot
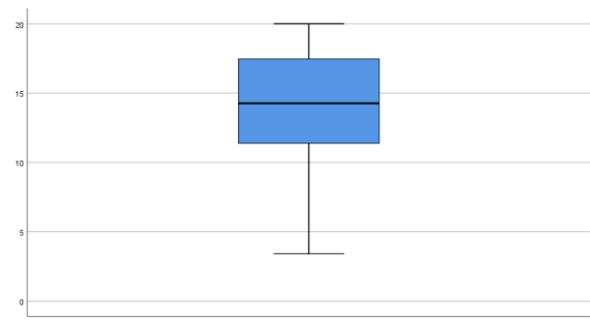
Figure 11. Fine Motor Coordination and Visual Motor Integration Retest Score boxplot
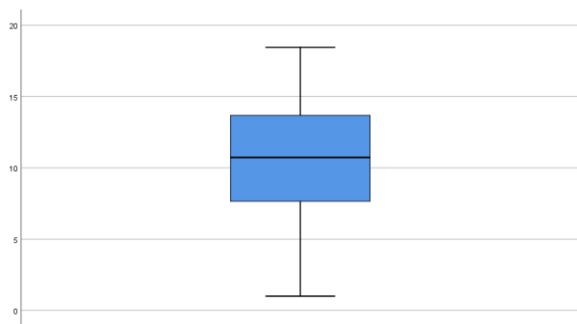
Figure 12. Emergent Numeracy and Mathematics Test Score boxplot
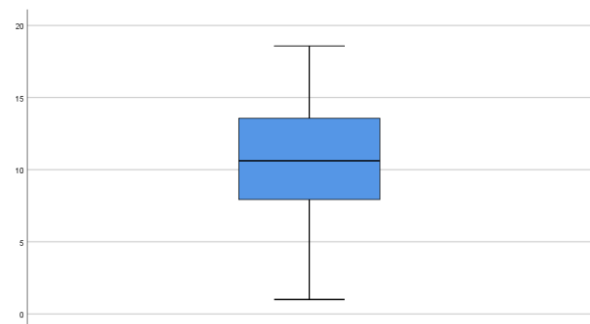
Figure 13. Emergent Numeracy and Mathematics Retest Score boxplot
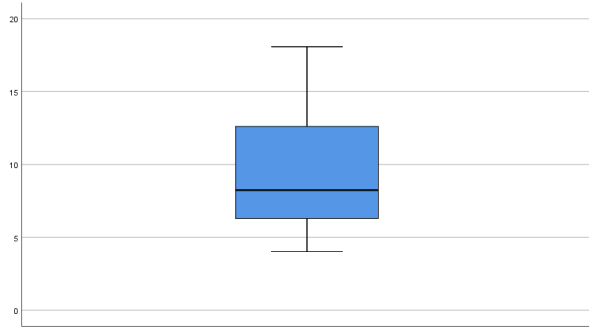
Figure 14. Cognitive and Executive Functioning Test Score boxplot
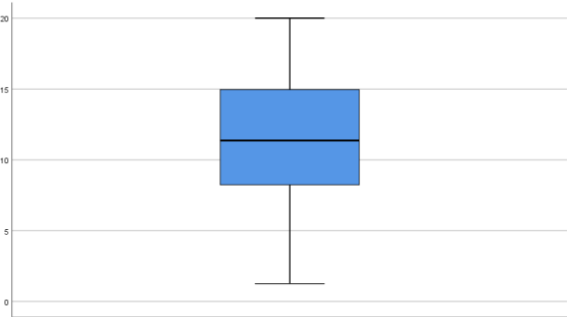
Figure 15. Cognitive and Executive Functioning Retest Score boxplot
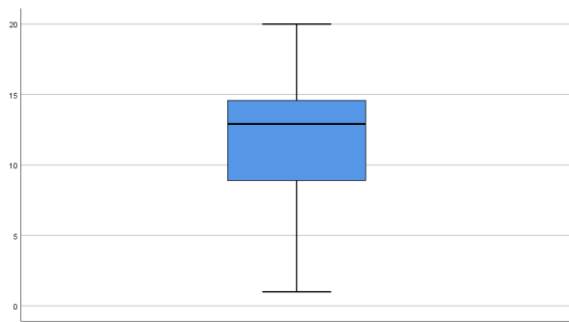
Figure 16. Emergent Language and Literacy Test Score boxplot
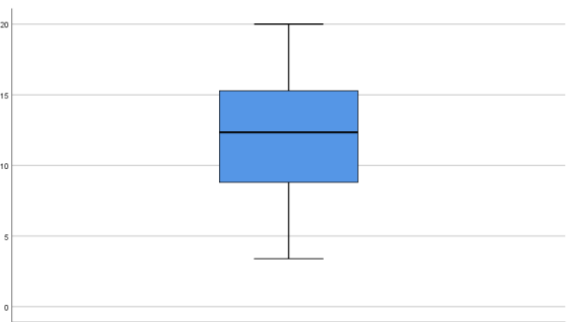
Figure 17. Emergent Language and Literacy Retest Score boxplot
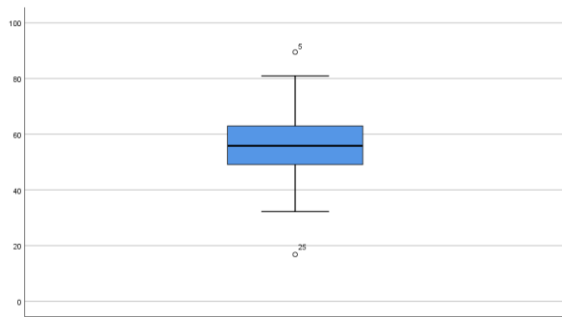
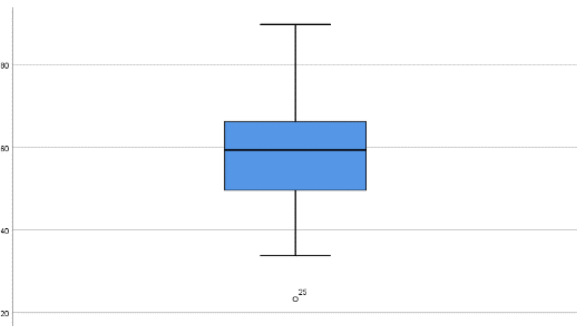
Figure 18. Total ELOM Test Score boxplot

Figure 19. Total ELOM Retest Score boxplot
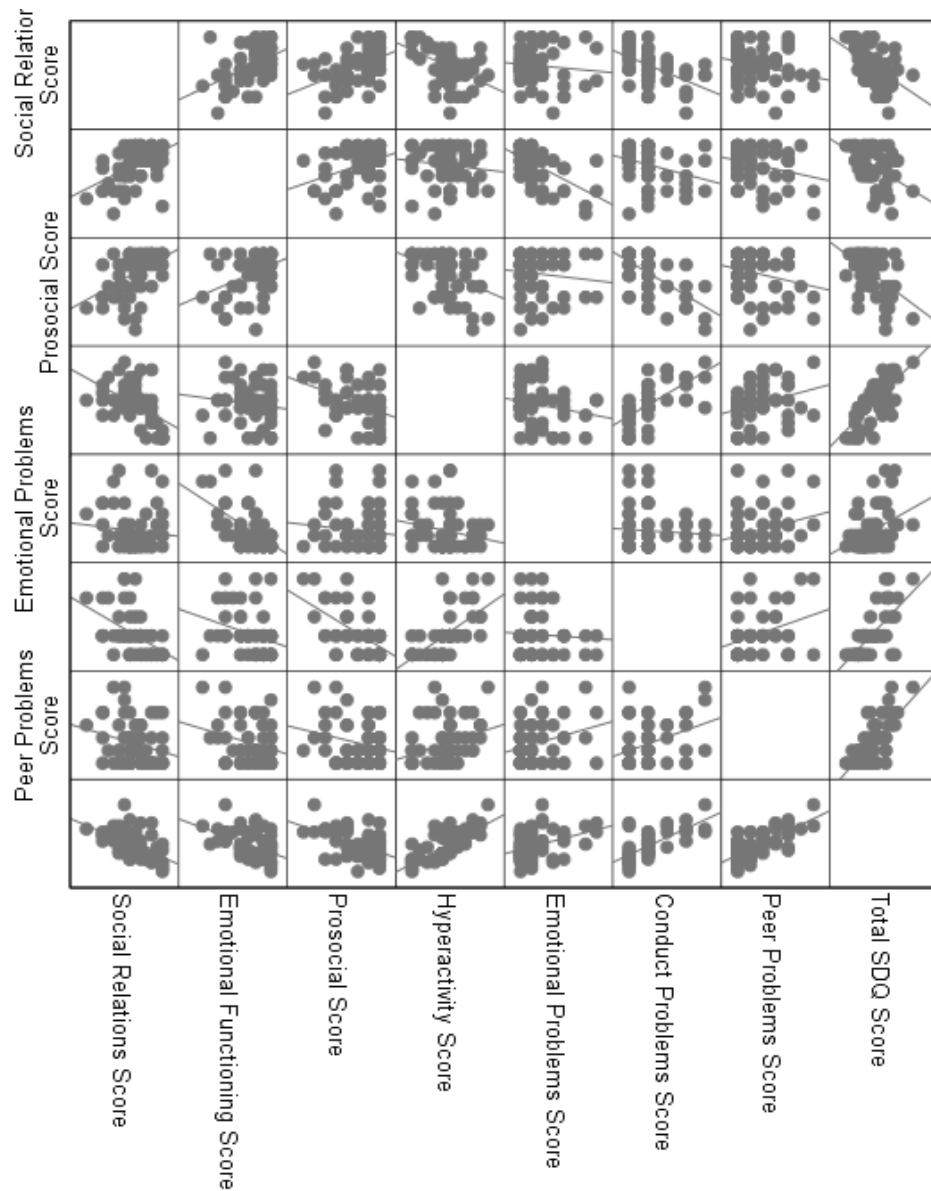
Study 2

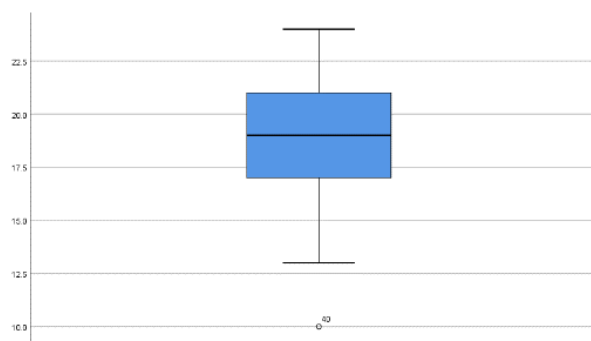*Figure 20.* Teacher Assessment and SDQ scales scatterplot matrix

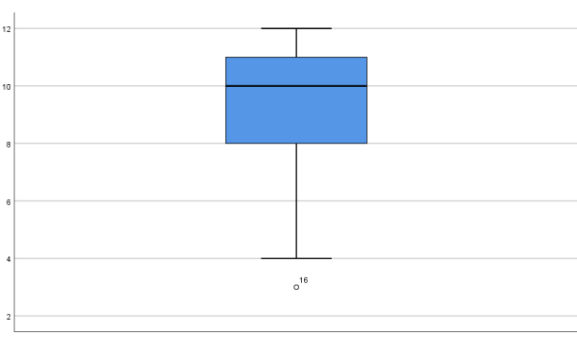*Figure 21.* Teacher Assessment Social Relations
Score boxplot

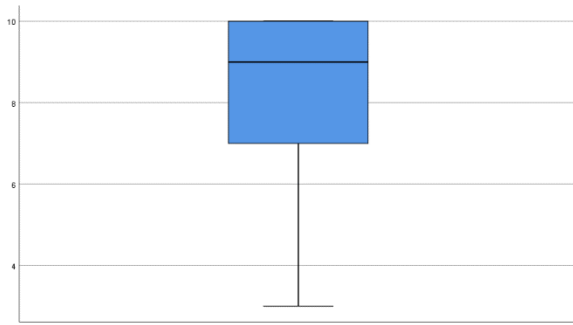*Figure 22.* Teacher Assessment Emotional
Functioning Score boxplot
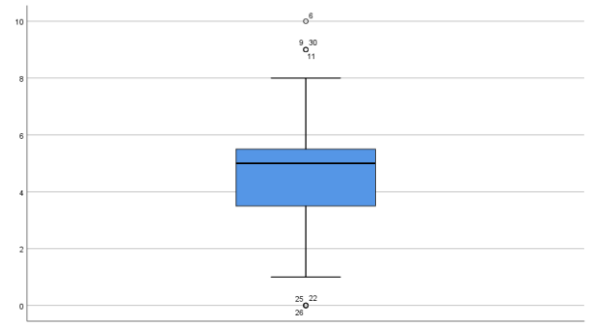
Figure 23. SDQ Prosocial Score boxplot
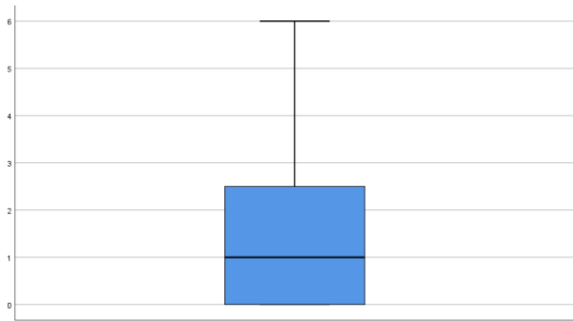

Figure 24. SDQ Hyperactivity Score boxplot

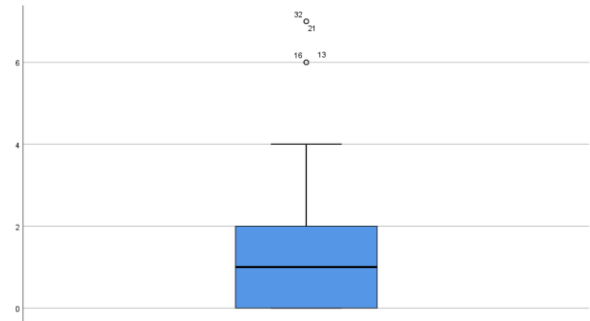*Figure 25.* SDQ Peer Problems Score boxplot

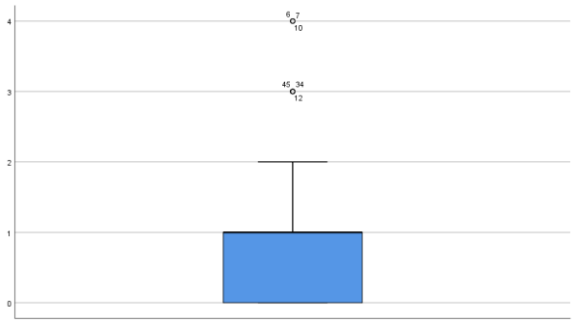*Figure 26.* SDQ Emotional Problems Score boxplot

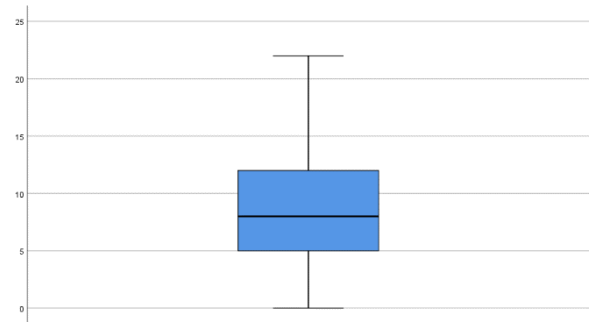*Figure 27.* SDQ Conduct Problems Score boxplot

Figure 28. Total SDQ Score boxplot

Appendix F: Email to the Quintile 5 preschool where only Study 2 was conducted.

We, Jasmin Roxanne Moonsamy and Tiffany Joy Henning, are conducting our Honours thesis in Psychology at the University of Cape Town under the supervision of Professor Andrew Dawes.

Professor Dawes and his team recently developed the Early Learning Outcomes Measure (ELOM), which is being used around the country to assess children's development and also the effects of ECD programmes on their development. For further information please see: elom.org.za

We attach the ELOM briefing document that outlines the nature of the ELOM. There are two components:

· Direct Assessment of the child: requires the Direct Assessment of the child's development through administering various tests.

· Teacher Assessment of the child's social and emotional functioning on short rating scales.

Our research project is focusing on whether the ELOM Teacher Assessment has concurrent validity with another rating scale completed by teachers, the Strengths and Difficulties Questionnaire (SDQ). Our research seeks to establish the concurrent validity of the two measures by comparing the teacher's ratings on the same child on the two measures.

Our request

We are requesting that your teachers complete both the ELOM Teacher Assessment and the SDQ on each child in their class.

It is important to note that we will not be testing any children.

The two instruments must be completed at the same time for each child. However, the exercise can extend over several weeks and teachers can complete the instruments for their children at any time convenient prior to the end of the second term (14 June) (one child after the other until all are done). We are hoping to gather assessments on up to 50 children.

The estimated time to fill out both forms is 10 minutes.

We will request consent from parents/guardians prior to the assessment because even though the children will not be required to be tested, information about the social and emotional functioning of the child will be collected. No child's name will appear in the research project. The teacher's themselves will not be assessed in any way but simply be rating the children on the scales provided. All information will be confidential as will the name of your school.

There are no foreseeable risks or benefits to teachers or the children in this exercise. We would be happy to provide information on the ELOM and SDQ.

We would like to set up a brief meeting with you within this week if possible? When we meet, we can show you the ELOM Strengths and Difficulties Questionnaire and Teacher Assessment.

Looking forward to your response.

Contact details

Tiffany Henning 0827500608 HNNTIF001@myuct.ac.za

Jasmin Moonsamy 0725608122 MNSJAS001@myuct.ac.za

Kind Regards

Tiffany Henning and Jasmin Moonsamy

Appendix G: Informed Consent Form for Parents/Guardians for Study 2 Only

UNIVERSITY OF CAPE TOWN FACULTY OF HUMANITIES: INFORMED CONSENT

Early Learning Outcomes Measure (ELOM) Study: Concurrent Validity

Contact numbers to call should you want further information:

Tiffany Joy Henning HNNTIF001@myuct.ac.za 082 750 0608

Jasmin Roxanne Moonsamy MNSJAS001@myuct.ac.za 072 560 8122

Supervisor: Professor Andrew Dawes adkinloch1@gmail.com 082 422 9940

If you have any complaints, please email rosalind.adams@uct.ac.za as a point of contact with the Psychology Department at UCT.

Instructions:

Please read carefully. Ask somebody to help if you cannot understand.

We are conducting our honours thesis in Psychology at the University of Cape Town. We are trying out a new way of measuring children's social and emotional development. To do this we will be asking your child's teacher to rate your child's social and emotional behaviour on a short questionnaire. We will not do any testing with your child. All information we collect from the teachers will remain confidential and will not be disclosed to anyone. The University of Cape Town Ethics Committee has approved the study.

At the end of the research we will write a research report. The name of the school, the teacher and the child will not appear in that report.

On the next page we ask you whether you agree that your child can be assessed or not and if their information can be used in only our study.

Thank you very much for completing the form.

PLEASE DO NOT FORGET TO GIVE IT TO YOUR CHILD TO BRING TO SCHOOL

CONSENT FORM

VERY IMPORTANT: PLEASE SEND THIS FORM BACK TO SCHOOL WITH YOUR CHILD <u>ON THE NEXT SCHOOL DAY. IF YOU DO NOT SEND IT BACK, WE SHALL ASSUME THAT YOU HAVE NO OBJECTIONS TO YOUR CHILD'S PARTICIPATION.</u>

PLEASE PRINT THE NAME OF YOUR CHILD'S SCHOOL HERE:

……………………………………….

PLEASE PRINT YOUR CHILD'S NAME HERE:

………………………………………………..

PLEASE READ:

I understand that my child will not be participating in any test and that my child's teacher will rate my child's social and emotional behaviour on a short questionnaire. I understand that the results will remain confidential. I understand that the child's scores will be used for research purposes.

I understand that I am not being forced to give permission for my child to be rated by the teacher. I understand that neither I nor my child will be given anything for participating in the research.

PLEASE PRINT YOUR NAME HERE:	
IF YOU **AGREE** THAT YOUR CHILD'S SOCIAL AND EMOTIONAL DEVELOPMENT CAN BE RATED BY THE TEACHER, <u>MAKE AN **X** HERE:</u>	
IF YOU **DO NOT AGREE** THAT YOUR CHILD'S SOCIAL AND EMOTIONAL DEVELOPMENT CAN BE RATED BY THE TEACHER, <u>MAKE AN **X** HERE:</u>	

<u>PLEASE SIGN HERE:</u>

PLEASE FILL IN TODAY'S DATE HERE: DAY………….   MONTH ………………………….. 2019

Did <u>this</u> child attend a preschool (an 'ECD/Educare centre' or crèche) for the whole of last year? (Make an **X** in the block that applies to your child)	**YES**	**NO**
Tiffany Joy Henning and Jasmin Roxanne Moonsamy's signatures	**T. J. Henning**	

Appendix H: Informed Consent Form for Teachers for Study 2

UNIVERSITY OF CAPE TOWN FACULTY OF HUMANITIES: INFORMED CONSENT

Early Learning Outcomes Measure (ELOM) Study: Teacher Informed Consent

Contact numbers to call should you want further information:

Tiffany Joy Henning HNNTIF001@myuct.ac.za 082 750 0608

Jasmin Roxanne Moonsamy MNSJAS001@myuct.ac.za 072 560 8122

Supervisor: Professor Andrew Dawes adkinloch1@gmail.com 082 422 9940

If you have any complaints, please email rosalind.adams@uct.ac.za as a point of contact with the Psychology Department at UCT.

Instructions:

We are conducting our Honours thesis in Psychology at the University of Cape Town. Professor Dawes and his team recently developed the Early Learning Outcomes Measure (ELOM), which is being used around the country to assess children's development and also the effects of ECD programmes on their development. A focus of our research project includes whether the ELOM Teacher Assessment has concurrent validity with another rating scale completed by teachers, the Strengths and Difficulties Questionnaire (SDQ). This involves comparing the teacher's ratings about a child's social and emotional functioning on the same child on the two measures. We will not be testing any children for this component of the study. The University of Cape Town Ethics Committee have given their permission. We are requesting that you complete both the ELOM Teacher Assessment and the Strengths and Difficulties Questionnaire (SDQ) on each child in your class. The two instruments must be completed at the same time for each child. This can extend over several weeks, at any time convenient prior to the 23rd of July.

We will request consent from parents prior to the ratings. All information will be confidential as will your name, the children's names and the name of your school – it will not appear in the research project. The data you provide will only be used in this project. Your participation is voluntary. You may choose not to participate and withdraw from this study at any stage without any penalties or consequences. A possible inconvenience could be the amount of

time it takes to fill out the questionnaires (estimated time of 5 minutes per child). There are no foreseeable risks or benefits to teachers or the children. On the next page we ask you whether you agree to participate in this study and if the information can be used in only this study.

Thank you very much for completing the form.

CONSENT FORM

PLEASE PRINT THE NAME OF YOUR SCHOOL HERE: ……………………………………….
PLEASE READ: I understand the above and consent to participate in this study voluntarily and to the data being used in this research project as stated.   I understand that my feedback, name, children's names and school's name will remain confidential. I understand that I am not being forced to participate. I also understand that nothing will happen to me if I do not want to. I understand that I will not be given anything for participating in this research.

PLEASE PRINT YOUR NAME HERE:	
IF YOU **AGREE** TO PARTICIPATE, <u>MAKE AN **X** HERE:</u>	
IF YOU **DO NOT AGREE** TO PARTICIPATE, <u>MAKE AN **X** HERE:</u>	
<u>PLEASE SIGN HERE:</u>	
PLEASE FILL IN TODAY'S DATE HERE: DAY…………. MONTH …………………………. 2019	
Tiffany Joy Henning and Jasmin Roxanne Moonsamy's signatures	