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Can social inclusion be evaluated? Investigating the psychometric properties of the social inclusion intervention scale

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ABSTRACT: The present study aims to validate a newly developed Social Inclusion Intervention Scale (SIIS) using Exploratory Factor Analysis and Confirmatory Factor Analysis. The participants were 128 children aged 45-84 month-old from local integrated preschools in Hong Kong. The factor structure of the SIIS fit the data well (RMSEA = .08, NFI = .92, and TLI = .95, CFI = .96, SRMR = .04), with good convergent validity (all CR values > .92, all AVE values > .61). The internal consistency was good across items (all α values > .91) and factors (all CR values > .92). Hence, the sample obtained from the clinical trials of this study showed a good model fit, which suggested that the SIIS is adequate in measuring social inclusion among preschool children in social inclusion intervention programmes. The implications of the two emerged themes of social inclusion from the findings, Relationships and Acceptance, are further discussed to ascertain how they shed light on the design of social inclusion intervention.

Keywords: *social inclusion, intervention efficacy, confirmatory factor analysis (CFA), preschoolers.*

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Introduction

There has been a worldwide policy shift to advance the objectives of Education for All and to promote the implementation of inclusive education since the Salamanca world conference (UNESCO, 1994), resulting in a continuous upward demand for school placements in mainstream preschool settings in different countries (Graham & Jahnukainen, 2011; Sin, 2010). Consequently, more inclusive education intervention programmes have been conducted and their efficacy examined through inclusive education research studies (Lai & Zhang, 2014; Lindsay, 2007). While it may be easier to ensure the physical inclusion of children with special needs in preschool settings by the enrolment statistics of children aged 4 to 6 years, it may be more difficult to evaluate the extent of social inclusion in these integrated preschool settings.

According to the meta-analysis by Koster et al. (2009), the construct of social inclusion can be defined using four sub-themes: (1) friendship relationships between children with and without special needs; (2) reciprocated interactions between children with and without special needs; (3) social acceptance status in class; and (4) self-perception by children with special needs of being accepted by their classmates. Based on these four sub-themes, various assessment measures for social inclusion, in the form of Likert rating scales, questionnaires, and checklists, have been developed (Tsang & Cheng, 2017). For example, the Social Participation Questionnaire (Koster et al., 2009) measured peer acceptance, friendship, peer interaction, and self-perception of social inclusion among primary students with special needs; the Acceptance Scale for Kindergarteners (ASK) developed by Favazza and Odom (1997) to assess the attitude of 5- to 6-year-old children towards their peers with special needs. In practice, the ASK was used in combination with other observational methods in order to more comprehensively reflect the multi-dimensions of social inclusion. To assess peer relationships, sociometric techniques such as sociograms or peer nomination tests were simultaneously used to determine intervention effectiveness by comparing the nature and degree of peer relationships among participating students (Endedijk & Cillessen, 2015; Jiang & Cillessen, 2005; Kemp & Carter, 2002; Mikami et al., 2013; Pijl et al., 2008). Other researchers used combined sociometric ratings and direct observations of children's engagement and interaction, along with interviews with the children regarding peer acceptance to reflect the status of social inclusion (Guralnick et al., 2007; Hunt et al., 2002). There seems to be a need to develop a comprehensive measure that assesses the multi-dimensions of social inclusion for preschoolers.

In the past attempts to put the concept of social inclusion into practice, the focus was seemingly more inclined towards providing social interaction opportunities for children with and without special needs in integrated preschool settings (Dietrich, 2005). The premise is that the other aspects of social inclusion, such as social acceptance and

friendship-building, will naturally come when children with and without special needs interact more in the shared activities. In reality, in spite of having more opportunities to socially interact in integrated preschool settings, children with special needs are still found to spend more time alone than their neurotypical peers (Hall & McGregor, 2000). Furthermore, they are more likely to be socially rejected (Odom et al., 2006) or have fewer reciprocal relationships (Buysse et al., 2002).

So far, among the few social inclusion studies which have reported the efficacy of social inclusion intervention programmes in integrated preschool settings (Gena, 2006; Sainato et al., 2015), the change in social interaction skills was the primary indicator adopted to evaluate the social inclusion performance of the children in intervention programmes (Stanton-Chapman & Brown, 2015). A systematic review of social inclusion interventions by Tsang and Cheng (2017) found that self-initiated social interaction to peer, response to interaction requests, and duration of engaging in an interaction were the most common outcome indicators. Four of the 10 studies found that the participants increased the number of self-initiated social interactions, the length of the engagement during play sessions, the commenting behaviour, and verbal and non-verbal requests (Chan & O'Reilly, 2008; Nelson et al., 2007; Woods & Poulson, 2006). Based on these findings, social interactive skill is an essential indicator of social inclusion performance.

Does the dimension of social interaction alone represent social inclusion and thus adequately indicate the intervention efficacy? Should the other dimensions of social inclusion be adopted as well to comprehensively evaluate the intervention efficacy? What are the implications for intervention design when other dimensions of social inclusion are assessed? These questions prompted our study to develop a valid social inclusion evaluation tool, the Social Inclusion Intervention Scale (SIIS), which aims to tap into the multi-dimensions of social inclusion. We hypothesize that the SIIS can adequately reflect the multi-dimensions of social inclusion performance in both children with and without special needs in integrated preschool settings.

Literature review

According to Koster et al. (2009), the four sub-themes of social inclusion are closely associated with one another. Interactions are the most basic complementary social exchanges between two children (Devine & Dattilo, 2000; Devine & Lashua, 2002). On the next level, Relationships refer to a set of sustained interactions that take place within a children dyad who are known to each other. The more complex level is Social Acceptance, which refers to a network of relationships between children groups that exerts equal status and valued treatment within the groups (Rubin et al., 2006). Finally, self-perception

of social status in a social group highlights the sense of self-control in engaging in a social group (Freitag & Dunsmuir, 2015).

So far, there are two theoretical frameworks that account for the associations between the sub-themes and the overall construct of social inclusion. First, the Social Capital theory asserts the ability of people to garner benefits in a form of human, physical, cultural, or symbolic benefits by virtue of engagement in a social group (Devine & Parr, 2008). Social capital is based on the norms of reciprocity and trust. Relationships become the capital in children when trust and reciprocity are present during their interaction, and, the capital provides access to the desired benefits of social inclusion (Glover & Hemingway, 2005). Despite having special needs, children still possess a diversity of strengths that act as social capital to gain social acceptance in a social group. For example, some children with Autism Spectrum Disorders (ASD) are particularly talented in music, art, or mathematics. Acknowledging their strengths within the social group may help them gain social acceptance and in turn improve their self-perception of being accepted by peers in integrated preschool settings.

In addition, the Theory of Planned Behaviour proposes that social inclusion performance can be predicted by "behavioural intentions", mediated by the child's own "subjective awareness" of the social expectations to socially accept the behaviour and the "perceived behavioural control" over carrying out social inclusion (Freitag & Dunsmuir, 2015). Hence, the influence of the child's own attitudes towards working with peers with special needs, and the subjective awareness of their teachers' or parents' social expectations are used to predict the children's social inclusion performance towards their peers with special needs. The theory explains how social inclusion indicators, such as inclusive attitudes as behavioural intentions in preschool children, are valid in evaluating social inclusion performance in integrated preschool settings.

These theoretical frameworks steer the design of social inclusion intervention strategies. For instance, by providing children with greater knowledge of the individual differences in the strengths and weaknesses of their peers, and equipping them with appropriate inclusive prosocial behaviours. The social inclusion intervention strategies may increase the perceived behavioural control among the children with and without special needs. This may further result in more positive behavioural intentions and more positive friendship-building behaviours among them (Laws & Kelly, 2005).

Methods

Participants

The participants were K2 or K3 preschoolers aged between 4 and 6 years old (*M* = 4.94; *SD* = .68), who were enrolled in the integrated preschool settings in Hong Kong. Ten preschools were contacted and four gave consent to participate in the current study. A total of 128 students (57 girls and 71 boys) with and without special needs were recruited. According to the preschools' records, 34 students were diagnosed with special needs (i.e., Autism; Attention-deficit/hyperactive Disorder; Developmental Delay; Speech and language Delay; Comorbid Developmental Delay with Speech and Language Delay) and 94 students had no special needs. The socio-demographic characteristic of the students from each preschool are shown in Table 1.

TABLE 1 Participants' descriptive statistics of the four participated preschools

		AGE (MONTHS)		*BOY*	*GIRL*	*SN*	*NON-SN*
PRESCHOOL	*GRADE*	*N*	*M (SD)*	*N (%)*	*N (%)*	*N (%)*	*N (%)*
A	K2	31	53.45 (4.27)	17 (55%)	14 (45%)	10 (32%)	21 (68%)
B	K2	35	52.06 (3.91)	19 (54%)	16 (46%)	6 (17%)	29 (83%)
C	K3	28	65.21 (5.61)	17 (61%)	11 (39%)	10 (36%)	18 (64%)
D	K3	34	66.53 (5.53)	18 (53%)	16 (47%)	8 (24%)	26 (76%)

Note: N = number of participants; *M* = Mean; *SD* = Standard deviation; SN = Special Needs.

Measures

The Social Inclusion Intervention Scale (SIIS)

We implemented the following three steps to develop the content of the SIIS. Firstly, we examined the item content of the existing social inclusion instruments, including the "Acceptance Scale for Kindergartens (ASK)" from the study of Favazza and Odom (1996), the "Social Participation Questionnaire (SPQ)" from the study of Koster et al. (2009), the "Social Communication Behavioural Assessment (SCBA)" from the SAHK (2014), and the "Assessment of Social and Communication Skills for Children with Autism (ASCS)" from the study of Quill (1997). As a result, we included items for the construct of social inclusion in the SIIS in four aspects, namely the ability to 'relate' well to one another, 'interact' reciprocally with one another, 'value' the strength of self and others, and 'appreciate' the positive behaviours of oneself and others respectively.

Secondly, we developed the items that adhered to the four aspects. Examples of SIIS items included: Item 9, "Identify the appropriate behaviour for treating a good friend" in 'relate', which was adapted from ASCS (Quill, 1997); Item 2, "Respond to others' greeting" in 'interact', which was adapted from SCBA (SAHK, 2014); Item 5, "Understand the capabilities of oneself " in 'value', which was adapted from SPQ (Koster et al., 2009). A four-point Likert scale (0 = *never (0%)*; 1 = *rarely (<50%)*; 2 = *sometimes (50-80%)*; 3 = *always (>80%)*) was used to measure the 18 items. Lastly, the SIIS underwent an expert review by a panel of three special needs educators who assessed its relevance and came to 80% agreement regarding its content.

Procedures

The original version of the SIIS was written in Chinese. A back-translation procedure was adopted (Brislin, 1970; Chen & Boore, 2010). The Research Ethics Review Board of The Education University of Hong Kong approved this study prior to sampling. Invitation letters for the study were first sent to a thousand local kindergartens by electronic fax. The principals of the interested preschools were then contacted and asked to give consent to participate in this study. The written informed consent was obtained from the parents of all the participants (N = 128) prior to the study. The teachers of 128 participants completed the questionnaires according to their observation of the children's reciprocated interaction in the past four weeks. Two of the four classes (schools C and D) were selected and the teachers of these classes completed the questionnaire 4 weeks later to examine the test–retest reliability (participation rate = 100%).

Statistical analysis

Data analysis was performed using SPSS 26 software. We first conducted a missing value analysis. Then we conducted exploratory factor analysis (EFA) using a principal factor estimation method and oblique rotation. In order to eliminate the issue of sample size, the Kaiser-Meyer-Olkin (KMO) value should be bigger than .5. Moreover, the factor loading of each item must be higher than .3. Afterwards, we could take the final factor model from EFA as the initial factor model for the confirmatory factor analysis (CFA) using AMOS 26 software.

Then, the Modification Index (MI) was used to add additional meaningful structural parameters. The Goodness-of-Fit Index (GFI), Chi-Square to degree of Freedom (χ^2/df), Root Mean Square Error of Approximation (RMSEA), Normed Fit Index (NFI), Tucker-Lewis Index (TLI), Comparative Fit Index (CFI), and the Standardised Difference between the Observed Correlation and the Predicted Correlation (SRMR) were examined. The usual cut-off values for well-fitted factor models are lower than 3.0 for χ^2/df, larger than .90 for GFI, CFI, NFI, and TLI, and lower than .08 for RMSEA (Awang, 2015).

Lastly, model diagnosis was conducted to detect model issues and to identify the poorly fitted relationships. This was done by examining the estimated factor loadings and correlations between latent variables, measurement errors, and the standardized residual variance–covariance matrices. Item redundancy was also examined by inspecting the MI for model fit improvement. Any MI value for a pair of correlated errors exceeding 15.00 justifies either (a) the deletion of one of the two redundant items with a factor loading under .60 or (b) the setting of the two correlated measurement errors of redundant items as a "free parameter estimate" under the same latent construct (Awang, 2015). Subsequently, a new measurement model would be rerun to improve the model fit.

After evaluating and improving the model fit, the internal consistency of items in each factor was estimated by Cronbach's alpha (α). In general, the internal consistency is considered to be excellent if $\alpha \geq .90$, and it is considered to be good if $.70 \leq \alpha < .90$. According to Koo and Li (2016), for test-retest reliability, based on the 95% confidence interval of the Intraclass Correlation coefficient (ICC) estimated by the Paired Sample t-test, values greater than .90, between .75 and .90, between .50 and .75, and less than .50 are indicative of excellent, good, moderate, and poor reliability, respectively. The independent mean differences of gender, grade, and diagnostic type were further examined by an Independent Sample t-test.

Subsequently, the convergent and discriminant validity were computed using the procedure and formulas suggested by Colwell (2016), Gaskin (2013), and Raykov (1997). In this method, the convergent validity, Average Variance Extracted (AVE), should be equal to or greater than .50 and lower than Composite Reliability (CR). For discriminant validity, AVE should be greater than Maximum Shared Squared Variance (MSV). Lastly, the internal consistency of the factors was obtained from the (CR) with values greater than .70 indicating good reliability.

Results

Exploratory factor analysis

The current data had no missing value. Besides, the KMO measure of sample size was .93 indicating that no sample size issue was found. The minimum sample requirement of 100 was fulfilled by at least three items (i.e., Factor 1's items = 11, Factor 2's items = 7) in each latent construct and a maximum of five latent constructs (i.e., Factor 1 and Factor 2; Hair Jr et al., 2010).

The SIIS items, factor loading, and distribution of the original SIIS aspects are shown in Table 2. The EFA only loaded the items into two latent constructs (i.e., Factor 1 and Factor

2), which trimmed the original SIIS aspects from four (i.e., Relate, Interact, Value, and Appreciate) down to two. Most of the items in 'relate', 'interact' and 'value' were loaded on Factor 1. Most of the items in 'appreciate' were loaded on Factor 2. Factors 1 and 2 were named as 'Relationships' and 'Acceptance' respectively.

TABLE 2 Items' factor loading of social inclusion intervention scale from exploratory factor analysis

ITEMS OF SIIS	*FACTOR LOADING*		*ORIGINAL SIIS ASPECTS*
	FACTOR 1	*FACTOR 2*	
1. Proactively greet others	.93	-	Interact
2. Respond to others' greeting*	.74	-	Interact
3. Proactively provide positive feedback to others	.70	-	Appreciate
4. Provide help and support when seeing others expressing negative emotion and inappropriate behaviour	.76	-	Value
5. Understand the capabilities of oneself	.73	-	Value
6. Understand the abilities/strengths of others	.77	-	Value
7. Show appreciation of others' strengths	.88	-	Value
8. Encourage others to overcome their difficulties	.85	-	Interact
9. Identify the appropriate behaviour of treating a good friend (such as, companionship/playing together/hanging out)	.88	-	Relate
10. Treat others as one would to a good friend	.90	-	Relate
11. Invite others to be friends	1.02	-	Relate
12. Use gestures (such as, quiet/listen) to redirect others during class	-	.90	Appreciate
13. Respond to others' gestures (such as, quiet/listen reminder) accordingly during class*	-	1.00	Appreciate
14. Recognize the positive and negative responses from others	-	.54	Relate
15. Recognize one's behaviour that will affect others' emotion	-	.71	Interact
16. Identify the intention of others' behaviour	-	.60	Appreciate
17. Show understanding of others' inappropriate behaviour	-	.56	Appreciate
18. Restrict oneself from irritating others	-	.60	Value

Note: SIIS=social inclusion intervention scale.

*Children's responses can be verbal or non-verbal (e.g. giving a thumb-up or high-five, patting gently, and hand in a tissue).

Confirmatory factor analysis

Two 2-factor (i.e., Relationships and Acceptance) models with the factor loading, item numbers (SIIS xx), and correlated measurement errors (e x) are shown in Figure 1.

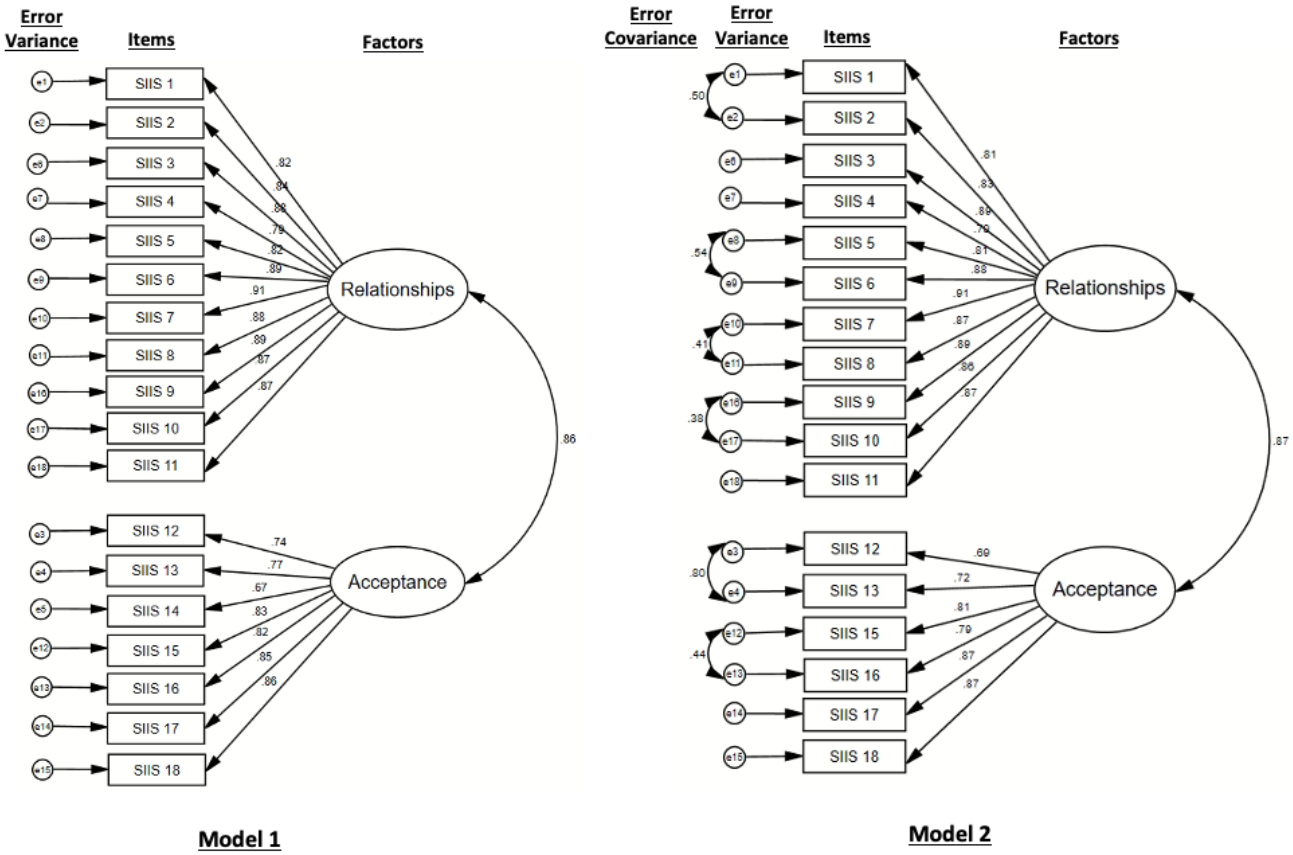

FIGURE 1 Factor structures of the social inclusive intervention scale

Note. SIIS01: Proactively greeting others; SIIS02: Respond to others' greeting; SIIS03: Proactively provide positive feedback to others; SIIS04: Provide help and support when seeing others expressing negative emotions and inappropriate behaviour; SIIS05: Understand the capabilities of oneself; SIIS06: Understand the abilities of others; SIIS07: Shows appreciation of others' strengths; SIIS08: Encourage others to overcome their difficulties; SIIS09: Identify the appropriate prosocial behaviour towards a good friend; SIIS10: Treating others as one would a good friend; SIIS11: Invite others to be friends; SIIS12: Use gestures (such as, quiet/listen) to redirect others during class; SIIS13: Response to others' gestures (such as, quiet/listen reminder) accordingly during class; SIIS14: Recognize the positive and negative responses from others; SIIS15: Recognize one's own behaviour that will affect others' emotions; SIIS16: Identify the intention of others' behaviour; SIIS17: Show understanding of others' inappropriate behaviour; SIIS18: Restrict oneself irritating others.

Modification for model selection

First, when the factor loading of 18 items of Model 1 (see Figure 1) was examined, it was found that all of the SIIS items of the model passed the cut-off point of > .60 (Awang, 2015). Second, we compared the fit indices (see Table 3) for Model 1, and the fit indices of χ^2/df = 3.87, RMSEA = .15, NFI = .81, TLI = .83, CFI = .85, and SRMR = .05. The hypothesized model yielded a poor fit to the data.

Next, a close examination of the MI was performed. Seven pairs of correlated measurement errors were found to be higher than 15.00 (i.e., e1<->e2 = 33.51; e3<->e4 = 87.46; e5<->e6 = 20.53; e8<->e9 = 37.69; e10<->e11 = 21.42; e12<->e13 = 22.00; e16<->e17 = 20.23), which indicated the existence of redundant items in Model 1. Six of the seven pairs (e1<->e2; e3<->e4; e8<->e9; e10<->e11; e12<->e13; e16<->e17) were set as "free parameter estimate", except for the pair of e5 and e6, as they were located in different latent constructs. The item of e5 (i.e., SIIS 14) was deleted to improve the model as its factor loading (i.e., .67) was close to the cut-off point.

Subsequently, Model 2 was generated (see Figure 1). The steps examining the factor loadings and MI of the model were repeated. The fit indices are presented in Table 3. All items in Model 2 passed the cut-off point (i.e., .60). The fit indices of χ^2/df = 1.84, RMSEA = .08, NFI = .92, TLI = .95, CFI = .96 and SRMR = .04. This time, all fit indices of Model 2 demonstrated a good fit with good construct validity. Therefore, we selected Model 2 as the final SIIS model.

TABLE 3 Fit Indices of the SIIS' two-factor models of confirmatory factor analysis

	FIT INDICES					
	CHISQ/DF	*RMSEA*	*NFI*	*TLI*	*CFI*	*SRMR*
Model 1	3.87	.15	.81	.83	.85	.05
Model 2	1.84	.08	.92	.95	.96	.04

Note. SIIS=social inclusion intervention scale; CHISQ/df=chi-square/degree of freedom; RMSEA=root mean square error of approximation; NFI=normed fit index; TLI=tucker-lewis index; CFI=comparative fit index; SRMR=standardised difference between the observed correlation and the predicted correlation.

Test-retest reliability and internal consistency of SIIS items

The final 17-item version of Model 2 was adopted for test–retest analysis. Table 4 shows that the SIIS had good test–retest reliability (ICC = .91–.95) as well as high internal consistency of SIIS items with all Cronbach's alphas above .91for the two subscales based on the CFA results. Besides, there were no statistically significant differences between the two measurements, indicating acceptable scale stability over time (Table 4).

Gender, grade, and type of diagnosis

Among the 128 participants, there was no evidence showing that boys scored higher than girls on the two subscales (i.e., Relationships and Acceptance) and the total score (all *p* values > .05) (see Table 5). There was also no evidence showing that children in K2 scored higher than K3 on the two subscales and the total score (all *p* values > .05) (see Table 5).

Besides, there were significant mean differences among the two groups with and without special needs (SN) (i.e., non-SN had higher scores than SN) for Relationships ($t(126) = 5.00$, $p < .01$, Cohen's $d = 1$), Acceptance ($t(126) = 4.88$, $p < .01$, Cohen's $d = .98$) and total score ($t(126) = 5.19$, $p < .01$, Cohen's $d = 1$) (see Table 5). The findings suggested that children without special needs scored more in the two social inclusion domains than children with special needs.

TABLE 4 Test-retest reliability and internal consistency of the items in social inclusion intervention scale

FACTORS	*TEST-RETEST RELIABILITY* (*N* = 62)							*INTERNAL CONSISTENCY* (*N* = 128)
	ICC	95% CI	INITIAL *M* (*SD*)	RE-TEST *M* (*SD*)	*t*-value	*p*	CORRELATION (*r*)	CRONBACH'S ALPHA (α)
F1: Relationships	.92	.89-.94	20.15 (7.24)	20.61 (7.39)	-1.04	.30	.88*	.93
F2: Acceptance	.91	.86-.92	11.90 (4.87)	11.66 (4.76)	.49	.62	.67*	.91
Total	.95	.93-.97	32.05 (11.90)	32.27 (11.72)	-.28	.63	.86*	.96

* p<.0001.

Note. *N* = number of participants; F1 = factor 1; F2 = factor 2; ICC = intra-class correlation; CI = confidence interval for ICC; *M* = Mean; *SD* = Standard deviation.

TABLE 5 T-test results comparing Gender, Grade and Diagnostic type social intervention scale

SCORES	*GENDER*					*GRADE*					*DIAGNOSIS TYPE*				
	BOY (*N* = 71)	GIRL (*N* = 57)				K2 (*N* = 66)	K3 (*N* = 62)				SN (*N* = 34)	NON-SN (*N* = 94)			
	M (*SD*)	*M* (*SD*)	*t*- value	*p*	Cohen's *d*	*M* (*SD*)	*M* (*SD*)	*t*- value	*p*	Cohen's *d*	*M* (*SD*)	*M* (*SD*)	*t*- value	*p*	Cohen's *d*
Factor1	19.61 (8.76)	20.95 (9.10)	.84	.4	.15	20.12 (9.94)	20.29 (7.73)	-.11	.91	.02	13.91 (8.83)	22.48 (7.80)	5.00	.00	1.00
Factor2	10.76 (4.95)	10.53 (5.23)	-.26	.8	.05	11.48 (5.70)	9.77 (4.12)	1.93	.06	.34	7.29 (4.71)	11.87 (4.63)	4.88	.00	.98
Total	30.37 (13.06)	31.47 (13.71)	.46	.64	.08	31.61 (14.99)	30.06 (11.32)	.65	.52	.12	34.35 (11.53)	21.21 (13.27)	5.19	.00	1.00

Note. *N* = number of participants; Factor1 = relationships; Factor2 = acceptance; *M* = Mean; *SD* = Standard deviation; SN = Special Needs.

Validity and internal consistency of factors

Convergent validity and internal consistency of factors

All AVE values (i.e., .61 – .65) were found to be greater than .5 and lower than the CR (i.e., .92 - .99) for Model 2 (see Table 6). The findings revealed that convergent validity was achieved for Model 2. Moreover, good reliability was indicated for Model 2 with all CR values greater than .70 (see Table 6).

TABLE 6 Indicators of internal consistency of factors and validity for Model 2

FACTORS	*INDICATORS*				
	CR	*AVE*	*MSV*	*RELATIONSHIPS*	*ACCEPTANCE*
Relationships	.99	.65	.76	.81	-
Acceptance	.92	.61	.76	.87	.78

Note. CR = composite reliability; AVE = average variance extracted; MSV = maximum shared squared variance.

Discriminant validity

All AVEs were found to be lower than the MSV for Model 2 (see Table 6). Besides, the square root of the AVE for Relationships (i.e., .81) was less than the absolute value (i.e., .86) of the correlations with another factor (see Table 6). Therefore, discriminant validity was not achieved for Model 2.

Discussion

In this paper, we present the findings of our investigation on the dimensionality of social inclusion among children with and without special needs in integrated preschool settings. Through conducting EFA and CFA, we not only validated the newly developed Social Inclusion Intervention Scale (SIIS), but also confirmed our hypothesis that the construct of social inclusion is multi-dimensional. Of note, a model of two factors (i.e., Relationships and Acceptance) emerged from the original proposed model of four factors (i.e., Relate, Interact, Value, and Appreciate) for evaluating the construct of social inclusion.

To be specific, the two dimensions (i.e., Relationships and Acceptance) of the SIIS are in line with two of the four sub-themes of social inclusion proposed by Koster et al. (2009), i.e., Friendship relationships, Reciprocated interactions, Social acceptance, and Self-perceptions of social status. Furthermore, the Acceptance dimension of SIIS is consistent with the Acceptance Scale developed by Favazza and Odom (1997); the Relationships dimension of the SIIS is in line with the Peer Nomination Test presented by Mikami et al.

(2013), which assessed inter-personal peer relationships. Moreover, the psychometric properties of its test-retest reliability, internal consistency, convergent and discriminant validity positively showed that the SIIS can be used to adequately assess intervention efficacy of social inclusion programmes.

Past research confirms our findings that positive relationships and peer acceptance are closely associated, as shown by their high correlation value (i.e., .87; Ferreira et al., 2017; Meyer & Ostrosky, 2016). The social acceptance status of a child is best indicated by the increase in the number of friends the child makes. Past research also supports their close association with other dimensions of social inclusion. Children with special needs who have more playmates are more likely to have better socially interactive skills that help sustain positive relationships (Guralnick et al., 2007; Guralnick et al., 2011).

Furthermore, it is worth noting that both Relationships and Acceptance are inter-personal constructs. That is, any child, regardless of having special needs or not, cannot accomplish relationship-building and accepting or being accepted alone. Both are reciprocated constructs involving the relations between at least two persons. Hence, the target participants of social inclusion intervention are not just children with special needs, but also those without special needs. Hence, the inter-personal nature of the SIIS item content distinguishes itself from those of some other social inclusion rating scales, the majority of which involve items assessing non-reciprocal child-centred ability performances or environmental-oriented characteristics (Cordier et al., 2017).

Limitation of the study

There are several limitations to this study that need to be acknowledged. First, the SIIS was first developed using Chinese, and the translated English version has not been tested on another sample. Hence, we recommend further validation of the SIIS in English-speaking communities. Furthermore, the sample size of the present study was small and the sample was not randomly selected; hence, it may not be representative of the overall integrated preschool population. Therefore, future research could increase the sample size to a minimum of 300 participants (Yong & Pearce, 2013) for a better goodness-of-fit testing of the SIIS model.

Implication for future practice and research

More importantly, the study findings shed some light on the importance of adopting an ecological approach to social inclusion intervention. Past intervention approaches focused more on improving social interaction and communication skills (Tsang & Cheng, 2017). Thereby, the existing intervention design has focused on enhancing social interaction skills and creating a barrier-free social environment (Hästbacka et al., 2016). While it is necessary to improve social interactive skills in children, the skill alone is

insufficient to bring about peer acceptance and friendship building among children with and without special needs in integrated preschool settings. In order to foster relationship-building skills and social acceptance attitudes in children, future design of social inclusion intervention needs to focus more on how to make friends and maintain friendships with others, equipping children with prosocial skills such as empathy, embracing differences, accepting children who have different strengths, interests and social status, resolving conflicts, and, refraining from rejecting others. Ultimately, children with special needs are more likely to be socially interactive when they have more playmates than children without friends (Guralnick et al., 2007). Furthermore, the inclusion of neurotypical peers in the intervention programmes is crucial as their acceptance attitudes and relationship-building initiatives can increase their social inclusion (Barry et al., 2003; Bauminger, 2002; Kasari et al., 2012) and scaffold dyadic interactions for children with special needs in integrated preschool settings (Guralnick et al., 2011).

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