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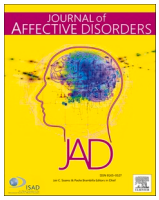

Research paper

The self-effacing empathy scale: Its validity and reliability among adolescents and their parents

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ABSTRACT

Background: Empathy is a cornerstone of interpersonal and emotional health, yet its measurement often conflates self-oriented sympathetic responses with other-oriented empathy. To measure other-oriented empathy in its interpersonal manifestation, the Self-Effacing Empathy Scale (SEES) was examined for its validity and reliability among adolescents and their parents.

Method: Adolescents and their parents, resident in South Africa were recruited through social media. Hundred and twelve participants completed a composite questionnaire that comprised the SEES, Basic Empathy Scale (BES), Interpersonal Reactivity Index (IRI), and the Vigour Assessment Scale (VAS). A replicative data set comprising the same measures was collected eight weeks later from the same participants.

Results: Convergent validity of the SEES was found in it correlating strongly in the initial data set with the BES ($r = 0.639$) and moderately with the other-oriented items of the IRI ($r = 0.528$), and strongly in the replicative data set ($r = 0.884$; $r = 0.771$). Discriminant validity was found in its weak correlation with the VAS ($r = 0.326$) in the initial data set. Cronbach's alpha coefficients indicated good (0.697) and excellent (0.940) internal consistency. The SEES incurred a small standard error of measurement, whereby the total scores were differing at most between 2.34 and 2.49 from the true values over 72 theoretically possible scores. A three-factor model indicated structural reliability, accounting for 46.3 % and 64.8 % of the cumulative variance in the respective data sets.

Conclusions: The SEES provides a valid and reliable measure for investigating associations between health and self-effacing empathy, and effects of interventions on it.

1. Introduction

Empathy is widely acknowledged as a cornerstone of personal psychological development, healthy social functioning, and the maintenance of positive relationships. Research demonstrates that children with higher levels of empathy exhibit improved emotional regulation, reduced aggression, and greater engagement in prosocial behaviours (Decety and Cowell, 2020; Trentacosta and Fine, 2020; Spinrad and Eisenberg, 2022). Additionally, empathy is essential for forming strong bonds with primary caregivers and others in a child's social environment (Davidov and Paz, 2021; Kochanska and Kim, 2022). Beyond childhood, empathy has been identified as a critical determinant of effective interpersonal relationships in general (Butters, 2010; Teding van Berkhout and Malouff, 2016), well-being and mental health (Bovina, 2020; Zaki, 2020; Li et al., 2024). Cross-cultural studies suggested that empathy predicted prosocial behaviours and influenced the perceived seriousness of criminal acts (Rodriguez et al., 2019). Lacking in empathy has been linked to loneliness (Cacioppo et al., 2020; Van Staden and Coetzee, 2010), mood disorders (Raine and Chen, 2021; Ziegler and Smith, 2023), autistic spectrum disorders (Fatima and Babu, 2024) and personality disorders (Fertuck et al., 2021; Ripoll and Snyder, 2022).

Despite its importance, measuring empathy validly and accurately poses various challenges. Many empathy scales are unidirectional, focusing on individual traits and capabilities rather than situating empathy within the context of reciprocal relationships. A review of the empathy measurement literature reveals that some instruments focus exclusively on emotional components while others, particularly self-report measures, emphasise cognitive aspects (Reniers et al., 2020; Chrysikou and Thompson, 2021). These self-report measures often require that participants reflect on their perceived empathetic capabilities or personal interpretations of empathy (such as the Interpersonal Reactivity Index and Emotional Empathy Scale, rather than measuring

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their empathy in its actual interpersonal manifestations, leading to interpretations that may neither accurately reflect an individual's true empathetic capabilities nor their empathetic functioning (Zaki and Ochsner, 2020; Decety and Holvoet, 2021). Self-reports of perceived empathy are at risk of presenting a distorted or inflated view of an individual's empathetic capacities. For example, items phrased as "I am" reflect subjective self-evaluations that may not align with actual behaviours. Triangulation of data sources may serve to improve the reliability of empathy measures that rely on perceived empathy within participant responses (Tamburrino et al., 1993), but this does little to correct the validity of empathy scales eroded by the potential distortions of individual self-reflection (Bannigan and Watson, 2009; Drost, 2011; John and Benet-Martínez, 2000).

Furthermore, empathy measuring instruments often conflate empathy and sympathy, such as the Adolescent Measure of Empathy and Sympathy (AMES) and Basic Empathy Scale (BES) (Lima and Osório, 2021; Vieten et al., 2024), obscuring the crucial selfless, self-effacing, and other-oriented qualities of empathy underpinned by a self-other distinction (du Vaure et al., 2017). With emphasis on the other, empathy entails that an individual understands and appreciates the experiences and emotions of someone else (Decety and Meyer, 2008; Stern, 2016), also described as "participating in the other person's experiences, not [necessarily] by any intellectual effort" (Jaspers, 1968).

Foregrounding the experiences of someone else, self-effacing empathy requires a deliberate bracketing of one's own affective and cognitive standpoint in prioritising the other's internal experiential state without internalising or personalising that experience. Although self-effacing inescapably requires understanding and emotional engagement as is the case for empathy in general, it diverges conceptually from empathic concern and perspective-taking by the minimisation of one's own feelings within the empathic engagement. Whilst empathic concern involves emotional responsiveness to others' distress, it may still include self-referential feelings, for example personal sorrow or discomfort. Similarly, perspective-taking involves cognitive role adoption but does not require the suspension of one's own feelings. In contrast, self-effacing empathy captures in metaphorically terms, "what is like for you to be in your shoes" and not "what is like for me had I been in your shoes", nor the resulting desire to help as in compassion (Gallagher et al., 2024). The success of bracketing one's own emotions and cognitive standpoint is particularly at issue at the core of self-effacing empathy when, for example, challenged by a dislike of the other person or his or her behaviour.

To address these shortcomings of existing scales, the Self-Effacing Empathy Scale (SEES) was developed by selecting and reformulating items from existing empathy scales that address selfless self-effacing empathy, deliberately excluding sympathy-related parameters and eschewing reflections on perceived capabilities, and formulating additional items in terms of manifestations of selfless empathy within dynamic interpersonal, reciprocal relationships. This study examined whether the SEES measured that which it is supposed to measure (i.e., its validity) and measured so consistently (i.e., its reliability). More specifically, the study among adolescents and their parents examined the convergent and the discriminant validity of the SEES, its internal consistency, split-half reliability, structural reliability, the standard error of measurement (SEM), and its association with age, gender, and highest level of education.

2. Materials and methods

2.1. Participants and procedures

The population comprised adolescents and their parents who were resident in South Africa and responded to recruitment through social media (Instagram, Facebook and Whatsapp). Adolescents between the ages of 13 and 17 years and 11 months, and one of their parents had to be willing to participate. They were further required to provide informed consent on an ethically approved online informed consent document prior to participating in the study and have access to the internet for the completion of a composite questionnaire on Qualtrics that captured all the variables and measuring instruments.

A sample size of 112 was reached after the minimum sample size for this study had been set at 100 participants, with an equal number of adolescents and parents, using the guide of obtaining data from a least 5 participants per item for the 20-item SEES (Anthoine et al., 2014). A second data set, serving as a same-sample replication part of the study, was obtained by each individual participant completing the same measures eight weeks after doing these the first time. Although it had been anticipated that the extent of empathy of some participants might change during this period, the validity and the reliability testing of the SEES should not be influenced by changes in empathy. The names of the measuring instruments were not revealed to participants in the composite questionnaire, as to avert these influencing responses on specific items of these instruments. Data were collected anonymously between May 2023 and April 2024. All procedures and the digital informed consent document had been approved by the legally accredited Faculty of Health Sciences Research Ethics Committee at the University of Pretoria before the study commenced.

2.2. Variables and measures

The age, gender, and highest level of education of participants (HLOE) were recorded. The following measures were utilised:

2.2.1. Self-effacing empathy scale (SEES)

The SEES was created by selecting, extracting and modifying items from existing empathy scales that measure interpersonal empathy and reciprocity. Candidate items were selected for specifically addressing the reciprocal nature of empathy within relationships with other, and one's awareness of another person's emotions and experiences in a self-effacing way. Items were then reformulated with a deliberate focus away from oneself and instead on the experience of the other person, guided metaphorically with a focus on what is like "for you to be in your shoes" and not "for me had I been in your shoes". Consider for example the following two items of the Basic Empathy Scale (see below): "after being with a friend who is sad about something, I usually feel sad" and "My friends' emotions don't affect me much". For these two items, the focus is on the impact on oneself – that is, the impact on "me" and what "I" experience or feel. In contrast, the SEES emphasises and focuses on the other rather than "me". Items were further formulated with the view to cover various kinds of experiences (e.g., positive and negative feelings and thoughts) and when self-effacing empathy may be challenged or difficult interpersonally.

This conceptual process supported the content validity of the SEES and entailed various iterations drawing on the expertise of three clinicians of whom two had previously published on instrument development. It also served to formulate the items in clear and unambiguous ways as to underpin reliability. Also to this end, the SEES alongside procedures on the Qualtrics platform were piloted among three potential participants.

The scale consists of 20 items for which participants were required to respond on a 5-point Likert type scale (see Supplementary Materials). Responses were coded from 1 to 5 and recorded as: does not describe me, describes me slightly well, describes me moderately well, describes me very well and describes me extremely well.

2.2.2. Basic Empathy Scale (BES)

The BES was chosen as comparator measure for being one of the most commonly used scales in measuring general empathy and, congruent with our study, being initially developed for use in adolescents. It measures affective and cognitive empathy in a two-factor structure (Jolliffe and Farrington, 2006), consisting of 20 self-report items in which participants are required to rate responses on a 5-point Likert type

scale. Nine and 11 items address respectively cognitive and affective empathy. This measure was found to have good internal consistency for the cognitive (Cronbach α = 0.79) and affective (Cronbach α = 0.85) empathy subscales, with a moderate degree of correlation (r = 0.43) between the subscales. A recent systematic review confirmed its psychometric properties in 76 articles (Cabedo-Peris et al., 2021), and it was adapted for Arabic-speaking (Dallagi-Belkilani et al., 2024) and intellectual disability populations (Heynen et al., 2024).

2.2.3. Interpersonal Reactivity Index (IRI)

The IRI was chosen as comparator measure for being a well-established measure of empathy that is specifically expressed interpersonally. This self-report measure was developed by Davis (1983) and comprises 28 items. Its validity was investigated by comparisons with measures of social functioning, self-esteem, emotional regulation, sensitivity to others as well as with previously developed unidimensional empathy measures (Mehreen and Simon, 2025; Raimondi et al., 2023). It captures four dimensions of empathy in four scales. These scales are outlined below:

2.2.4. Fantasy Scale (FS)

This scale measures the tendency to imaginatively transpose oneself into fictional situations, such as imagining how one would feel if events in a story were happening to oneself. It reflects cognitive empathy by engaging in perspective-taking through imagination.

2.2.5. Perspective-Taking Scale (PT)

This scale assesses the reported tendency to spontaneously adopt the psychological point of view of others in everyday life. It involves understanding others' thoughts and feelings, which is a key aspect of cognitive empathy.

2.2.6. Empathic Concern Scale (EC)

This scale measures the tendency to experience feelings of sympathy and compassion for unfortunate others. It reflects affective empathy, as it involves sharing and responding emotionally to others' experiences.

2.2.7. Personal Distress Scale (PD)

This scale measures the tendency to experience distress and discomfort in response to extreme distress in others. It reflects self-oriented feelings of anxiety and unease in tense interpersonal settings, which can be considered a form of emotional empathy.

Although correlations of variable strength between the scales have been reported, discriminant validity analyses indicated that each measures a distinct dimension of empathy.

2.2.8. Vigour Assessment Scale (VAS)

The VAS was chosen for it not being a measure of empathy but of a distinct mental phenomenon. It is a self-report measure of vigour comprising items that capture both presence and absence of vigour during the preceding 7 days. This measure showed good validity and reliability among social media respondents (Dlagnekova and Van Staden, 2024) and a psychiatric population (Dlagnekova et al., 2021). It comprises of 27 items that are rated on a four-point Likert scale (none of the time = 1; sometimes =2; often =3; most of the time = 4). This scale was chosen for examining the discriminant validity of the SEES, that is, the VAS measuring a diverging construct from that which the SEES is supposed to measure, notwithstanding that vigour may be anticipated as having a relation with empathy in so far as one may be more or less vigorous in being empathetic.

2.3. Statistical analysis

A redundancy analysis of items had been done first by which items 19 and 20 were expunged. Item 19 and 20 did not correlate significantly with the total SEES score and reduced internal consistency in the Cronbach alpha calculations. All analysis were subsequently performed for the remaining 18-item version of the SEES, with reverse coding the relevant items 3, 10, 14, 16 and 18.

For potential associations with the SEES, a Spearman's rho correlation and Kendall's tau was calculated for age, gender, and whether the participant was an adolescent or a parent. The association between the HLOE and the SEES was examined using the Welch test and the Brown-Forsyth test, for which respectively equal variances and a normal distribution need not be assumed.

To examine whether the data were aligned with the previously established internal validity of the comparator measures, confirmatory factor analyses were performed using Stata version 18 software. Convergent validity was examined by calculating Spearman's rho correlation coefficients to determine the extent to which the SEES converged with existing measures for which convergence may be expected (Anthoine et al., 2014), and thus for which moderate to strong positive correlations were hypothesised. Convergence was expected for the BES but this was not clear for the IRI scales that measure distinct dimensions of empathy and contain various items outside the conceptual scope of the SEES. Instead, convergence was expected theoretically for a selection of IRI items that are more other-oriented, viz. items 5, 6, 13, 14, and 24. These were selected by our systematically applying this theoretical focus to the IRI items, subject to justifications and risks considered elsewhere (Widhiarso et al., 2025; Smith et al., 2000). A composite value for these were calculated, called IRI-Others, for which Cronbach's alpha internal consistency values of the two data sets were 0.641 and 0.760. For discriminant validity, Spearman's correlation coefficients were calculated between the SEES and the VAS, for which correlations were hypothesised to be no more than of moderately positive strength. As to eschew potential distortions of non-normative data when parametric tests were use, bootstrapping was performed for the means, medians and the correlation coefficients using bias accelerated 95 % confidence intervals, and calculating the bootstrapped bias that indicates the difference between the average of the bootstrapped estimates and the original data. The strength of correlation coefficients was defined as follows: $r < 0.20$ is negligible; $0.20 < r < 0.40$ is weak; $0.40 < r < 0.60$ is moderate; $0.60 < r < 0.80$ is strong; and $r > 0.80$ is very strong (Van Staden et al., 2022).

For testing the internal reliability of the SEES, Cronbach alpha coefficients were calculated, reflecting the internal consistency among the items. This was done for the full scale and each of its two parts. Cronbach alpha coefficients of equal or more than 0.7 and 0.9 were respectively defined as good and excellent. For split-half reliability, the SEES was split between the first consecutive 9 and the subsequent 9 items and the parts so derived were compared using a Spearman's rank correlation test, Spearman-Brown coefficient, and the Guttman coefficient. The Standard Error of Measurement (SEM) was calculated as the product of the standard deviation and the square root of the difference between 1 and the reliability coefficient.

For testing the structural reliability of the SEES, an exploratory factor analysis was performed using principal axis factoring for which Oblimin rotation with Kaiser normalization was applied. Guiding principles in factor identification were a threshold Eigenvalue of 1.0, factor loadings of more than 0.3, a minimum of three items per factor, and parsimony in the interest of generalisability (Preacher et al., 2013). The validity and reliability analyses were performed for both data sets, using SPSS version 29.

3. Results

3.1. Descriptive features and structural validity of comparator measures

Table 1 shows the descriptive features of the participants and that the SEES was not significantly associated with their age, gender, the highest level of education of the parents, or whether an adolescent or parent participant. Table 2 shows the means and medians of the various

Table 1
Descriptive features and associations with the Self-Effacing Empathy Scale (SEES).

Variable ($N = 112$)		Descriptive features	Statistical associations with the SEES (Initial Data Set)	
		Mean	Test statistic	Strength and/or probability
SEES by adolescents and parents	Adolescents N = 56	Mean = 55.73 SD = 4.31	Spearman's ρ = 0.106 Kendall's τ = 0.090	Negligible, $p = 0.268$ Negligible, $p = 0.266$
	Parents $N = 56$	Mean = 54.66 SD = 4.70		
Age	All	Mean = 30.38 SD = 15.42	Spearman's ρ = −0.079 Kendall's τ = −0.057	Negligible, $p = 0.408$ Negligible, $p = 0.400$
	Adolescents $N = 56$	Mean = 15.3 SD = 1.54	Spearman's ρ = −0.020 Kendall's τ = −0.014	Negligible, $p = 0.886$ Negligible, $p = 0.889$
	Parents N = 56	Mean = 45.46 SD = 4.34	Spearman's ρ = 0.069 Kendall's τ = 0.047	Negligible, $p = 0.627$ Negligible, p = 0.627
Gender all		Male = 50 (44.6 %) Female = 62 (55.4 %)	Spearman's ρ = 0.061 Kendall's τ = 0.052	Negligible, $p = 0.520$ Negligible, $p = 0.518$
Gender adolescents		Male = 25 (44.6 %) Female = 31 (55.4 %)	Spearman's ρ = 0.056 Kendall's τ = 0.047	Negligible, $p = 0.683$ Negligible, $p = 0.679$
Gender adults		Male = 25 (44.6 %) Female = 31 (55.4 %)	Spearman's ρ = 0.065 Kendall's τ = 0.055	Negligible, $p = 0.635$ Negligible, $p = 0.631$
Highest level of education of parents			Welch statistic = 2.674, Df1 = 2; Df2 = 9.736; Brown-Forsythe statistic = 2.974, Df1 = 2, Df2 = 15.189	Not significant, $p = 0.119$ Not significant, $p = 0.081$
Primary		5 9 %		
Secondary		13 23.3 %		
Tertiary		38 67.8 %		

measures. Table 3 shows the results of the confirmatory factor analyses by which model fit indices supported the structural validity of the comparator measures in this sample. The RMSEA values suggest a good population fit (≤ 0.05) for both the IRI data sets, and a good or almost good fit for the BES and VAS depending on the data set. For all the measures and data sets, the corresponding probability values (p-close) indicate a close fit to these being less or equal to 0.05. When compared to a null baseline model, the CFI and TLI values indicate a good fit for the IRI and, in the replicative data sets, for the BES and the VAS. The SRMR values all being 0.82 or less, indicate acceptable residual levels. The CD values reflect that the models accounted for 84 % or more of the total variance in the observed variables.

3.2. Convergent and discriminant validity

For convergent validity in the initial data set, the SEES correlated strongly with the BES, moderately with IRI's others-oriented items and the Empathic Concern scale, weakly with the Perspective Taking and the Personal Distress scales, and negligibly with the Fantasy scale (See Tables 4 and 5). In the replicative data set, the SEES correlated very strongly with the BES and the IRI-Others, strongly with the Personal Distress and Perspective Taking scales, and moderately with Fantasy and Empathic Concern scales. Regarding discriminant validity, the SEES correlated weakly with the VAS in the initial data set and strongly in the replicative data set. The bootstrapped bias values all indicate a very small and negligible difference between the average of the bootstrapped estimates and the original data.

3.3. Reliability

Results of testing the consistency in the measurements of the SEES are shown in Table 6. The Cronbach's alpha coefficients for the initial and replicative data sets were good and excellent respectively. When split in half, the coefficients for the two parts were all more or equal to 0.82 in the replicative data set, but less salient in the initial data set. The SEM calculated at 2.49 for the initial data set, means that the observed total SEES scores were within 2.49 from the true values that ranged in the sample over 22 points and maximally over 72 theoretical points. For the replicative data set, the SEM calculated at a lower value 2.34, meaning the observed SEES scores were closer to the true values than in the initial data set despite a larger range of 34 obtained in the sample.

To examine the structural reliability of the SEES through an exploratory factor analysis, the preceding Kaiser-Meyer-Olkin (KMO) tests for the respective data sets yielded values of 0.746 and 0.939, indicating that the sample size was sufficient for the analyses. Bartlett's test of sphericity showed significant outcomes (with respectively an approximate chi-square value of 534.365 (df = 153, $p < 0.001$) and 1211.405 (df = 153, p < 0.001), which indicate a significant interrelation among the SEES items and confirming their suitability for factor

Table 2
Descriptive Features of the Measures.

Measures	Data set	Mean of total score	BCa 95 % confidence interval		Median of total score	BCa 95 % confidence interval	
($n = 112$)			Lower bound	Upper bound		Lower bound	Upper bound
Self-effacing empathy scale	Initial	55.19	54.34	55.92	56.5	55.0	57.0
	Replicative	62.71	60.95	64.52	60.5	57.5	67.0
Basic empathy scale	Initial	78.88	78.10	79.63	80.0	80.0	80.0
	Replicative	85.47	84.24	86.69	84.0	83.0	87.30
IRI-others	Initial	19.52	19.24	19.80	20.0	19.5	20.5
	Replicative	20.92	20.57	21.23	21.0	20.0	21.5
IRI-fantasy scale	Initial	26.99	26.45	27.54	27.0	27.0	27.0
	Replicative	29.60	29.13	30.09	30.0	29.0	31.0
IRI-perspective-taking	Initial	27.69	27.23	28.13	28.0	.	.
	Replicative	29.75	29.24	30.26	30.0	29.5	30.0
IRI-empathic concern	Initial	27.31	26.78	27.81	28.0	.	.
	Replicative	29.46	29.02	29.85	29.0	29.0	30.0
IRI-personal Distress	Initial	25.50	24.83	26.31	26.0	25.0	26.0
	Replicative	26.73	26.41	27.40	27.0	27.0	27.0
Vigour assessment scale	Initial	29.03	27.74	30.29	29.0	29.0	29.0
	Replicative	35.49	34.13	36.84	35.0	34.5	35.5

BCa 95 % CI = Bias Accelerated 95 % Confidence Intervals.

Table 3
Confirmatory factor analyses of comparator instruments.

Measures	Data set	Population fit			Baseline comparison		Size of residuals	
		RMSEA	90 % CI	p-close	CFI	TLI	SRMR	CD
Basic empathy scale	Initial	0.054	0.025–0.077	0.375	0.843	0.817	0.080	0.848
	Replicative	0.050	0.027–0.069	0.483	0.939	0.931	0.063	0.934
Interpersonal reactivity index	Initial	0.042	0.024–0.057	0.795	0.940	0.934	0.072	1.00
	Replicative	0.045	0.028–0.059	0.691	0.935	0.928	0.063	0.998
Vigour assessment scale	Initial	0.051	0.035–0.065	0.436	0.787	0.768	0.082	0.932
	Replicative	<0.001	<0.001–0.036	0.998	1.00	1.003	0.071	0.938

RMSEA = Root Mean Squared Error of Approximation; CI = Confidence Interval; p-close = *p*-value for close fit; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; SRMR = Standardised Root Mean Squared Residual; CD = Coefficient of Determination.

Table 4
Spearman's Correlation Coefficients between the SEES, BES, IRI and VAS.

Measures			SEES	BES	IRI-others	VAS
Self-Effacing Empathy Scale (SEES)	Initial data set	Coefficient	1	0.639	0.528	0.326
		BCa 95 % CI	1	0.499–0.759	0.346–0.681	0.135–0.499
		SE	–	0.067	0.078	0.095
		BBias	–	−0.004	−0.001	−0.006
	Replicative data set	Coefficient	1	0.884	0.771	0.635
		BCa 95 % CI	1	0.838–0.915	0.691–0.830	0.515–0.721
		SE	–	0.022	0.039	0.057
		BBias	–	−0.004	−0.004	−0.007
Basic Empathy Scale (BES)	Initial data set	Coefficient	0.639	1	0.572	0.306
		BCa 95 % CI	0.499–0.759	1	0.429–0.707	0.109–0.472
	Replicative data	Coefficient	0.884	1	0.789	0.617
		BCa 95 % CI	0.838–0.915	1	0.728–0.836	0.501–0.702
Interpersonal Reactivity Index-Others (IRI-Others)	Initial data set	Coefficient	0.528	0.572	1	0.304
		BCa 95 % CI	0.346–0.681	0.429–0.707	1	0.138–0.460
	Replicative data set	Coefficient	0.771	0.789	1	0.645
		BCa 95 % CI	0.691–0.830	0.728–0.836	1	0.517–0.743
Vigour Assessment Scale (VAS)	Initial data set	Coefficient	0.326	0.306	0.304	1
		BCa 95 % CI	0.135–0.499	0.109–0.472	0.138–0.460	1
	Replicative data set	Coefficient	0.635	0.617	0.645	1
		BCa 95 % CI	0.515–0.721	0.501–0.702	0.517–0.743	1

BCa 95 % CI = Bias Accelerated 95 % Confidence Interval; SE = Standard Error; BBias = Bootstrapped Bias.

Table 5
Spearman's correlation coefficients between the SEES and IRI scales.

Measures	Data set	SEES	FS	PT	EC	PD	IRI-others
Self-Effacing Empathy Scale (SEES)	Initial	1	0.174	0.238	0.412	0.331	0.528
	Replicative	1	0.594	0.749	0.570	0.654	0.771
Fantasy Scale (FS)	Initial	0.174	1	0.063	0.254	−0.029	0.173
	Replicative	0.594	1	0.554	0.455	0.397	0.587
Perspective-taking Scale (PT)	Initial	0.283	0.063	1	0.065	0.324	0.666
	Replicative	0.749	0.554	1	0.485	0.662	0.892
Empathic Concern Scale (EC)	Initial	0.412	0.254	0.065	1	0.139	0.543
	Replicative	0.570	0.455	0.485	1	0.518	0.656
Personal Distress Scale (PDS)	Initial	0.331	−0.029	0.324	0.139	1	0.283
	Replicative	0.654	0.397	0.662	0.518	1	0.669
IRI-Others	Initial	0.528	0.137	0.666	0.543	0.282	1
	Replicative	0.771	0.587	0.892	0.656	0.669	1

analysis.

In the factor analyses of two data sets, a three-factor model was extracted after 6 iterations for each, which explained 46.3 % and 64.8 % of the cumulative variance respectively. The pattern matrices for the respective data sets are shown in Tables 7 and 8, and the factor correlation matrix of each is shown in Table 9. The three factors were labelled "Attuned Empathically", "Disconnected Empathically", and "Empathic Despite Aversive Challenge".

Much congruence is evident between the factor analytical models for the respective data sets. Fifteen of the 18 items clustered in the same three-factor pattern. Regarding the other three, items 2 and 11 loaded on Factor I in the initial data set, but in the replicative data set these also loaded on respectively Factors II and III. Item 15 loaded on Factor II in the initial data set, but also on Factor III in the replicative data set. Correspondingly, a confirmatory factor analysis on the replicative data set showed a good model fit. The chi-square statistic was 149.662 (p = 0.103), suggesting no significant difference between the model and the data. The fit indices supported this, being an RMSEA = 0.038 (90 % CI = 0.001 to 0.062; p-close = 0.770), CFI = 0.982, TLI = 0.979, and SRMR = 0.047. The model also showed a high coefficient of determination (CD = 0.990), with AIC and BIC values of 3508.681 and 3671.791, respectively.

4. Discussion

The results of this study support the validity and the reliability of the SEES as a measure of self-effacing empathy in adolescents and their parents. For the purposes of validity testing, model fit indices indicated

Table 6
Consistency of the SEES.

Kind of coefficient	Part of SEES	Coefficient	
		Initial data set	Replicative data set
Cronbach's alpha	All 18 items	0.697	0.940
	Part I *n* of items = 9[a]	0.775	0.931
	Part II *n* of items = 9[b]	0.538	0.850
Spearman's correlation coefficient between parts		0.193	0.820
Spearman-Brown coefficient		0.323	0.901
Guttman Split-half coefficient		0.322	0.893
Guttman's Lambda for Parts I and II			
Lambda 1		0.685	0.888
Lambda 2		0.732	0.943
Lambda 3		0.697	0.940
Lambda 4		0.332	0.893
Lambda 5		0.705	0.918
Lambda 6		0.786	0.952
Standard error of measurement (Theoretical maximum range = 72)		2.49 Sample's range = 22	2.34 Sample's range = 34

[a] For items 1 to 9.
[b] For items 10 to 18.

Table 7
Pattern matrix of the three-factor model derived from the initial data set.

Item	Factor loading		
	I	II	III
Factor I: attuned empathically			
8. I am often aware when people are excited even when they have not told me so.	0.675	0.009	−0.332
4. I often imagine how it might feel for people.	0.614	−0.111	−0.012
5. I am often aware when people are worried even when they have not told me so.	0.584	−0.016	−0.138
9. I am often aware when people are happy even when they have not told me so.	0.571	0.050	−0.372
12. I am often aware and interested in how someone feels when I would not have felt the same had I been in his or her situation.	0.567	0.011	0.124
1. I often imagine what someone else might think.	0.553	0.014	0.122
6. I am often aware when people are feeling low even when they have not told me so.	0.491	0.047	−0.262
11. I often make an effort to understand how it might feel for someone else.	0.473	0.135	0.139
7. I am often aware when people are scared even when they have not told me so.	0.447	0.091	−0.386
2. I usually anticipate when someone will be upset.	0.433	−0.044	0.211
Factor II: disconnected empathically			
10. I am often surprised by someone else being upset. (R)	−0.065	0.639	0.063
18. I often have difficulty knowing what it is like for someone else. (R)	0.108	0.616	0.162
16. I often pretend that I know how someone else is feeling. (R)	−0.053	0.601	0.034
3. I often assume someone else is feeling the same as I do. (R)	−0.010	0.591	−0.004
14. I often do not want to know what it is like for someone else. (R)	0.021	0.543	−0.232
Factor III: empathic despite aversive challenge			
17. I am interested in what it is like for someone whom I dislike.	−0.117	0.010	0.543
15. I sometimes imagine what it is like for someone else when he or she is doing something that is disgusting to me.	0.089	0.133	0.516
13. I sometimes imagine what it feels like for someone else when he or she is doing something that I do not like.	0.048	−0.023	0.396

Note. Extraction Method: Principal Axis Factoring. Rotation Method: Oblimin with Kaiser Normalization. Rotation converged in 10 iterations.

that our data aligned well with the previously established structural validity of the comparator measures. Although thus well-suited as comparators in this respect, these are not suitable for testing criterion-related validity as the SEES is the first measure that focuses on the self-effacing qualities of empathy and a gold standard for this does not exist. Convergent validity with comparator measures of empathy was found in that the SEES correlated moderately to very strongly with the Basic Empathy Scale and the other-oriented items of the IRI. That the BES and the selected items of the IRI are not well-suited in capturing the self-effacing qualities of empathy (as in the SEES), is reflected in the distance from a perfect correlation with respective coefficients of 0.639 and 0.528 (in the initial data set). For the four scales of the IRP, particularly the perspective taking and the personal distress (of others) scales that are arguably more self-effacing, convergence with the SEES was found in strong correlations in the replicative data set, but not clearly so in the initial data set that yielded weak correlations.

Discriminant validity of the SEES was supported by its weak correlation ($r = 0.326$) with vigour in the initial data set, but its strong correlation in the replicative data set ($r = 0.635$) suggests interaction between one's vigour and empathy, with more of this interaction in play eight weeks after the initial data had been collected. One should not interpret this increased correlation as necessarily indicating a lack of discriminant validity, a measurement artefact, or that vigour would be inherent to self-effacing empathy. This may suggest instead that self-effacing empathy may, over time, be associated with increased personal vigour. It may also reflect a context-specific developmental interaction, wherein participants became more vigorous in being empathic. Further research is required to clarify this association (for example, reflecting a maturation and/or contextual response). Nonetheless, as the strong correlation in the replicative data set undermines conclusions on the discriminant validity of the SEES, further research should also examine its discriminant validity in relation to constructs other than vigour.

Concurrent validity of the SEES, that is the SEES measuring that which it is supposed to measure across groups, may be inferred from an absence of statistically significant associations between the SEES and participants' age, gender, highest level of education, or whether an adolescent or parent.

Whilst the validity results confirm that the SEES was measuring that which it was supposed to measure, the reliability results confirm that the SEES measured consistently. The Cronbach's alpha coefficients for the respective data sets indicate good (0.697) and excellent (0.940) internal consistency of the items coherently measuring the same phenomenon. The higher consistency coefficient in the replicative data set, we hypothesise, may be attributed to participants becoming more familiar with the items of the SEES and that their increased empathy enhanced their understanding of the relevant experiences measured by the items. The SEES incurred only a small error of measurement over 72 theoretically possible scores, whereby the measured total scores were differing no more than 2.34 and 2.49 from the true values.

An assessment of the structural reliability of the SEES benefitted from exploratory analyses on two data sets in the same sample obtained eight weeks apart. A three-factor model served both data sets well. The three factors “Attuned Empathically”, “Empathic Despite Aversive Challenge” and “Disconnected Empathically” corroborated the scale's premises in its capturing self-effacing empathy, and accounted for 64.8 % of the cumulative variance, which is usually indicative of a good outcome for a new measuring instrument (Mvududu and Sink, 2013).

4.1. Limitations and future directions

The study potentially incurred selective sampling among adolescents and their parents, as it depended on participants who were willing to respond and participate. Willingness to participate in similar studies is known to be influenced by higher levels of education and female gender

Table 8
Pattern matrix of the three-factor model derived from the replicative data set.

Item	Factor loading		
	I	II	III
Factor I: attuned empathically			
8. I am often aware when people are excited even when they have not told me so.	0.892	−0.050	−0.097
6. I am often aware when people are feeling low even when they have not told me so.	0.846	0.059	−0.142
5. I am often aware when people are worried even when they have not told me so.	0.736	0.003	0.039
9. I am often aware when people are happy even when they have not told me so.	0.719	0.100	0.092
4. I often imagine how it might feel for people.	0.669	0.085	0.183
7. I am often aware when people are scared even when they have not told me so.	0.615	0.242	0.021
12. I am often aware and interested in how someone feels when I would not have felt the same had I been in his or her situation.	0.602	−0.086	0.333
1. I often imagine what someone else might think.	0.531	0.241	0.073
Factor II: disconnected empathically			
16. I often pretend that I know how someone else is feeling. (R)	0.046	0.774	−0.188
10. I am often surprised by someone else being upset. (R)	−0.043	0.735	0.066
14. I often do not want to know what it is like for someone else. (R)	0.162	0.578	0.101
3. I often assume someone else is feeling the same as I do. (R)	0.249	0.527	0.007
18. I often have difficulty knowing what it is like for someone else. (R)	0.268	0.525	0.161
15. I sometimes imagine what it is like for someone else when he or she is doing something that is disgusting to me.	−0.038	0.475	0.445
2. I usually anticipate when someone will be upset.	0.354	0.379	0.210
Factor III: empathic despite aversive challenge			
13. I sometimes imagine what it feels like for someone else when he or she is doing something that I do not like.	−0.037	0.013	0.584
17. I am interested in what it is like for someone whom I dislike.	0.105	−0.031	0.452
11. I often make an effort to understand how it might feel for someone else.	0.331	0.181	0.393

Note. Extraction Method: Principal Axis Factoring. Rotation Method: Oblimin with Kaiser Normalization. Rotation converged in 11 iterations.

Table 9
Factor correlation matrix for each data set.

Factor	Data set					
	Initial data set			Replicative data set		
	I	II	III	I	II	III
1. Attuned empathically	1	0.156	−0.115	1	0.691	0.469
2. Disconnected empathically	0.156	1	0.028	0.691	1	0.360
3. Empathic despite aversive challenge	−0.115	0.028	1	0.469	0.360	1

Note. Extraction method: Principal Axis Factoring. Rotation method: Oblimin with Kaiser Normalization.

(Wilson and Musick, 1997), a trend that was observed in our study. In addition, the use of self-report measures may have introduced response biases, such as social desirability bias, which could affect the accuracy of the data (Podsakoff et al., 2012).

Furthermore, the study population was limited to adolescents and their parents who willingly responded upon social media invitation and were resident in South Africa. This means the validity and the reliability of the SEES among people who do not meet this description are at best extrapolated, assuming that the relevant contextual influences are the same. Although the confirmatory factor analyses suggested a good population fit for the comparator measures, empirical grounds for extrapolating from the SEES results should be examined further in confirmatory factor analyses on its factor structure and replicating this study in other cultural and population settings.

Confirming the validity and the reliability of the SEES, makes it a suitable measuring instrument in future research that examines, for example: interactions of self-effacing empathy with personality (Ripoll and Snyder, 2022), mental disorders including mood disorders (Ziegler and Smith, 2023), schizophrenia (Weng et al., 2022) and autistic spectrum disorders (Fatima and Babu, 2024) resilience (Xing et al., 2023) and other parameters of positive mental health and well-being Benoit and Gabola, 2021); longitudinal changes in self-effacing empathy during development (Malti, 2021) (in the relationship between adolescents and their parents, for example); and its responsiveness to interventions (Hu et al., 2022; Trivedi-Bateman and Crook, 2022).

5. Conclusion

Results of this study provide evidence for the reliability and the validity of the SEES among adolescents and their parents. So warranted, the SEES may be used in measuring self-effacing empathy in future research and clinical settings as an indicator of positive mental health and well-being. Moreover, it provides a measure for investigating the associations of self-effacing empathy with other health and well-being parameters, psychological factors, personality development and traits, mental disorders, and the effects that empathy-training, psychotherapy, and medicinal interventions may have on self-effacing empathy.

Use of generative Artificial Intelligence

No generative artificial intelligence was used in the writing of this article.

CRediT authorship contribution statement

Veren Gyapersad: Writing – original draft, Validation, Software, Resources, Project administration, Methodology, Investigation, Data curation, Conceptualization. **Werdie van Staden:** Writing – review & editing, Visualization, Validation, Supervision, Software, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

Compliance with ethical standards

The study received ethics approval from the legally accredited Faculty of Health Sciences Research Ethics Committee. The study adhered to the stipulations of the 2013 version of the Declaration of Helsinki. All participants gave informed consent captured on an ethically approved study-specific informed consent document.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jad.2025.120258.

Data availability

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available owing to ethical restrictions as required by the research ethics committee that approved the study. The measuring instrument is made available as supplementary material.

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