

Relational aggression during early childhood: A systematic review

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ABSTRACT

Seminal work on relational aggression in middle childhood began in 1995 and the first study to examine relational aggression in early childhood was published in 1996 in the *Journal of Research in Childhood Education*. Since then, an abundance of research examining the prevalence of relational aggression during early childhood has been published in over 53 peer-reviewed journals. This review summarises the empirical evidence from these studies. A systematic search of the literature published between 1995 and 2019 identified 106 studies for inclusion. Studies were coded to extract data on participant characteristics, measurement characteristics, the prevalence of relational aggression, dependent variables (psychosocial factors), and research rigor. Results indicate that the prevalence of relational aggression during early childhood has remained stable over the past 25 years. However, we observed considerable heterogeneity regarding the instruments and informants that were used and psychosocial factors that were evaluated in the different studies. Recommendations and consideration are given to future directions in the study of relational aggression during early childhood.

1. Introduction

Aggression is typically defined as the intent to hurt or harm an individual (Dodge et al., 2006). During early childhood, aggression has been described as physical (e.g., punching) or relational (e.g., spreading rumors) in nature (Evans, Frazer, Blossom, & Fite, 2018; Ostrov & Crick, 2007). Typically, physical aggression peaks during toddlerhood (18–30 months; Hay et al., 2014) and decreases thereafter as children develop the ability to self-regulate and increases in their cognitive and language development and social information processing (Dodge & Schwartz, 1997; Girard et al., 2014; Séguin et al., 2009). In contrast, relational aggression emerges during early childhood and remains somewhat stable particularly for older girls (Blakely-McClure & Ostrov, 2016; Crick et al., 2006). According to the World Health Organisation, early childhood represents development that occurs between 0 and 8 years (World Health Organisation, 2020). Thus, early childhood development spans early childhood education including preschool and the early years of formal schooling. However, most research on relational aggression in young children has focused on preschool or school-age samples, with few studies including both age groups across this important developmental transition (Evans et al., 2018). This research will respond to this gap by providing a review of the prevalence of relational aggression and

associated psychosocial factors examined during early childhood (0–8 years).

1.1. Defining relational aggression

Over the past 25 years, there has been a growing body of literature on relational aggression during early childhood. Crick and Grotpeter (1995) seminal work on relational aggression in middle childhood spurred researcher's interest in examining these behaviors during early childhood. They defined relational aggression as behaviors that damage social relationships such as spreading malicious rumors, gossip, secrets or lies, peer exclusion, threatening to end a social relationship, or harming others through purposeful manipulation (Crick & Grotpeter, 1995). Young children's use of relationally aggressive behaviors have been described as both direct and indirect (Crick et al., 2007), but given the increases in social and cognitive development during early childhood, relational aggression is most often obvious and direct (Ostrov & Godleski, 2010). The terms indirect aggression (Björkqvist et al., 1992) and social aggression (Underwood et al., 2001) have also been used to describe behaviors similar to relational aggression, however, these related constructs have been predominately researched in school-age and adolescent samples. Comprehensive reviews have been published

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on the definitional similarities and differences in these overlapping but distinct terms (Archer & Coyne, 2005; Murray-Close et al., 2016; Ostrov et al., 2018).

1.2. Measures of relational aggression

Various methods of measuring the construct of relational aggression have been reported and have been compared and reviewed (Archer & Coyne, 2005; McEvoy et al., 2003; Voulgaridou & Kokkinos, 2019). The primary measures of relational aggression used in early childhood include peer assessment, teacher ratings, and observations of child behavior in naturalistic and laboratory settings. While an examination of each of these measures is beyond the scope of this review, reviews conducted by Archer and Coyne (2005) and Voulgaridou and Kokkinos (2019) examine and evaluate existing relational aggression measures that have been utilised with school-age populations. Drawing on these reviews, two methodological observations to the assessment of relational aggression are relevant to this review. First, while multiple measures of relational aggression have been utilised with school-age populations, there remains an absence of a generally accepted and empirically valid relational aggression measure (Voulgaridou & Kokkinos, 2019). Voulgaridou and Kokkinos' (2019) review was restricted to relational aggression measured in 6–19 year olds, therefore measures used to assess relational aggression during early childhood may not have been included. Second, both reviews recommend that researchers employ multiple measures and sources of information to obtain an accurate representation of the prevalence of relational aggression. Given that relational aggression takes on different forms at different developmental stages (Archer & Coyne, 2005), it is important to examine the measures and sources of information used to assess relational aggression during early childhood. These methodological considerations will be included in this review.

1.3. Relational aggression and psychosocial factors

Since Crick and Grotpeter's (1995) publication disseminating the first findings of the association between school-age children's relational aggression and social-psychological adjustment, researchers have continued to examine a range of psychosocial factors related to relational aggression. Relational aggression is associated with various concurrent and future psychosocial adjustment indices including social factors such as peer rejection and problematic peer relationships; cognitive and emotional factors such as emotional dysregulation and social cognitive processing; environmental factors such as parenting and teacher-student relationships; and psychological factors such as depression and internalising behaviors (for reviews see Card & Little, 2006; Card et al., 2008; Hodges et al., 2003; Murray-Close et al., 2016). Despite the substantial interest among researchers to measure the predictors and outcomes associated with relational aggression, it is near impossible to gauge the various psychosocial factors that have been examined over two decades of relational aggression research. In an effort to continue to extend and build on previous research, this review will compile a comprehensive list of the psychosocial factors that researchers have included in their study of relational aggression during early childhood. This could provide great benefit to understand and respond to current gaps in empirical evidence on the various psychosocial factors related to relational aggression, particularly during the early childhood developmental period when prevention and intervention in relational aggression are crucial.

Despite the increase in attention and awareness of relational aggression over the past 25 years, no comprehensive systematic review of the existing research literature have been conducted to determine whether prevalence estimates of relational aggression have increased overtime and what psychosocial factors have been evaluated in the different studies. While there appears to be a plethora of relational aggression research conducted in early childhood, most of this is with

either preschool samples or school-age samples. Given early childhood includes both preschool and school-age children, it is important to include data on both these populations in a comprehensive review of relational aggression. Overall, this review has three aims: 1) to identify, code, and evaluate empirical studies that assess relational aggression during early childhood (0–8 years); 2) to examine the prevalence of relational aggression since 1995; and 3) to elucidate psychosocial factors that have been evaluated with relational aggression in the different studies. This review provides a systematic summary of study characteristics in terms of participant characteristics, the relational aggression measure(s), sources of information, and the psychosocial factor(s) examined in the study.

2. Design and methods

This systematic review and preparation of this manuscript were undertaken following the PRISMA guidelines (Moher et al., 2009).

2.1. Search procedures

A search of electronic databases PsycINFO, Education Resources Information Centre (ERIC), and Scopus was performed using the search terms relational aggression, social aggression, covert aggression, overt aggression, direct aggression, physical aggression, alongside child, preschool, preadolescence, boy, or girl. Empirical research, review articles, book chapters, and publications that were either online in advance or in a journal from 1995 to 2019 were included in this initial search, yielding 4469 publications. It should be noted that this review focuses on studies from 1995 onwards because this is when the seminal work of Crick and Grotpeter (1995) emerged. The first assessment of relational aggression during early childhood was conducted by McNeilly-Choque and colleagues in 1996. A summary of the systematic search procedures is presented in Fig. 1.

2.2. Inclusion and exclusion criteria

The titles, abstracts, participant characteristics, and measures of relational aggression reported in the 4469 publications were screened for duplicates, research beyond middle childhood, neurobiological and psychopharmacological studies, and commentaries, resulting in 1923 records requiring further screening for inclusion. To be included, an article had to meet the following criteria: 1) published in an academic, peer-reviewed, English journal, or was translated and made available in English; 2) the age of the study participants was between 12 and 96 months (1–8 years); 3) included a measure of relational aggression. Measures of indirect aggression were excluded from this review. Bibliographic studies, reviews, and studies using a global qualitative question about relational aggression were not reviewed. Longitudinal studies that measured relational aggression beyond 96 months were only included if relational aggression were reported between 12 and 96 months. Both authors screened the abstracts resulting from the search procedures to determine whether inclusion criteria were met. There were 266 articles identified and screened of which 106 met the inclusion criteria. Of these 106 articles, those identified as low in quality were excluded from further review ($n = 3$), as was one study that primarily focused on exploratory and confirmatory factor analysis. Therefore, 102 articles are reported in the present review. There was consensus (i.e. 100% inter-rated agreement) between authors on the inclusion and exclusion of studies.

2.3. Data extraction

2.3.1. Coding of variables

Each article was summarised according to: 1) participant characteristics, including sample size, age, and gender; 2) the measure and informant used to assess relational aggression; 3) descriptive statistics of

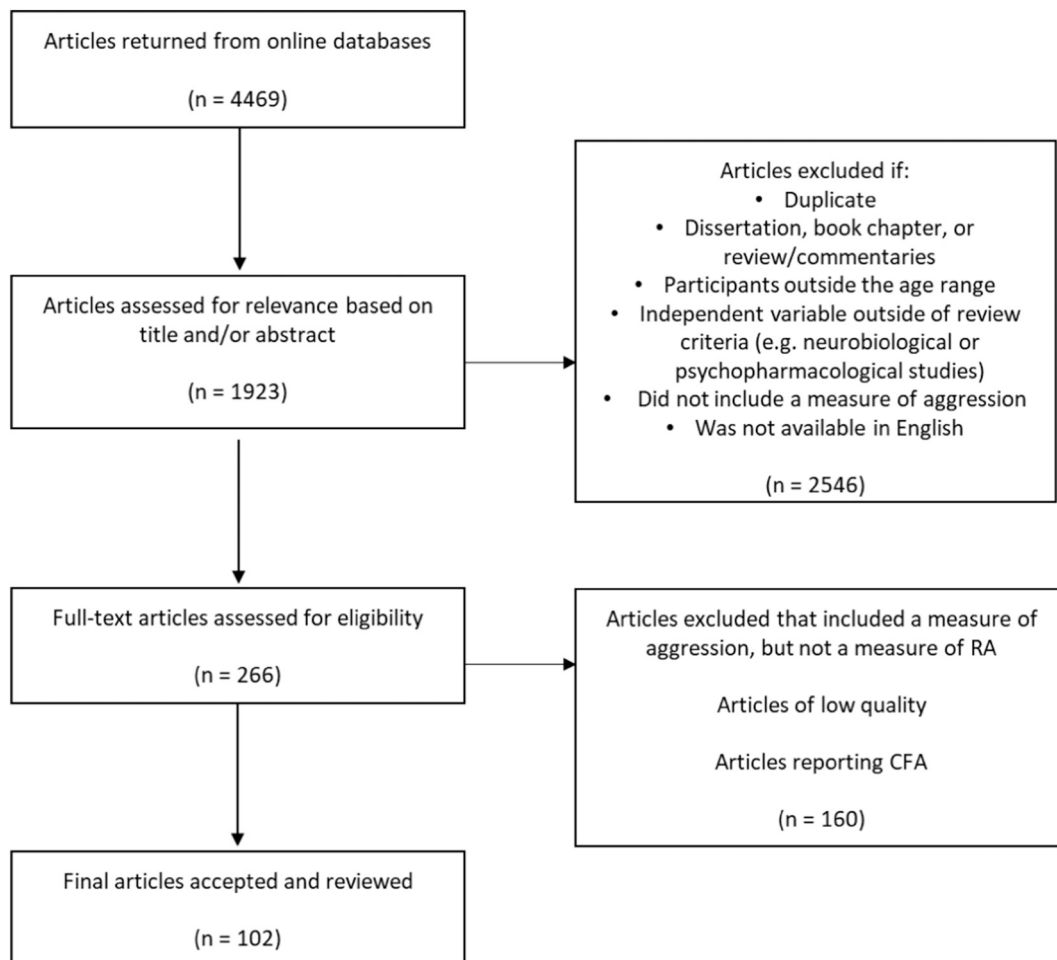


Fig. 1. Flowchart of search procedures and included studies.

relational aggression measure; 4) dependent variables related to psychosocial factors; and 5) overall study quality.

2.3.2. Evaluation of study rigor

The methodological rigor of each study was evaluated by assessing the reliability and validity statistics of the quantitative relational aggression measure used and the descriptive statistics reported in each study. Reliability can be conceptualised as the degree to which an instrument yields consistent results. Descriptive statistics provide simple summaries about the participant sample and the measures used to assess independent and dependant variables. Descriptive statistics are important for establishing the validity of the participant sample and allows comparison to other similar studies (Morgan, Gliner, & Harmon, 1999). Quality indicators included: 1) sufficient detail on participant characteristics, including mean age and gender; 2) sufficient detail to enable replication of the relational aggression measure; and 3) sufficient detail to enable interpretation of the relational aggression measure including reporting of the prevalence of relational aggression (sample mean and standard deviation) and reliability coefficients. Based on these criteria, studies were assigned a rating of 'high quality', 'adequate', or 'low quality'. Studies classified as strong in methodological rigor received high quality ratings on all indicators. Studies classified as adequate received high quality ratings on a minimum of two indicators, and those classified as low in quality received less than two high quality ratings. Both authors independently evaluated each study, and there was 100% agreement for all coded variables and ratings.

3. Results

Characteristics summarised in Table 1 and below in narrative are grouped according to (a) relational aggression measure, (b) informant, (c) participant's mean age and total population sample, (d) the percentage of male participants, (e) mean relational aggression score and standard deviation for the population sample, and (f) the psychosocial factor(s) measured in the study.

3.1. Relational aggression measure

Measures of relational aggression have been utilised 142 times across the 102 articles. In total 35 different measures, in various forms, have been utilised to assess relational aggression during early childhood. The most commonly utilised measure of relational aggression has been the Preschool Social Behavior Scale (PSBS; Crick et al., 1997) ($n = 53$), with 29 studies using a teacher-informed six-item, five-point scale, English language version. Compared to other measures of relational aggression, the PSBS-TF has consistently shown high reliability ranging from >0.70 to 0.96. Other frequently utilised measures included naturalistic observations ($n = 22$), the Preschool Proactive and Reactive Aggression – Teacher Report (PPRATR; Ostrov & Crick, 2007) ($n = 11$), sociometric nomination procedures ($n = 9$), the Children's Social Behavior Scale – Teacher Form (CSBS-T; Crick, 1996) ($n = 7$), and the MacArthur Health and Behavior Questionnaire (MHQ; Boyce et al., 2002) ($n = 4$). Sociometric nominations generally had the lowest reliability scores (or reliability was not reported) compared to the other common measures of relational aggression. Researchers assessing relational aggression during

Table 1
Summary of research that has included an assessment of relational aggression during early childhood.

Measure of relational aggression (RA)	RA measure informant	Mean participant age in months (N)	% male	Reliability of RA measure	Mean score per item (SD)	Psychosocial factor(s) measured in the same study	Reference
Preschool Social Behavior Scale–Teacher Form (PSBS–TF) – six items (five-point scale)	Teacher	49.56 (751)	51	$\alpha = 0.84$	1.75 (1.86)	Physical aggression, anger-expressing levels, emotion regulation	Ersan (2019)
"	"	47.37 (86)	44	$\alpha > 0.90$	Not reported	Physical aggression, friendship status and quality	Kamper-DeMarco and Ostrov (2019) ^a
"	"	56.50 (275)	51	$\alpha = 0.89$	1.76 (0.55)	Physical aggression, parenting behaviours	Lau (2019) ^a
"	"	51.12 (105)	51	$\alpha = 0.84$	1.90 (0.85)	Physical aggression, theory of mind, verbal ability	Baker et al. (2018)
"	"	45.22 (97)	57	$\alpha = 0.93$ to 0.94	1.48 (0.71)	Physical aggression, peer victimization, ADHD symptoms, deception/lying, prosocial behavior, depressive symptoms, anxiety	Kamper-DeMarco and Ostrov (2017)
"	"	60.2 (109)	48	$\alpha = 0.89$	2.15 (1.65)	Physical aggression, Social skills, executive functioning, language development and skills, prosocial behavior, theory of mind	Shahaecian et al. (2017) ^a
"	"	53.13 (16)	31	$\alpha = 0.91$	2.67 (1.29)	Physical aggression, prosocial behavior, personal-social skills, acceptability beliefs, behavioral responses to aggression	Swit et al. (2016)
"	"	58.56 (35)	60	$\alpha = 0.92$	2.12 (2.68)	Physical aggression, mother-child relationship	Ambrose and Menna (2013) ^a
"	"	57.53 (59)	59	$\alpha = 0.94$	1.65 (2.23)	Physical aggression, prosocial behavior, affect in play	Fehr and Russ (2013)
"	"	T1: 42.44 (47); T2: not reported (40)	36	$\alpha > 0.80$	T1: 1.79 (2.21); T2: 2.05 (2.40)	Physical aggression, parental media monitoring, violent media exposure, educational media exposure	Ostrov, Gentile, and Mullins (2013) ^a
"	"	55 (193)	51	$\alpha = 0.90$	Reported combined with another measure	Physical aggression, emotion regulation, social information processing	Helmsen et al. (2012)
"	"	50.0 (60)	58	$\alpha = 0.93$	1.9 (2.3)	Prosocial behavior	Swit and McMaugh (2012)
"	"	54.86 (65)	48	$\alpha = 0.94$	2.00 (0.96)	Physical aggression, effortful control	Gower and Crick (2011) ^a
"	"	48.67 (24)	54	Not reported	Not reported	Physical aggression, counter-normative behavior	Ingram and Bering (2010)
"	"	44.36 (120)	43	$\alpha > 0.87$	T1: 1.60 (1.99); T2: 1.78 (2.22)	Physical aggression, prosocial behavior, peer rejection, victimization	Ostrov (2008) ^a
"	"	43.54 (47)	36	$\alpha > 0.80$	2.81 (2.63)	Physical aggression, prosocial behavior, parent-child relationship qualities, student-teacher relationship	Ostrov and Bishop (2008) ^a
"	"	44.36 (120)	43	$\alpha = 0.87$ to 0.93	T1: 1.60 (1.99); T2: 1.78 (2.22)	Physical aggression, deception	Ostrov et al. (2008) ^a
"	"	79.68 (57)	40	$\alpha = 0.96$	1.48 (2.02)	Parent over reactivity, parent laxness, positive affect, negative affect	Brown et al. (2007)
"	"	48.4 (82)	51	$\alpha = 0.93$	1.26 (1.33)	Overt aggression, peer acceptance, social skills	Carpenter and Nangle (2006)
"	"	51 (122)	43	$\alpha = 0.90$	Not reported	Physical aggression, parenting style, psychological control, child's reunion behaviours	Casas et al. (2006) ^a
"	"	39.0 (91)	57	$\alpha > 0.70$	Reported combined with observation measure	Physical aggression, peer rejection	Crick et al. (2006) ^a
"	"	44.65 (64)	42	$\alpha > 0.80$	Not reported	Physical aggression, deception	Ostrov (2006) ^a
"	"	47 (76)	50	$\alpha > 0.70$	Not reported	Physical aggression, verbal aggression, prosocial behavior, parental media monitoring, violent media	Ostrov, Gentile, and Crick (2006) ^a

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Table 1 (continued)

Measure of relational aggression (RA)	RA measure informant	Mean participant age in months (N)	% male	Reliability of RA measure	Mean score per item (SD)	Psychosocial factor(s) measured in the same study	Reference
"	"	50.36 (100)	Not reported	$\alpha = 0.90$	1.65 (not reported)	exposure, educational media exposure	Estrem (2005)
"	"	T1: 69.60 (74); T2: 61.08 (56)	55	$\alpha = 0.89$ to 0.91	T1: 0.00 (0.79); T2: 0.00 (0.83)	Physical aggression, language development	Johnson and Foster (2005) ^a
"	"	64 (48)	50	Not reported	Not reported	Physical aggression, prosocial behavior, peer liking, friendship mutuality and stability	Ostrov and Keating (2004) ^a
"	"	55.9 (145)	46	$\alpha = 0.93$	1.70 (1.71)	Physical aggression, verbal, and nonverbal aggression, peer acceptance, social dominance	Bonica et al. (2003)
"	"	58 (59)	58	Not reported	1.56 (0.27)	Relational victimization, language development	McEvoy et al. (2003) ^a
"	"	46.92 (98)	51	$\alpha = 0.94$	2.25 (1.08)	Physical aggression	Sebanç (2003)
Preschool Social Behavior Scale-Parent Form (PSBS-PF) – six items (five-point scale)	Parent	56.50 (mother: 247; father: 243)	51	Mother: $\alpha = 0.75$; father: $\alpha = 0.77$	Mother: 1.61 (0.41); father: 1.63 (0.41)	Overt aggression, peer acceptance and rejection	Lau (2019) ^a
"	"	58.56 (73)	60	$\alpha = 0.68$	1.85 (0.97)	Physical aggression, parenting behaviours	Ambrose and Menna (2013) ^a
PSBS-TF – three items (five-point scale)	Teacher	33.61 (198)	49	$\alpha = 0.82$	1.42 (0.75)	Physical aggression, mother-child relationship	Krygsmann and Vaillancourt (2019) ^a
PSBS-TF – three items (three-point scale)	Teacher	72.7 (682)	49	$\alpha = 0.83$	0.17 (0.34)	Physical aggression, depression, peer victimization	Wettstein et al. (2013) ^a
PSBS-TF – six items (nine-point scale)	Teacher	Not reported (226)	46	$\alpha > 0.90$	T1: 1.79 (3.16); T2: 1.62 (2.53)	Physical aggression, prosocial behavior, peer social preference	Boyle and Hassett-Walker (2008)
PSBS-TF – eight items (five-point scale)	Teacher	T1: 57.16 (166); T3: not reported (176)	52	$\alpha > 0.85$	T1, T2: reported combined with observation measure; T3: 1.50 (1.56)	Overt aggression, general aggression, impulsivity, passivity	Gower et al. (2014) ^a
"	"	49.67 (75)	53	$\alpha = 0.90$ to 0.93	T1: 1.59 (0.60); T2: 1.69 (0.76)	Physical aggression, student-teacher relationship quality, peer acceptance, behavioral and emotional problems	Gower and Crick (2011) ^a
"	"	52 (67)	48	$\alpha = 0.94$	2.00 (2.34)	Physical aggression, effortful control	Juliano et al. (2006) ^a
"	"	45.36 (87)	54	$\alpha = 0.82$	Not reported	Physical aggression, prosocial behavior, impulsive and oppositional behavior, anxious and depressive behavior	Werner, Senich, and Przepyszny (2006)
"	"	Not reported (65)	52	$\alpha = 0.96$	1.49 (1.96)	Physical aggression, mothers' responses to aggression, maternal emotional response, maternal behavioral intervention strategies	Crick et al. (1997) ^a
PSBS-TF – nine items (five-point scale)	Teacher	T1: 51.60 (175)	48	$\alpha = 0.88$	T1: 1.77 (0.59), T2: 1.57 (0.60)	Overt aggression, prosocial behavior, depressed affect, peer acceptance, peer rejection	Werner et al. (2014)
PSBS-TF – translated into Turkish – six items (five-point scale)	Teacher	63.6 (90)	50	$\alpha = 0.78$	T1: 1.55 (1.32); T2: 1.37 (0.95); T3: 1.51 (1.73)	Physical aggression, mothers' social coaching qualities	Akcan and Ergun (2019)
"	"	Not reported (30)	47	Not reported	T1: 3.36 (1.72); T2: 2.79 (1.77)	Overt aggression, aggressiveness intensity and problem, victimization	Akçay and Emiroğlu (2019)
"	"	Not reported (300)	48	$\alpha = 0.90$	3.72 (2.32)	Physical aggression, prosocial behavior, children's media interaction	Soydan et al. (2017)
PSBS-TF – shortened Japanese version – five items (five-point scale)	Teacher	Not reported (16)	0	$\alpha = 0.88$	1.6 (0.7)	Physical aggression, student-teacher relationship, parental attitudes	Isobe et al. (2004)
PSBS-TF – Iranian translated and adapted version – ten items (three-point scale)	Teacher	59.04 (106)	60	$\alpha = 0.87$	1.56 (1.50)	Interactive behaviours	Shahaeian et al. (2017) ^a
"	"	59.04 (106)	68	Not reported	1.56 (1.49)	Physical aggression, social skills, executive functioning, language development and skills, prosocial behavior, theory of mind	Language development

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Table 1 (continued)

Measure of relational aggression (RA)	RA measure informant	Mean participant age in months (N)	% male	Reliability of RA measure	Mean score per item (SD)	Psychosocial factor(s) measured in the same study	Reference
PSBS-PF – ten items (five-point scale)	Parent	T1: 57.81 (240); T2: not reported (198)	49	$\alpha = 0.73$ to 0.78	T1: 1.69 (0.41); T2: not reported	Physical aggression, superhero engagement, verbal aggression, prosocial behavior, defending behavior, television violence and time	Razmjooe et al. (2016) Coyne et al. (2017)
Preschool Social Behavior Scale-Teacher Form completed by observers (PSBS-OF) – six items (five-point scale)	Observer	45.09 (101)	40	$\alpha = 0.93$ to 0.94	Not reported	physical aggression, proactive and reactive physical and relational aggression, prosocial behavior, social exclusion, social dominance	Murray-Close and Ostrov (2009)
PSBS-TF – number of items not reported (scale not reported)	Teacher	57.93 (105)	58	$\alpha = 0.72$ to 0.86	1.46 (1.49)	Physical aggression, play behavior, victimization	Metin Aslan (2018) ^a
Preschool Proactive and Reactive Aggression – Teacher Report (PPRA-TR) – six items (five-point scale)	Teacher	51.70 (143)	50	Not reported	Reactive: 1.94 (0.90); proactive: 1.82 (0.99)	Physical aggression, inhibitory control, cognitive interference	Baker et al. (2019)
"	"	44.88 (124)	59	$\alpha = 0.92$	1.82 (0.80)	Physical aggression, victimization, bullying, social maladjustment problems	Ostrov et al. (2019) ^a
"	"	T1: 58.8; T2: 64.65; T3: 71.36 (80)	50	Not reported	T1: 4.40 (1.52); T2: 3.61 (1.55); T3: 3.48 (1.88)	Physical aggression, cool and hot executive functioning, verbal ability	O'Toole et al. (2019)
"	"	61.43 (106)	48	$\alpha = 0.80$ (proactive); 0.81 (reactive)	2.20 (0.76)	Physical aggression, peer acceptance, prosocial behavior, cool and hot executive functioning, theory of mind, verbal ability	O'Toole et al. (2017)
"	"	61 (104)	50	Not reported	Reactive: 2.34 (0.79); proactive: 2.12 (0.79)	Physical aggression, cool and hot executive functioning	Poland et al. (2016)
"	"	50.31 (36)	39	ICC: proactive = 0.84; reactive = 0.85	Not reported	Physical aggression, relationship with parents, peers, and siblings, academic progress, self-esteem, family functioning	Hart and Ostrov (2013) ^a
PPRA-TR – six items (six-point scale)	Teacher	T1: 67.68; T2: not reported (135)	50	$\alpha = 0.89$ to 0.93	T1: 2.12 (1.01), T2: 2.06 (0.78)	Physical aggression	Jambon and Smetana (2020)
PPRA-TR – four items (five-point scale)	Teacher	44.76 (301)	49	$\alpha > 0.69$ to 0.82	T1 – reactive: 2.11 (1.39), proactive: 1.84 (1.31); T2 – Reactive: 1.93 (1.30), Proactive: 1.70 (1.22)	Physical aggression, victimization	Ostrov et al. (2014)
Preschool Proactive and Reactive Aggression-Observer Report (PPRA-OR) – six items (five-point scale)	Observer	47.11 (332)	52	$\alpha > 0.87$	Proactive: 1.81 (0.79); reactive: 1.99 (0.87)	Physical aggression, asocial with peers, hyperactive-distractible, anxious-fearful, depressed affect, deception	Perry and Ostrov (2018)
"	"	42.80 (96)	53	ICC > 0.70	T1 – reactive: 2.02 (1.45), proactive: 1.75 (1.32); T2 – reactive: 1.77 (1.36), Proactive: 1.57 (1.36)	Physical aggression, peer rejection, anger, emotion regulation	Ostrov, Murray-Close, et al. (2013)
Naturalistic observations using the relational aggression subscale of the PPRA-RA (five-point scale)	Observer	46.78 (105)	48	$\alpha = 0.95$	2.03 (0.86)	Physical aggression, victimization, bullying, social maladjustment problems	Ostrov et al. (2019) ^a
MacArthur Health and Behavior Questionnaire-Teacher Version (HBQ-T) – six items (three-point scale)	Teacher	53.83 (50)	48	Not reported	0.58 (0.54)	Physical aggression, emotional understanding and emotion situation knowledge, peer acceptance, victimization, prosocial behavior, language skills, intellectual functioning	Laurent et al. (2018)
"	"	67.20 (89)	48	$\alpha = 0.81$	0.16 (0.26)	Physical aggression, overanxious behavior, parent emotional support, parent minimization, teacher-child closeness	Bardack and Obradović (2017) ^a
"	"	48.33 (146)	48	Not reported	Not reported		Belden et al. (2012)

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Table 1 (continued)

Measure of relational aggression (RA)	RA measure informant	Mean participant age in months (N)	% male	Reliability of RA measure	Mean score per item (SD)	Psychosocial factor(s) measured in the same study	Reference
MacArthur Health and Behavior Questionnaire–Parent Version – six items (three-point scale)	Parent	67.20 (89)	48	$\alpha = 0.66$	0.27 (0.27)	Victimization, functional impairment, preschool onset DSM-IV psychiatric disorders	Bardack and Obradović (2017) ^a
Items based on PSBS-TF and Direct and Indirect Aggression Scales	Teacher	84.7 (203)	49	$\alpha = 0.78$	0.75 (1.22)	Physical aggression, overanxious behavior, parent emotional support, parent minimization, teacher-child closeness	Brendgen et al. (2008) ^a
"	"	72.7 (234)	51	$\alpha = 0.82$	0.72 (1.22)	Physical aggression	Brendgen et al. (2005) ^a
Created for this study – 13 items (five-point scale)	Teacher	92.4 (496)	49	$\alpha = 0.93$	Not reported	Overt aggression, hostile attribution bias and feelings of distress, ODD symptoms, behavioral and emotional problems	de la Osa et al. (2018)
"	"	36 (622)	50	T1: $\alpha = 0.90$; T2: $\alpha = 0.94$	T1: 3.59 (3.70); T2: 3.29 (4.90)	Psychological disorders, callous-unemotional traits, social cognition, behavioral and emotional problems, functional impairment, general aggression index	Ezpeleta et al. (2015)
Created for this study – ten items (three-point scale)	Teacher	60 (258)	46	$\alpha = 0.92$	1.70 (1.98)	None	Shahim (2008)
Derived from Crick and colleagues' various measures of relational aggression – three items (five-point scale)	Teacher	Not reported (133)	59	T1 $\alpha = 0.62$; T2/T3 $\alpha = 0.89$ to 0.90	T1: 1.28 (0.45); T2: 1.34 (0.69); T3: 1.38 (0.70)	Physical aggression, proactive and reactive aggression, peer rejection, depressive symptoms, academic performance	Evans et al. (2018)
Adapted from Crick and Bigbee's (1998) measure of relational aggression – three items (five-point scale)	Teacher	Not reported (706)	49	$\alpha = 0.85$	1.27 (0.62)	Physical aggression, ADHD symptoms, ODD symptoms, proactive and reactive aggression, relational and physical victimization, peer rejection, withdrawn/depressed symptoms, academic performance	Evans et al. (2016)
Ladd and Profflet Child Behavior Scale – Aggressive with Peers subscale adapted for Turkish children – number of items not reported (three-point scale)	Teacher	Not reported (186)	52	Internal consistency coefficient = 0.81	Not reported per item; summed result: 4.01 (1.10)	Physical aggression, peer victimization	Gülay Ogelman et al. (2019) ^a
Children's Social Behavior Scale–Teacher Form (CSBS–TF) – six items (six-point scale)	Teacher	Not reported (164)	55	$\alpha = 0.95$	T1: 1.83 (1.00); T2: 1.33 (0.63)	Prosocial behavior, emotion regulation and symptoms, peer problems, conduct problems, hyperactive-impulsive behavior	Mihic et al. (2016)
CSBS-TF – seven items (five-point scale)	Teacher	60.24 (47)	49	$\alpha = 0.72$	1.55 (0.45)	Overt aggression, emotion recognition, prosocial behavior, affective perspective taking, reconciliation tendency	Liao et al. (2014)
CSBS-TF – five items (five-point scale)	Teacher	95.40 (283)	44	$\alpha = 0.90$ to 0.93	1.99 (0.89)	Overt aggression, victimization, temperament, depressive symptoms	Sugimura and Rudolph (2012)
"	"	Not reported (433)	45	$\alpha = 0.92$	2.02 (0.91)	Overt aggression, victimization, depressive symptoms	Rudolph et al. (2011)
Children's Social Behavior–Parent Report – five items (five-point scale)	Parent	87.96 (112)	51	$\alpha = 0.86$	T1: 1.80 (0.90); T2: 1.79 (0.97)	Physical aggression	Perry and Price (2017)
"	"	T3: not reported (27)	33	$\alpha = 0.73$	Not reported	Physical aggression, parental media monitoring, violent media exposure, educational media exposure	Ostrov, Gentile, and Mullins (2013) ^a
"	"	43.54 (47)	36	$\alpha = 0.67$	2.07 (1.50)	Physical aggression, prosocial behavior, parent-child relationship qualities, student-teacher relationship	Ostrov and Bishop (2008) ^a
Child Social Behavior Scale covert aggression scale – number of items not reported (scale not reported)	Teacher	Not reported (80)	50	$\alpha = 0.85$	1.34 (2.17)	Total aggression, lack of peer intimacy, empathy, perceptions of school,	Nelson, Kendall, and Shields (2013)

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Table 1 (continued)

Measure of relational aggression (RA)	RA measure informant	Mean participant age in months (N)	% male	Reliability of RA measure	Mean score per item (SD)	Psychosocial factor(s) measured in the same study	Reference
Revised Children’s Social Behavior–Parent Report – five items (five-point scale)	Parent	73.33 (36)	39	$\alpha = 0.72$	Not reported	prosocial behavior, fear and anger emotionality, emotion regulation Physical aggression, relationship with parents, peers, and siblings, academic progress, self-esteem, family functioning	Hart and Ostrov (2013) ^a
Social Behavior Scale (SBS) – a composite of items drawn from Children’s Social Behavior Scale – Teacher Form (CSBS–T) and PSBS–TF – number of relational aggression items not reported (five-point scale)	Teacher	86.4 (153)	51	Not reported	Not reported	Overt aggression, prosocial behavior, peer victimization, parent sensitivity, parent depression, child’s depression	Haskett et al. (2008)
Problem Behavior at School Interview – revised (PBSI–r) – three items based on CSBS–TF (five-point scale)	Teacher	89.04 (570)	49	$\alpha = 0.82$ to 0.87	T1: 1.80 (0.72); T2: 1.88 (0.81)	Teacher behavior	Weyns et al. (2017) ^a
Multi-item aggression scale – nine items (seven-point scale)	Teacher	52.08 (119)	43	$\alpha = 0.93$	0.04 (1.03)	Physical aggression, child’s personality, peer acceptance and rejection, parenting behaviours	McNamara et al. (2010) ^a
Multi-item aggression scale – three items (scale details not reported)	Teacher	51.48 (163)	45	$\alpha = 0.78$	2.68 (1.46)	Overt aggression, resource control strategies, problem solving strategies, receptive language ability, moral cognition, moral affect, social preference	Hawley (2003)
“Teacher measure” – 13 items (three-point scale)	Teacher	58.64 (241)	56	$\alpha = 0.74$ to 0.93	Not reported for whole measure	Overt aggression	McNeilly-Choque et al. (1996) ^a Nelson et al. (2014)
Items developed by McNeilly-Choque et al. (1996) – four items (three-point scale)	Teacher	59.87 (168)	50	$\alpha = 0.89$	0.50 (0.53)	Physical aggression, parenting dimensions	Nelson et al. (2014)
Items developed by McNeilly-Choque et al. (1996) – number of items not reported (three-point scale)	Teacher	57 (277)	52	Not reported	Not reported	Physical aggression, Peer sociometric assessments, Sociable behavior	Nelson et al. (2005) ^a
Derived from teacher measures successfully used with preschoolers in North American sample (Crick et al., 1997; McNeilly-Choque et al., 1996) – eight items (three-point scale)	Teacher	61.20 (207)	49	$\alpha = 0.91$	2.25 (0.33)	Overt aggression, parenting behavior, marital interactions	Hart et al. (1998)
Reduced teacher measure based on a previously tested expanded measure (Hart et al., 1998; McNeilly-Choque et al., 1996) – six items (three-point scale)	Teacher	57.07 (421)	54	$\alpha = 0.74$ to 0.92	0.38 (0.44)	Physical aggression, prosocial and sociability behaviours, child temperament, authoritative and authoritarian parenting styles	Russell et al. (2003)
“A battery of measures” – number of items not reported (three-point scale)	Teacher	60.23 (221)	49	$\alpha = 0.72$ to 0.89	2.41 (0.40)	Physical aggression, sociability, victimization	Nelson et al. (2016) ^a
Items adapted from the work of Crick et al., 1997 – four items (five-point scale)	Teacher	64.04 (260)	50	Not reported	Not reported	Physical aggression, sociability, victimization, peer sociometric assessments	Nelson et al. (2010) ^a
Derived from preschool measures previously employed with North American samples – number of items not reported (three-point scale)	Teacher	61.20 (204)	47	Not reported	Not reported	Physical aggression, dimensions of psychological control	Nelson, Yang, et al. (2013)
Preschoolers’ aggression questionnaire/scale – nine items (five-point scale)	Teacher	54.12 (60)	55	$\alpha = 0.94$	T1: 3.56 (0.74); T2: 3.44 (1.33)	Physical and verbal aggression, impulsive anger	Yektatabab et al. (2016)
Aggression Scale for Preschoolers (ASFP) – nine items (five-point scale)	Not reported	Not reported (144)	44	Not reported	T1: 1.16 (2.62); T2: 1.07 (2.18); T3: 1.03 (1.76); T4: 1.09 (2.34)	Physical aggression, verbal aggression, impulsive anger, speech intelligibility	Saki et al. (2019)
Multidimensional Assessment of Preschool Disruptive Behavior (MAP-DB) – eight items (six-point scale)	Parent	Not reported (1524)	48	$\alpha = 0.89$	0.70 (0.03)	Physical aggression, verbal aggression	Dirks et al. (2019)
Multi-item aggression scale – nine items (seven-point scale)	Parent	52.08 (119)	43	$\alpha = 0.79$	0.01 (1.00)	Physical aggression, child’s personality, peer acceptance	McNamara et al. (2010) ^a

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Table 1 (continued)

Measure of relational aggression (RA)	RA measure informant	Mean participant age in months (N)	% male	Reliability of RA measure	Mean score per item (SD)	Psychosocial factor(s) measured in the same study	Reference
Children's Social Experiences – two items (five-point scale)	Parent	51 (mother: 119; father: 85)	43	Not reported	Mother: 2.15 (1.14), father: 2.28 (1.05)	and rejection, parenting behaviours Physical aggression, parenting style, psychological control, child's reunion behaviours	Casas et al. (2006) ^a
Preschool School Behavior Scale–Peer Form (PSBS–P) – seven items (up to three nominations per item)	Peer	58 (59)	58	Cohen's $\kappa = 0.98$	0.07 (0.03)	Physical aggression	McEvoy et al. (2003) ^a
"	"	Not reported (65)	52	$\alpha = 0.71$	Not reported	Overt aggression, prosocial behavior, depressed affect, peer acceptance, peer rejection	Crick et al. (1997) ^a
PSBS–P – four items (unlimited nominations)	Peer	T1: 69.60 (74); T2: 61.08 (56)	55	$\alpha = 0.89$ to 0.90	T1: 0.00 (0.77); T2: 0.23 (0.72)	Physical aggression, prosocial behavior, peer liking, friendship mutuality and stability	Johnson and Foster (2005) ^a
PSBS–P – one item (three-point scale)	Peer	39.0 (91)	57	Not reported	Not reported	Physical aggression, peer rejection	Crick et al. (2006) ^a
Sociometric nomination procedure (unlimited nominations)	Peer	89.04 (570)	49	Not reported	T1: 0.11 (0.12); T2: 0.16 (0.16)	Teacher behavior	Weyns et al. (2017) ^a
Sociometric nomination procedure (up to six nominations per item)	Peer	60.23 (221)	49	$\alpha = 0.77$ to 0.93	0.00 (0.88)	Physical aggression, sociability, victimization	Nelson et al. (2016) ^a
"	"	61 (215)	47	Not reported	0.00 (0.96)	Physical aggression, parenting dimensions	Nelson et al. (2006)
Sociometric nomination procedure (up to five nominations per item)	Peer	64.04 (266)	50	Not reported	0.09 (0.82)	Physical aggression, sociability, victimization, peer sociometric assessments	Nelson et al. (2010) ^a
Sociometric nomination procedure (up to three nominations per item)	Peer	72.7 (192)	48	Inter-item correlation = 0.46	Not reported	Physical aggression, peer group norms of physical and relational aggression	Brendgen et al. (2013)
"	"	72.7 (682)	49	$\alpha = 0.62$	-0.16 (0.70)	Physical aggression, prosocial behavior, peer social preference	Wettstein et al. (2013) ^a
"	"	57 (325)	52	Not reported	Not reported	Physical aggression, peer sociometric assessments, sociable behavior	Nelson et al. (2005) ^a
"	"	58.64 (241)	56	$\alpha = 0.63$	Not reported	Overt aggression	McNeilly-Choque et al. (1996) ^a
Sociometric nomination procedure (three nominations per item)	Peer	84.7 (203)	49	Not reported	-0.17 (0.90)	Physical aggression, friends' aggressive behavior	Brendgen et al. (2008) ^a
"	"	72.7 (234)	51	$\alpha = 0.62$	-0.26 (0.77)	Physical aggression	Brendgen et al. (2005) ^a
Naturalistic observations	Observer	45.22 (97)	57	ICC > 0.71	T1: 0.51 (0.94); T2: 0.46 (0.95)	Physical aggression, victimization, emotion regulation, peer rejection	Godleski et al. (2015)
"	"	57.16 (190)	52	Inter-rater reliability = 0.82	Reported combined with teacher measure	Physical aggression, student-teacher relationship quality, peer acceptance, behavioral and emotional problems	Gower et al. (2014) ^a
"	"	50.31 (36)	39	ICCs ≥ 0.72	Proactive: 1.41 (2.03); Reactive: 0.24 (0.53)	Physical aggression, relationship with parents, peers, and siblings, academic progress, self-esteem, family functioning	Hart and Ostrov (2013) ^a
"	"	61.4 (42)	50	Cohen's $\kappa = 0.61$ to 1.0	0.06 (0.06)	Social acceptance and rejection, social dominance	Fanger et al. (2012)
"	"	66 (269)	50	$\kappa = 0.77$; ICC = 0.79	0.07 (0.09)	Physical aggression, peer rejection, overt and covert antisocial behavior	McEachern and Snyder (2012)
"	"	44.36 (120)	43	ICC = 0.72 to 0.86	T1: 1.02 (1.50); T2: 1.60 (2.42)	Physical aggression, prosocial behavior, peer rejection, victimization	Ostrov (2008) ^a
"	"	43.54 (47)	36	ICC > 0.72	0.98 (1.36)	Physical aggression, prosocial behavior, parent-child relationship qualities, student-teacher relationship	Ostrov and Bishop (2008) ^a
"	"	44.36 (120)	43	ICC = 0.72 to 0.86	T1: 1.02 (1.50); T2: 1.60 (2.42)	Physical aggression, deception	Ostrov et al. (2008) ^a
"	"	39.0 (91)	57	ICCs = 0.77 to 0.91		Physical aggression, peer rejection	Crick et al. (2006) ^a

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Table 1 (continued)

Measure of relational aggression (RA)	RA measure informant	Mean participant age in months (N)	% male	Reliability of RA measure	Mean score per item (SD)	Psychosocial factor(s) measured in the same study	Reference
"	"	52 (67)	48	Cohen's $\kappa = 0.75$	0.82 (1.95)	Physical aggression, prosocial behavior, impulsive and oppositional behavior, anxious and depressive behavior	Juliano et al. (2006) ^a
"	"	44.65 (64)	42	ICC = 0.81	0.07 (0.14)	Physical aggression, deception	Ostrov (2006) ^a
"	"	43.87 (50)	52	ICC = 0.77 to 0.91	0.23 (0.44)	Physical aggression	Ostrov, Crick, and Stauffacher (2006)
"	"	47 (76)	50	ICC = 0.70 to 0.85	Not reported	Physical aggression, verbal aggression, prosocial behavior, parental media monitoring, violent media exposure, educational media exposure	Ostrov, Gentile, and Crick (2006) ^a
"	"	52 (67)	48	Cohen's $\kappa = 0.84$	0.83 (1.45)	Physical aggression, theory of mind, social information-processing, language ability	Werner, Cassidy, and Juliano (2006)
"	"	49.5 (101)	48	ICC = 0.70 to 0.85	T1: 0.31 (0.42); T2: 0.22 (0.30)	Assessment of friendship	Burr et al. (2005)
Naturalistic observations	Observer	64 (48)	50	ICC = 0.82	5.25 (4.40)	Physical, verbal, and nonverbal aggression, peer acceptance, social dominance	Ostrov and Keating (2004) ^a
"	"	58 (59)	58	Cohen's $\kappa = 0.75$	0.01 (0.01)	Physical aggression	McEvoy et al. (2003) ^a
"	"	58.64 (241)	56	Interobserver reliability = 85%	1.13 (1.41)	Overt aggression	McNeilly-Choque et al. (1996) ^a
Early Childhood Observation System	Observer	47.37 (86)	44	ICC = 0.72 to 0.80	T1: 0.79 (1.21); T2: 0.71 (0.91)	Physical aggression, friendship status and quality	Kamper-DeMarco and Ostrov (2019) ^a
"	"	T1: 42.44 (47); T2: not reported (40)	36	ICC > 0.75	T1: 0.94 (1.19); T2: 2.43 (3.07)	Physical aggression, parental media monitoring, violent media exposure, educational media exposure	Ostrov, Gentile, and Mullins (2013) ^a
"	"	44.56 (103)	42	ICC = 0.72 to 0.86	T1: 1.04 (1.55); T2: 1.54 (2.12)	Physical aggression, victimization, peer rejection	Ostrov (2010)
"	"	45.54 (112)	42	ICC > 0.72	T1: 1.08 (1.53); T2: 1.71 (2.47)	Physical aggression, impulsivity-hyperactivity	Ostrov and Godleski (2009)
Revised version of Early Childhood Observation System	Observer	49.64 (403)	Not reported	ICC > 0.70	T1: 5.78 (3.06); T2: 4.28 (3.34)	Physical aggression, prosocial behavior, relational and physical victimization	Ostrov et al. (2009)
Early Childhood Play and Aggression Observation Form – nonverbal aggression dimension	Observer	57.93 (105)	58	ICC = 0.80; $\kappa = 0.75$ to 0.97	1.46 (1.49)	Physical aggression, play behavior, victimization	Metin Aslan (2018) ^a
Early Childhood Play Project observation system	Observer	33.61 (198)	49	ICC = 0.88	0.16 (0.32)	Physical aggression, depression, peer victimization	Krygsmann and Vaillancourt (2019) ^a
Structured interaction (triadic play situation)	Observer	56.03 (85)	54	ICC = 0.72	0.44 (1.05)	Physical aggression, Prosocial behavior, emotion situation knowledge, anger perception bias, mother-child emotional disclosure, child language production	Garner et al. (2008)
Structured interaction (coloring task)	Observer	64 (48)	50	ICC = 0.93	2.03 (2.33)	Physical, verbal, and nonverbal aggression, peer acceptance, social dominance	Ostrov and Keating (2004) ^a
"	"	54.86 (60)	52	ICC = 0.93	1.10 (1.58)	Physical, verbal, nonverbal, and received aggression, Prosocial behavior, Social behavior and adjustment	Ostrov et al. (2004)
Structured interaction (assigned activities)	Observer	56.41 (63)	Not reported	$\alpha = 0.97$	Sample size detail not sufficient to allow summary of results	Social engagement	Stauffacher and DeHart (2006)
"	"	Not reported (63)	Not reported	$\alpha = 0.97$	Sample size detail not sufficient to	Social engagement	

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Table 1 (continued)

Measure of relational aggression (RA)	RA measure informant	Mean participant age in months (N)	% male	Reliability of RA measure	Mean score per item (SD)	Psychosocial factor(s) measured in the same study	Reference
							allow summary of results
							Stauffer and DeHart (2005)

^a More than one measure/informant of relational aggression from this reference is included in the table; ICC = intra-class correlation coefficient; in order to present results in a standardized format, group means have been combined to provide an overall mean when an overall result was not reported; for longitudinal studies, when not otherwise specified, age has been reported for the first phase of the study and only the time points that the mean age of participants was 8.0 years or younger have been included in this review. Results for PSBS-TF and PPRA-TR measures where a five-point scale was used have been adjusted to represent a scale of 1 to 5 when a 0 to 4 scale was used.

early childhood have also tended to use measures that have been adapted, derived or created for the particular study ($n = 19$).

Most research assessing relational aggression during early childhood has been conducted in the United States ($n = 65$). Other countries where an assessment of relational aggression has been undertaken during early childhood include Canada ($n = 6$), Turkey ($n = 6$), Iran ($n = 5$), Australia ($n = 4$), Russia ($n = 4$), United Kingdom ($n = 4$), China ($n = 2$), Spain ($n = 2$), and one study in each of Belgium, Hong Kong, Croatia, Germany, Italy, and Japan. Further, only 12 of the 102 studies included in this review were short-term longitudinal studies.

3.2. Informant

Twenty-six of the articles included in this review used two informants of relational aggression, and seven articles included three informants. The remaining 69 articles relied on a single informant to report on children's relational aggression. The most common informants of young children's relationally aggressive behavior were teachers (57.75%) and observers (23.94%). Less frequent informants were peers (9.86%) and parents (7.75%). One study did not report the relationship of the informant used.

3.3. Participant's mean age and total population sample

Collectively, the 102 studies have included 18,634 children aged between 1 and 8 years old. Sample sizes ranged from 16 to 1524 participants ($M = 182.69$). Where mean age was reported ($n = 88$) and using reported mean age at time point one of longitudinal studies, the mean age of relational aggression assessment in the reviewed articles was 56.50 months. The mean age ranged from 34 months to 95 months old. The majority of articles ($n = 88$) measured relational aggression in children under the age of six and 42 articles reported a mean age of four years old.

3.4. Percentage of male participants

Of the articles that reported the gender of participants ($n = 98$), 69 had a similar number of male and female participants ($50\% \pm 5\%$), while 17 had a majority female participants (greater than 55% of participants were female), and 12 had a majority of male participants (greater than 55% male).

3.5. Prevalence of relational aggression

Since 1995, extensive research has assessed relational aggression during early childhood. As shown in Fig. 2, an average of 4.86 articles have been published per year that have included at least one assessment of assessments of relational aggression has been observed.

Over the past 25 years, the prevalence of relational aggression during early childhood has remained fairly stable, when the common PSBS-TF five-point scale (Crick et al., 1997) measure of relational aggression has

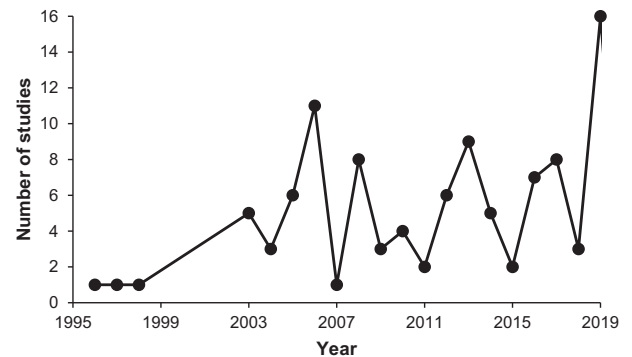


Fig. 2. Count of papers published that include at least one RA assessment (per year).

been used (see Fig. 3). In 25 of the 40 studies where the PSBS-TF five-point scale was used to assess relational aggression, teachers rated children as, on average, never or almost never engaging in relational aggression (i.e., Likert scale points 1–2). In three of these studies, teachers reported young children, on average, use relational aggression some of the time (i.e., Likert scale point 3) and in only one study teachers reported children, on average, engaged in relational aggression most of the time (i.e., Likert scale point 4). No studies found teachers reported children use relationally aggressive behaviors all of the time (i.e., Likert scale point 5). Nine of the studies that used the PSBS-TF with a five-point scale did not report the results of this measure. The summary of these PSBS-TF assessments suggests, on average, teachers report low levels of relational aggression during early childhood. The overall prevalence of relational aggression across all studies reviewed is difficult to ascertain because of the variability in the number of items used to assess relational aggression and the varying scales applied.

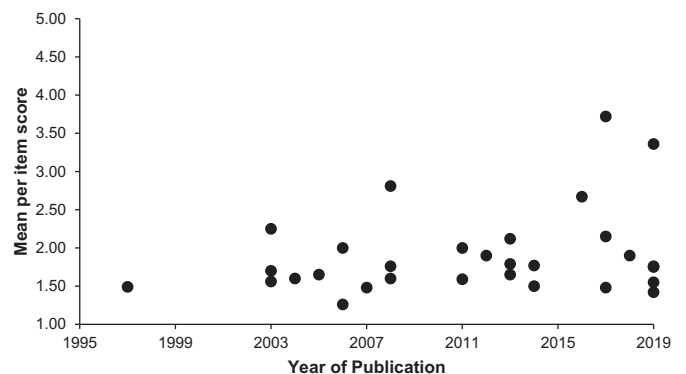


Fig. 3. Teacher-informed PSBS relational aggression assessments using a five-point scale (where results were reported [$n = 31$]).

3.6. Measures of psychosocial factors

In the 102 articles reviewed, a wide range of psychosocial factors have been assessed alongside relational aggression (see Appendix for Supplementary material). The majority of articles ($n = 88$) included two or more psychosocial factors. The most common relate to social factors (59.38% of all psychosocial factors assessed), including physical aggression ($n = 74$ articles), other forms of aggression such as reactive and proactive aggression, bullying, verbal and non-verbal aggression ($n = 31$), child-peer relationships ($n = 40$), prosocial behavior ($n = 31$), victimization ($n = 23$), and child-adult relationships ($n = 9$). Other psychosocial factors that were assessed in the articles reviewed included cognitive (22.69%), environmental (9.52%), and psychological (8.40%) factors. Common among these were social cognition ($n = 27$), parenting styles or practices ($n = 19$), executive function ($n = 17$), language development ($n = 12$), depressive symptoms ($n = 11$), media exposure ($n = 9$), hyperactivity-impulsivity ($n = 7$), aspects of personality ($n = 5$), and anxiety ($n = 5$). Overall, the psychosocial factors that have been assessed alongside relational aggression have tended to focus on individual factors. Fewer studies have been interested in environmental factors, including familial factors that might contribute to children's use of relational aggression during early childhood.

3.7. Study rigor

Study design rigor was evaluated for each of the 102 included articles. Sixty-five articles were considered to be of 'high quality' and included sufficient detail on participant characteristics, the relational aggression measure, the prevalence of relational aggression, and reported reliability coefficient(s). Thirty-eight articles failed to demonstrate high quality study rigor due to the absence of some basic descriptive statistics such as the mean age of participants, the mean score of relational aggression, and/or a reliability coefficient for the measure of relational aggression. These 38 articles were considered 'adequate quality'. As previously mentioned, three articles were rated as being 'low quality' because they did not include any of the quality indicators identified above. These three articles have not been included in the 102 articles that have been reviewed.

4. Discussion

This paper has presented a systematic review of 102 articles that assessed relational aggression in children aged between 12 and 96 months. The review was restricted to empirical articles that were published online in advance or in a journal from 1995 to 2019, representing the period since relational aggression was first examined in young children (Crick et al., 1995). Over the past 25 years, there has been a substantial increase in empirical studies that have included at least one measure of relational aggression in children between the ages of 1 and 8 years suggesting that relational aggression is considered an important construct to include in the assessment of aggression during early childhood. Despite the increase in attention towards relational aggression, prevalence rates reported in empirical studies reviewed in this paper do not indicate an increase in young children's use of these behaviors. Rather, the current review and synthesis of these studies suggest that since 1995, relational aggression has remained fairly stable with relatively low levels of relational aggression being reported by informants. This is encouraging and suggests that increased attention has not necessarily led to artificial inflation in the prevalence of these behaviors. However, caution should be given when interpreting the overall prevalence of relational aggression in the studies reviewed because of the variability in the measures utilised and the various informants used to assess young children's relational aggression. Other results of the present review also need to be interpreted with caution because the included studies varied significantly in terms of quality and rigor. While this could be considered as limiting the confidence of the conclusions,

the present review provides a good representation of the variable quality, study rigor, and methodological limitations of the extant literature, and provides suggestions for future research in this field.

The present review revealed that there are various types of measures now available to assess relational aggression in early childhood. The PSBS-TF six item, five-point scale (Crick et al., 1997) has been the most common measure used to assess relational aggression during early childhood. Over 50% of articles reviewed included the PSBS with teacher, parent, peer, or observer as the informant. While all articles included a measure of relational aggression, the dimensions of these measures showed considerable variability with the number of items used to assess relational aggression ranging from three to 13. Similarly, some measures focused specifically on the form of aggression (i.e., relational aggression) while other studies included a measure of form and function of aggression (i.e., reactive and proactive relational aggression). Similar to Voulgaridou and Kokkinos' (2019) review of the measures used to assess relational aggression in children 6–12 years, this review did not find any studies that explicitly reported on the direct or indirect nature of relational aggression used by young children. Although pre-schooler's use of relational aggression is considered to be more overt and direct, these behaviours are expected to become more covert and indirect as children get older. Applying a dimensional approach to measuring direct and indirect forms of relational aggression would allow researchers to understand at what age, during early childhood, children start to use more covert relational aggression (Swit, 2019). This would improve our understanding of the prevalence of different types of relationally aggressive behaviors and how they manifest across the early childhood developmental period.

Further, research has shown that relational aggression substantially increases between the ages of four to ten (Côté et al., 2006; Girard, Tremblay, Nagin, & Côté, 2019; Tremblay et al., 1999). This review of relational aggression during early childhood (0–8 years) is an opportunity to determine whether this age effect is evident across multiple studies. A review of the descriptive statistics and mean relational aggression scores does not appear to suggest higher prevalence of relational aggression in studies where the mean age was closer to 8 years. However, the variability in the scales used to measure relational aggression makes it very difficult to draw meaningful conclusions about potential age trends. This is an important avenue for future research to determine at what age young children's use of relational aggression increases.

The most common informant of young children's relational aggression use was teachers followed by observers, peers and parents. This is different from relational aggression research in youth where self-report and peer nominations were most common, followed by teacher and parent reports (Voulgaridou & Kokkinos, 2019). Numerous researchers agree that, during early childhood, teachers are one of the most accurate informants for evaluating young children's use of relational aggression (McNeilly-Choque et al., 1996; Merrell et al., 2006). Given the abundant social opportunities on offer to children in early childhood settings, observers may also be able to observe young children engage in relational aggression. In comparison, the home context may provide fewer opportunities for children to engage in relational aggression and therefore, parents may not be the best informants of these behaviors. These findings demonstrate the importance of taking into consideration the developmental period and social context in which relational aggression is assessed, to ensure reliable informants are chosen who can accurately report on children's behavior.

In comparison to studies of youth's relationally aggressive behavior, approximately one-third of studies included in this review used multiple informants to assess relational aggression. Using multi-informant assessments is considered a methodological strength as it increases a study's construct and convergent validity (Choi et al., 2011; De Los Reyes et al., 2015) and is considered best practice in the assessment of behavior (Dirks et al., 2012). Including multiple informants in the assessment of relational aggression during early childhood may be

particularly important because young children's behaviors can be brief and fleeting and teacher-child ratios in early childhood settings may be restrictive in allowing teachers to recognise the full extent of young children's use of relational aggression. Despite the strengths of using multiple informants to assess young children's relational aggression, multiple informants can also generate substantial and varied data about a child's relational aggression that can contribute to inconsistent findings or a lack of concordance between informants, also known as informant discrepancies (Goodman et al., 2010). Thus, applying a multi-informant approach to assess relational aggression in one context (e.g., early childhood setting) is more likely to provide an accurate representation of young children's behavior. This suggestion is supported by the high correlation frequently found between teachers' and observers' reports of young children's relational aggression in early childhood settings (e.g., Kamper-DeMarco & Ostrov, 2017).

In general, we observed considerable heterogeneity regarding the psychosocial factors that were evaluated in the different studies. Researchers acknowledge that relational aggression during early childhood can be associated with a host of psychosocial factors but without ongoing and consistent assessment and examination of these, it is difficult to identify which psychosocial factors are considered most related to relational aggression during early childhood. Overall, studies that have included a measure of relational aggression during early childhood have also been most interested in social psychosocial factors such as physical and other forms of aggression, peer rejection and acceptance, prosocial behavior and victimization. This is not surprising given that the PSBS-TF includes items assessing physical aggression, prosocial behavior, and peer acceptance and remains the most frequently utilised valid and reliable measure of relational aggression in early childhood.

In contrast, the total number of studies that have included measures of social cognitive, psychological and environment psychosocial factors are still considerably fewer than those that have included a measure of social psychosocial factors. This finding may indicate the inherent difficulty in measuring these constructs during early childhood. For instance, a recent study assessing young children's normative beliefs about aggression demonstrates the complexities in methodology and interpretation of social cognitive processes during early childhood (Swit et al., 2016). Thus, more work is needed to develop valid and reliable measures that are developmentally appropriate for early childhood and sensitive enough to capture the nuances of young children's cognitive and psychological development. The majority of empirical evidence linking aggression to depressive symptomology and other internalising consequences is limited to middle childhood and adolescence. Internalising consequences are often assessed through teacher and/or self-reports and are considered subjective constructs even in older children (Brendgen et al., 2002), making them difficult to accurately assess. It is even more difficult to assess depression in young children where it may look more like irritability. Indeed, this may be a reason why there remains limited research examining psychological psychosocial factors and their association with relational aggression during early childhood. Thus, methodological advances and exploration of these psychosocial factors in relation to relational aggression during early childhood represents a promising avenue for future research.

Several limitations were identified in the extant literature. Common limitations include a lack of consistency in the reporting of descriptive statistics with 24.65% of the 142 measures reported as a summed total of the children's total relational aggression score, 54.23% of measures reported as a mean of the relational aggression items assessed, and 2.11% reported combined with another measure. Descriptive statistics were not reported for almost one-fifth (19.01%) of relational aggression measures included in the reviewed articles. Deriving the mean is easy enough, however, this finding highlights that there is no consistent approach to measuring and reporting relational aggression. If we are to continue to make robust contributions to understanding relational aggression during early childhood, researchers must attempt to report

their findings in such a way that meaningful conclusions can be drawn and replication of studies can occur. Based on this extensive review of the literature, we recommend that researchers report the basic statistics of means, standard deviations, and range for all independent and dependent variables. Further, when using multiple measures of relational aggression, it is recommended that researchers report the mean relational aggression score for each measure rather than providing a composite score derived from multiple measures. This would allow researchers and practitioners to easily compare findings across populations and make meaningful conclusions about the prevalence of relational aggression.

In the past 25 years, there have been 35 different measures used to assess relational aggression during early childhood. Approximately one in five articles in this review adapted, derived or created a measure of relational aggression. This finding demonstrates that despite the increased attention and study of relational aggression during early childhood, there remains considerable variability in the measures used to assess and understand relational aggression. Another common limitation includes a lack of reliability checks and psychometric information reported in articles. The lack of reliability has considerable implications for interpretation of the extant literature. In particular, there is a risk of misinterpreting the prevalence of relational aggression in articles that have not provided sufficient psychometric information on the reliability of measures of relational aggression.

To further extend the potential scope and understanding of relational aggression during early childhood, it would seem important to conduct research that includes participants from diverse cultural backgrounds. Participants in the reviewed research were predominately from the United States and other predominately western countries, yet it is widely recognised that there are cultural norms that can impact on children's use of aggression, including relational aggression (Kawabata, Crick, & Hamaguchi, 2010). It is recommended that further research is undertaken that investigates the prevalence of relational aggression, as measured by multiple informants, among cross-cultural populations.

Future research could also investigate the association between relational aggression and psychosocial factors during early childhood. This may require researchers to focus their attention on developing reliable and valid measures to assess complex constructs such as social cognition and psychological outcomes in young children. It is our intention for researchers to use this review to identify the current gaps in our understanding of associations between young children's relational aggression and psychosocial factors. Further, there has been a paucity of research conducted in the past 25 years examining the longitudinal associations between relational aggression and psychosocial factors. More specifically, developmental cascade models (Masten & Cicchetti, 2010) could be useful to understand the reciprocal interactions and effects of young children's relationally aggressive behavior with other psychosocial factors such as psychological adjustment, social cognitive development, and environmental factors.

This paper presents a comprehensive review of the prevalence of relational aggression during early childhood over the past 25 years. The results of this review suggest that young children's use of relational aggression has remained stable since 1995 when researchers first started to measure this behavior in young children. In addition, the results of this review demonstrate that researchers are continuing to explore a variety of psychosocial factors associated with young children's use of relational aggression. Future studies should continue to employ multiple informants to assess relational aggression, with a focus on assessments tools that demonstrate high internal and external reliability and validity, and report descriptive statistics for each measure. Future studies should also continue to examine the longitudinal effects of relational aggression on psychosocial factors to determine which are most critical during early childhood.

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Declaration of competing interest

The authors declare that they have no conflict of interest.

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