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Can the family drawing be a useful tool for assessing attachment representations in children? A systematic review and meta-analysis

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ABSTRACT

A systematic review and meta-analysis were conducted to evaluate the quality and validity of Family Drawings (FD) with an Attachment-Based Coding System in assessing attachment representations among pre-school and school-age children. A literature search in notable databases identified 645 records, of which 20 were eligible after screening and quality assessment. Results showed: 1) ABCD attachment distribution in community children was: 48% secure, 20% avoidant, 21% ambivalent, 11% disorganized. Security prevailed both in classifications and Fury et al.' scales. 2) No significant differences according to the cultural background; 3) At-risk/clinical children showed higher insecurity than community ones using scales; 4) Girls were more secure than boys. In conclusion, FD may be a culture-fair method to assess attachment representations in children. Global scales seem more reliable than ABCD classifications for discriminating at-risk and clinical children, but further studies on these groups are needed.

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Family drawing; attachment; pre-school and school-age children; systematic review and meta-analysis

Introduction

The solid empirical evidence that has supported John Bowlby's theory of attachment (Bowlby, 1979, 1980) over the last forty years has been initially made possible by assessing infant attachment through the Strange Situation Procedure (SSP; Ainsworth et al., 1978). The SSP is well established as a gold standard attachment measure during infancy, and its four classifications – secure (B), avoidant (A), ambivalent (C), and the fourth disorganised (D) later added by Main and Solomon (1990), p. – are widely shared and applied in later stages of development. A meta-analysis on infant attachment assessed with the SSP (Van Ijzendoorn et al., 1992) reported that in samples of low-risk and non-clinical children, about 55% obtained secure classifications, with 23% avoidant, 7% ambivalent, and 15% classified as disorganised.

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The universality of the motivational attachment system is widely accepted as it is not only present in human beings as well as in birds and other mammals, but also because attachment theory added significant contributions to understanding the nature of the parent-infant bond and its consequences on a child's psychological and neurobiological development (Cassidy et al., 2013; Van Ijzendoorn & Sagi-Schwartz, 2008).

However, Rothbaum et al. (2000) challenged attachment theory as a Western-biased theory, of which fundamental principles would be closely linked to Western culture. Consequently, the theory would require some changes to apply these principles to other cultures and avoid cultural biases in interpreting research data from samples of non-Western countries. These claims were vigorously criticised in a series of commentaries, which highlighted that Rothbaum et al. (2000) only compared Western and Japanese middle classes, without considering cultural varieties and specifics, or paying attention to context (Chao, 2001). Therefore, Rothbaum et al. (2000) were criticised as having neglected fundamental empirical data and misunderstanding the essential role of the secure base as a source of socialisation (Chao, 2001; Gjerde, 2001; Kondo-Ikemura, 2001; Posada & Jacobs, 2001; Van Ijzendoorn & Sagi, 2001).

Concerning cross-cultural validity of attachment measures, scholars have debated the universality of children's attachment classifications defined by the SSP as it is a method developed within Western cultures with some characteristics that might not be valid cross-culturally (Keller, 2013). Studies that investigated cultural invariance of distribution among attachment classifications have strongly supported the prevalence of children's secure patterns across cultures (Van Ijzendoorn & Kroonenberg, 1988). Further findings highlighted cultural differences within the distribution of insecure categories, with a prevalence of the avoidant pattern in children from Western countries and a prevalence of the ambivalent pattern in children from non-Western countries, such as Israel or Japan. These findings were confirmed by further studies carried out in other countries in Asia, as well as in Africa (Mesman et al., 2016). Moreover, comparable results emerged in studies from South America, where a secure pattern appeared prevalent among urban low-risk children, while a disorganised pattern prevailed in rural at-risk samples, and avoidant and ambivalent patterns were reported to be equally distributed (Mesman et al., 2016).

Additionally, gender differences for attachment have been found in infants, toddlers, and children, specifically highlighting that females show more secure or ambivalent attachment patterns, while males show more avoidant patterns from pre-school age (Brennan et al., 1998; Del Giudice, 2009; Pace et al., 2020a).

Assessing attachment in pre-school and school-aged children

Starting from the second year of life, children develop locomotion, facilitating exploratory behaviour, and more self-reliant emotion regulation strategies, allowing them to separate from the caregiver for longer periods without causing overwhelming stress or fear (Vondra et al., 2001). Typical development also allows children to implement increasingly sophisticated communication modalities regarding their attachment needs to caregivers (Kerns & Richardson, 2008) by employing complex behaviours and verbal language, including pretence and symbolic play. Drawing is another common form of nonverbal communication allowing access to the child's internal representations of his/her

interpersonal relationships (Bergen, 2002; Pinto & Bombi, 2008). However, most of the tools developed to assess attachment in young children can be traced back to two main approaches: narrative or observational.

Within the widely defined narrative approach, different subtypes of verbal tasks are included: story completion tasks (e.g. the Manchester Child Attachment Story Task, MCAST, Green et al., 2000); recording the child's response to ambiguous pictures evoking attachment stressful situations (e.g. the Separation Anxiety Test, SAT; Klagsbrun & Bowlby, 1976); and attachment interviews – based on the Adult Attachment Interview (AAI, George et al., 1985) principles – specifically developed for children in middle and late childhood, as well as early and late-adolescence (e.g. the Child Attachment Interview, CAI; Shmueli-Goetz et al., 2008; the Friends and Family Interview, FFI; Steele & Steele, 2005; Pace et al., 2020a). Overall, narrative measures are clinically relevant research methods to gain in-depth information about children's attachment representations, allowing access to their inner world (Hillman et al., 2020). However, narrative measures show some limitations: first, young children do not show fully developed language abilities which may affect the way they respond; and second, all methods require costly and intensive training (Kerns & Richardson, 2008).

Attachment patterns in pre-school and school-age children are also assessed through behavioural-observational approaches, such as: laboratory observations, including adaptations of the SSP extending the time of separation between child and caregiver to activate the child's attachment system (e.g. the Separation-Reunion Procedure, SRP; Main & Cassidy, 1988); and home observations with pre-school children (e.g. the Attachment Q-Sort, AQS; Waters & Deane, 1985). Although behavioural-observational measures may be valid options for assessing children's attachment quality, they also incur some limitations: first, training for pre-school or middle childhood attachment measures is not easily accessible ; second, as children develop, they exhibit less visible and marked stress behaviours during attachment system activation, raising doubts about the sensitivity of these tools, especially for school-age children.

Assessing attachment through drawings: the history of Family Drawings with an Attachment-Based Coding System

Another possible channel of access to children's internal working models (IWMs) is through drawing, which psychologists often consider a pictorial representation of children's relational experience, a "graphic speech" through which to infer children's internal representations, affect, cognition, personality, and perceived relationships with others (Pinto & Bombi, 2008). The pioneering attempt to use family drawing to assess six-year-old children's attachment representations to primary caregivers classified through the SSP at 12 months of age was made within the Berkeley Longitudinal Study on individual differences in parent–child attachment by Kaplan and Main (1986). The authors hypothesised that particular elements within the family drawings could reveal the children's attachment representations as relationships between family members were expected to emerge through the ways the child would draw them, so distinguishing children with different attachment histories. Before administering the FD, the authors recommend asking the child to complete a warm-up drawing, on whatever the child wants to draw, to have an example of the child's quality of drawings to compare with the FD (Kaplan &

Main, 1986). The FD is administered using at least a 8.5 × 11 inches white paper (but larger sheets are recommended so that children can draw freely; Behrens & Kaplan, 2011), and a set of multiple colored pencils or crayons. The only instruction given to the child is to draw a picture of his/her family. While the child draws, the researcher observes and notes the order in which the elements of the drawing are sketched and, as soon as the child ends the FD, the researcher asks him/her to identify the people in the drawing.

Kaplan and Main (1986) developed a coding system based on several individual markers of family drawings, such as the amount of distance between the child and the mother, the placement of different elements, representation of emotion, etc. (a detailed description is in Behrens & Kaplan, 2011, p. 441). These individual markers indicate how the child's attachment pattern influences the child's representation of his/her family and they are aggregated in the child's drawings. Drawings classified as secure (B) show centred, grounded, and completed figures with opened arms; often, the family members show some degree of movement and natural proximity, and everyday objects, such as bicycles or pets, may be included. Drawings classified as avoidant (A) present distance between family members with uncompleted figures, for example, without arms, and the impression of movement is absent, as well as an emphasis on invulnerability with standard expressions represented by happy faces. Drawings classified as ambivalent-resistant (C) show vulnerability in family relations, sometimes family members are overlapping, with disproportionally large or small figures. Drawings classified as disorganised (D) often contain exaggerated elements of brightness, alongside figures that are drawn with some body parts missing, and additionally, these drawings usually contain ominous themes with bizarre traits (Behrens & Kaplan, 2011; Jin et al., 2018; Madigan et al., 2003).

Later, Fury et al. (1997) added integrative ratings, i.e. eight global scales, for scoring family drawings, aiming to design a more perceptive method than individual and aggregated signs in discriminating attachment representations. The eight global scales were: 1) Vitality/Creativity, based on the emotional investment in the drawing, indicated by colour, embellishment, detail, and creativity; 2) Family Pride/Happiness, referring to the expression of affect and emotions, and elements indicating a sense of belonging to the family; 3) Vulnerability, based on the placement of elements on the page, as well as parts of the body that might be exaggerated; 4) Emotional Distance/Isolation, represented by the presence of expressions of anger or sadness, but also in the distance between the child and his/her caregiver; 5) Tension/Anger, when members of the drawing appear closed, or carelessly drawn without much detail; 6) Role reversal, inferred from relations of the sizes and roles of elements; 7) Bizarreness/Dissociation that appear through some particular themes, signs, or symbols that are unusual; 8) Global pathology, that is visible through the degree of negativity, often present in the use of colour, feelings, and details of the figures (Fihrer & McMahon, 2009). Raters assign scores on a 7-point Likert-type scale from 1 (very low) to 7 (very high), with a score of 4 (moderate) as the middle point of the scale. Fury et al. (1997) developed these eight global rating scales to analyse different aspects of children's attachment which are expected to be connected with children's past attachment histories (Jin et al., 2018). For example, children with a secure history were more likely to create drawings high in vitality and family pride and low in global pathology, whereas those with an avoidant attachment history created drawings showing more emotional distance and tension, those with an ambivalent/resistant attachment history

produced drawings showing more vulnerability and role-reversal, and those with a disorganised attachment history created drawings scoring high on bizarreness and global pathology (Fury et al., 1997; Jin et al., 2018). In the last 30 years, the Family Drawing test has been used to assess children's quality of attachment, and especially Kaplan and Main's ABCD classifications and Fury et al.'s Global Rating Scales have been widely used in research.

The current interest among attachment researchers and clinicians in using FD has resulted in a series of studies with a variety of types of participants involved (e.g. low-risk community samples, high-risk disadvantaged samples), as well as different cultural backgrounds (e.g. North-western samples, African samples, etc.), and the choice of coding system used to rate the drawings. For example, Fury et al.'s (1997) global scales were the only coding system used in some studies (Clarke et al., 2002; Dallaire et al., 2012; Howard et al., 2017; Leon et al., 2007; Procaccia et al., 2014), whereas only ABCD classifications by Kaplan and Main (1986) were used in other studies (Pianta et al., 1999; Rehder et al., 2020; Shiakou, 2012).

Work in this area has now advanced to a stage where a review and quantitative analysis of extant research would be of critical value to collate and contrast existing results, to offer clear indications on the usefulness of FD, and to have data that allows a comparison of different coding systems.

Objectives and hypotheses

This study's objective was to review the validity of Family Drawings with an attachment-based coding system. Meta-analytic techniques were performed where sample sizes allowed, while a systematic review was reported in case of sample size restrictions (see method section below). The original indicators of Kaplan and Main (1986) have been poorly validated as they are less reliable and don't adequately discriminate between secure and insecure, and clinical and non-clinical populations (Madigan et al., 2003; Pianta et al., 1999). Therefore, they have been excluded from this meta-analysis which is focused on Kaplan and Main's ABCD classifications and Fury et al.'s Global Rating Scales. Starting from an examination of the extant research, the following objectives and hypotheses were formulated:

First, to establish a baseline distribution of pre-school and school-age children's attachment through FD, how the FD classifications and scores on Fury et al.'s scales are distributed in community samples around the world was examined. Therefore, the distribution of the SSP categories in comparison (typically developing) samples within the meta-analysis on clinical samples by Van Ijzendoorn et al. (1992), was chosen as a parameter. In line with this, it seems reasonable to expect that typically developing pre-school and school-age children from low-risk families would be mostly classified as secure through the FD (higher on Vitality and Pride) compared with insecure categories (A, C, and D). Among the insecure categories, higher percentages of insecure-avoidant (higher on Tension and Emotional Distance) than insecure-ambivalent (higher on Vulnerability and Role-reversal) and disorganised classifications (higher on Bizarreness and Global Psychopathology) were expected.

Second, this study examined the universality versus culture-specificity of attachment as assessed through the FD. In line with cross-cultural findings with the SSP (Van Ijzendoorn & Kroonenberg, 1988), the B category was expected to be modal. Therefore, no group difference between low-risk children with Western and non-Western cultural backgrounds rated as secure, as well as correspondent scores on Vitality and Pride on Fury et al.'s scales, were expected. Regarding insecure categories, results by Van Ijzendoorn and Kroonenberg (1988, p. 154) suggest an expectation of more A classifications in Western children than non-Western, who in turn were expected to report more C classifications. Consequently, correspondent group differences in scores on Fury et al.'s scales related to A (i.e. Tension and Emotional distance) and C (i.e. Vulnerability and Role-reversal) patterns were expected. No hypothesis on D category and related scales (i.e. Bizarreness and Global Pathology) was stated due to a lack of supporting literature.

Third, distribution of children's FD attachment classifications and scores on Fury et al.'s scales were examined in: a) samples at-risk for adverse attachment experiences in the growth environment (e.g. low-income, socially disadvantaged families, etc.), children with adversities in early attachment relationships (e.g. prolonged separation, neglect, maltreatment, etc.), as well as adopted and foster children; b) clinical samples where children had received a psychiatric diagnosis. These groups were expected to show less secure classifications and lower scores on Fury et al.'s scales related to security (i.e. Vitality and Pride), and more A, C, and D categories, as well as higher scores on all scales related to insecurity (i.e. Tension, Emotional Distance, etc.), than low-risk children. A comparison between at-risk and clinical groups in ABCD distribution and Fury et al.'s scales was performed, without specific expectations given the paucity of extant studies.

Fourth, differences in FD distributions across gender as well as associations with age were examined. Girls' family drawings were hypothesised to receive more secure and insecure-ambivalent classifications as well as higher scores in related Fury et al.'s scales than boys', who were expected to be classified more as insecure-avoidant as well as score higher on Tension and Emotional Distance scales, while no hypothesis on D category and related scales was stated due to lack of supporting literature. Concerning the influence of age, in line with analogous constructs from similar developmental periods (i.e. MCAST, Pace et al., 2014), fewer secure representations and more disorganised classifications were expected in the FD distribution of categories of younger children, with corresponding lower scores in Vitality and Pride and higher scores in Bizarreness and Global Pathology.

Method

Preferred Reporting Items for Systematic reviews and Meta-analyses (PRISMA) guidelines were followed throughout the present review (Moher et al., 2009). This set of evidence-based items guides investigators in designing, writing, and reporting results of systematic reviews and meta-analyses, to improve their quality and usability by following common parameters. The PRISMA guidelines were initially designed to report results on the effects of intervention in the medical field, but they are widely used for other objectives, including the evaluation of methods of assessment (Moher et al., 2009).

Search strategy

Relevant studies were selected through nine databases, namely Cochrane Library, PsycArticles, PsycInfo, Psychology, Behavioral Sciences Collection, Eric, PubMed, Scopus, and Web of Science, using the keywords "family drawing" and "attachment" to search all records. No field restrictions were applied at this stage, as keywords were in English, and documents written in other languages and/or with non-children participants would be excluded later, when applying exclusion criteria. The full search strategy can be seen in Appendix A. Moreover, experts in the field and other sources (e.g. Research Gate) were consulted to identify additional relevant records not present in the databases.

The current research was limited to those papers which presented the following inclusion criteria: a) studies had to be empirical and quantitative, that is, correlational, longitudinal, observational, cross-sectional, case-control/comparative, as well as single-case studies, if they provided necessary data[1]; b) studies had to use the Attachment-Based Coding System by Kaplan and Main (1986), reporting the distribution of A, B, C, D (four-way), A, B, and C (three-way) or secure-insecure (two-way) classifications, and/or scores on global scales by Fury et al. (1997); c) the participants had to be children[2] d) studies had to be published between 1980 and July 2020; e) abstracts and/or keywords of studies had to be written in English.

When the database allowed it, age-related filters were applied to exclude studies with only participants older than 18 years old. Non-empirical studies were excluded, and datasets presented in several published reports were included only once, based on the fullest description given, to ensure duplication did not occur.

To gain complete data information on ABCD classifications and Fury et al.'s scales if they were missing in the articles, authors were contacted twice (in September and November 2020). Two authors provided additional data, six authors responded they were no longer able to access the datasets, one full-text was not retrievable due to access restrictions caused by the Covid-19 pandemic, eight authors never responded, and one author's contact details could not be identified.

Data collection

Through the literature search, 644 records were identified, plus one additional record (Kaplan & Main, 1986) through consultation, for a total of 645 records. As shown in Figure 1, after duplicates were removed using Zotero software, 518 records were screened. Eligibility assessment of each study based on the inclusion and exclusion criteria was performed independently in a blinded standardised manner by two reviewers, F.M. and A.S, who showed high agreement (ICC = 0.89). The pioneering work of Kaplan and Main (1986) had to be excluded at this stage as it was not possible to recover the full text. Disagreements between reviewers were discussed and resolved by consensus. This process led to the identification of 30 full texts to be further scrutinised. After full-text screening, the systematic review included 20 articles, of which 17 were also included for meta-analysis (excluding Fihrer & McMahon, 2009; Gernhardt et al., 2016; Procaccia et al., 2014) with an overall population sample of 2380 children aged 4–12 years old.

Identification and selection of studies to include in the review on the Family Drawing with Attachment-Based Coding System: flow diagram.

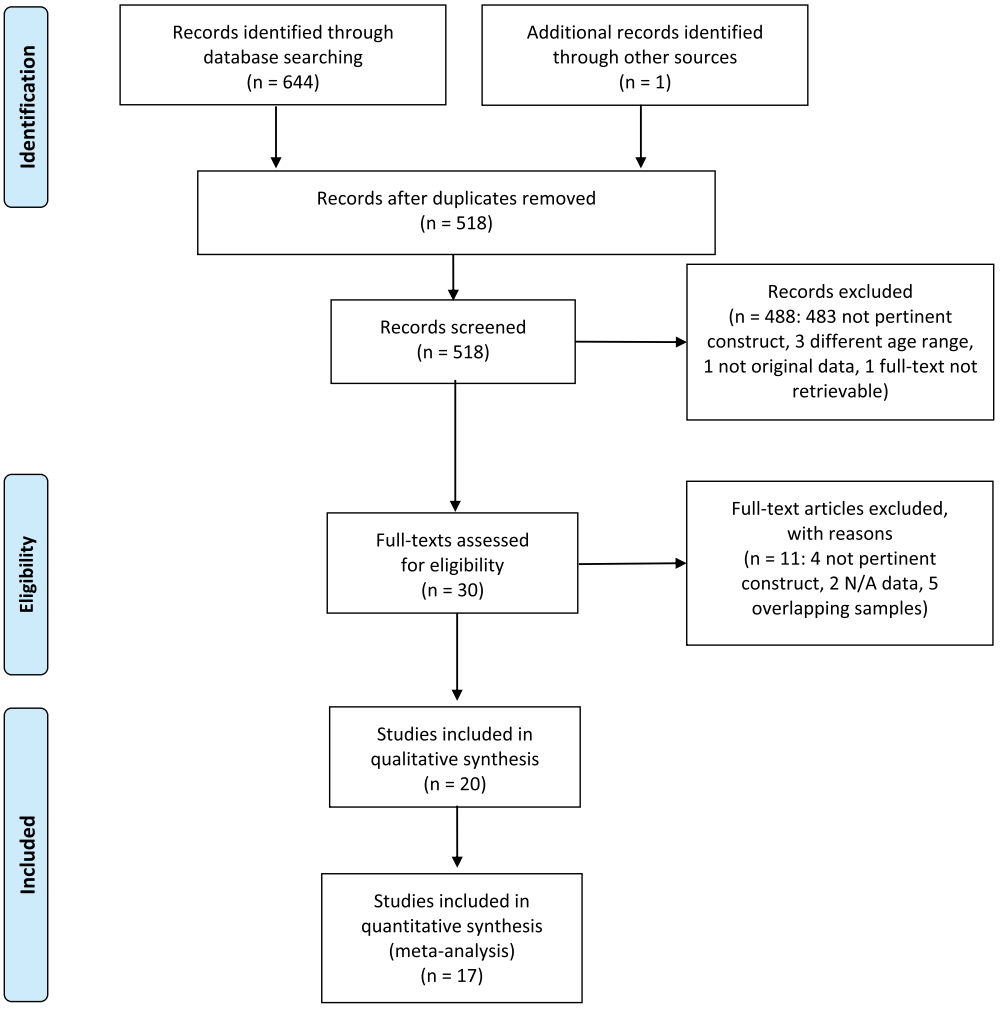

Figure 1. Identification and selection of studies to include in the review on the family drawing with attachment-based coding system: flow diagram.

Data extraction and quality assessment

For the remaining 20 articles, A.S. and F.M. carried out the quality assessment based on the Newcastle-Ottawa Quality Assessment Scale adapted for nonrandomised studies (Wells et al., 2016). This scale includes three areas: selection, comparability, and outcome. In each area, evaluators assigned a total of 5, 2, and 3 stars, respectively, based on the ability of the article to meet certain criteria, including representativeness of the sample, sample size, non-respondents, ascertainment of exposure (for selection); assessment of the outcome and statistical test (for outcome). The sum of scores in each area corresponded to a total score between 0 and 10, with a 7 or more indicative of high-

quality, 4–6 of moderate-risk, and 3 or less indicating high-risk of bias. At the end of the quality assessment, data were extrapolated from each article based on those necessary for the review objectives, that is, sample size, distribution of ABCD categories and mean scores in Fury et al.'s scales according to: 1. type of sample, coded as "community" (low-risk/typical functioning), "at-risk" (low-income, socially disadvantaged families, with sick parents, or children with trauma in early attachment relationships due to separation, neglect, maltreatment, or adopted or in foster care), or "clinical" (with psychiatric diagnoses); 2. cultural background[3] of community children coded as Western (Canada, USA, Italy, Greece) or non-Western (Japan, Korea, Cameroon, Israel); 3. Gender, regardless of the type of cultural background. Other relevant information extracted (e.g. participants' characteristics, inter-rater agreement, other attachment measures, qualitative assessment) is reported in the detailed description of selected studies in Table 1 (below).

Data analysis

In line with the study objectives, a meta-analysis methodology was used when possible, that is, when at least two studies examined the same construct (Valentine et al., 2010). However, even after having contacted the authors twice, not enough data were collected to provide meta-analytic data for each objective.

Regarding the data included in the meta-analysis, percentage distributions of attachment classifications (two-way and four-way) were calculated for community groups, also based on their Western or non-Western cultural background, for at-risk groups, and boys and girls regardless of the type of sample. Multiple X^2 tests with Yates correction were employed to compare distributions (community vs. at-risk, Western vs. non-Western, boys vs. girls), reporting Cramer's V (φ_c) and Odds Ratio (OR) as measures of effect size.[4]

Furthermore, it was possible to calculate the average of mean scores (M) and standard deviations (SD) in Fury et al.'s global scales of community, at-risk, and clinical groups, and according to cultural background. These average mean scores were compared through multiple t-tests, assuming unequal variances and reporting bias-corrected Hedges' *g* as a measure for effect size, due to different sample sizes (Borenstein et al., 2011). Scores within the same sample were compared through paired t-test, considering mean and standard deviations of differences between mean scores in Fury et al.'s scales across sample considered for each analysis. Ninety-five percentage Confidence Intervals (CI) were reported for each analysis, all considered significant with $p < .05$.

Not enough data were retrievable to perform meta-analyses on classifications in clinical groups (one study), or differences in Fury et al.'s scales according to gender, and age-related differences in distribution and scales, because raw data were not available and/or too heterogeneous to be synthesised (e.g. many only stated no differences, or *p*-value without reporting the correlation, etc.). Therefore, the hypotheses of these objectives were answered through a systematic review.

Table 1. Description of the studies revised for review on the family drawing with attachment-based system.

Source	Child Sample(s)	N	Country	Gender (% male)	Age range, years (M, SD)	Coding system	Inter-rater agreement	Main outcomes	NOS quality
Behrens and Kaplan (2011)	Community	47	Japan (Not-Western [NW][b])	NA	5–6.5 (M = 5.8, SD = 0.37)	Secure-insecure AND Fury's scales	Two-way: k = .80	(1) 66% insecure (2) Girls higher in Vitality and Pride than boys; boys higher in Bizarreness and Global pathology than girls (3) Secure FD higher in Vitality and Pride, lower in Bizarreness and Global pathology than insecure FD	7
Clarke et al. (2002)	Mixed: clinical (ADHD children) and community	38	Australia (W)	19 (100%; clinical) NA (community)	5–10 (M = 8.4, SD = 1.45)	Fury's scales	Global Scales: from 89% to 100%	(1) ADHD group: lower scores on Pride and higher on Vulnerability, Tension, Role Reversal, Bizarreness and Global Pathology (2) Clinical group: Only Bizarreness correlated negatively with age (3) Control group: positive correlation between age and Emotional Distance	8
Dallaire et al. (2012)	Mixed: at risk (caregivers in jail, etc.) and community	44	USA (W)	31 (70%)	6–10 (M = 8.13, SD = 1.87)	Fury's scales	Global Scales: from 72% to 89%	(1) No differences on the eight Global Scales between jail and control group (2) Age correlates with Pride, Vulnerability, Emotional distance, Tension, Bizarreness (3) Gender correlates with Vitality, Pride, Tension, Global Pathology: more Vitality, Pride in females than males, more Tension and Global pathology in males than females.	7
Fihrer and McMahon (2009)[c]	At risk (mothers with depression' symptoms)	74	Australia (W)	39 (53%)	6–8 (M, SD = NA)	Secure-insecure AND Fury's scales	Global Scales: ICCs from .68 to 1.0	(1) 62% insecure	8
Fury et al. (1997)	At risk (social disadvantages)	76[d]	USA (W)	93 (54%)	NA[d]	ABC AND Fury's scales	Global Scales: from .57 to .90	(1) 50.5% insecure	5
Gernhardt et al. (2016)[c]	Community	63	Germany (W) Africa (Not-W)	32 (51%)	6 (M = 6.5, SD = 0.25)	ABCD AND Fury's scales	Global Scales: ICCs from .79 to .94	(1) African drawings had higher scores on Emotional distance, Vulnerability, Tension, Role reversal (2) Berlin FDs higher scores on Vitality, Pride, Global Pathology	5

(*Continued*)

Table 1. (Continued).

Source	Child Sample(s)	N	Country	Gender (% male)	Age range, years (M, SD)	Coding system	Inter-rater agreement	Main outcomes	NOS quality
Goldner and Scharf (2011)	Community	222	Israel (Not-W)	121 (55%)	8–12 (M = 9.70, SD = 1.14)	ABCD AND Fury's scales	Four-way: 77.4%, κ = .68, ($p < .001$)	(1) 58.6% insecure (2) Secure FDs: highest on Vitality and Pride; lowest on Emotional distance, Tension, Bizarreness, Global pathology and Vulnerability and lower on Role reversal than ambivalent FDs. (3) Disorganized FDs: highest on Bizarreness and higher Vulnerability than secure and avoidant FDs (4) Avoidant FDs: higher on Tension than Ambivalent FDs.	4
Goldner (2014)	Community	81	Israel (Not-W)	33 (41%)	8–12 (M = 10.26, SD = 1.26)	ABCD AND Fury's scales	Four-way: 84%, k = .83 ($p < .001$) Global Scales: ICC from .80 to .95	(1) 62% insecure (2) Girls more secure in attachment classification and higher on Vitality and Pride than boys (3) Boys higher for Tension.	3
Goldner et al. (2015)	Community	77	Israel (Not-W)	39 (51%)	6–7.5 (M = 6.7, SD = 0.53).	ABCD AND Fury's scales	Four-way: 77.4%, k = .68 ($p < .001$); Global Scales: ICC from .80 to .95	(1) 56% insecure	3
Howard et al. (2017)	Mixed: at risk (adopted) and community	89	USA (W, n = 41), Eastern Europe (Not-W, n = 48)	54 (61%)	5–13 (M = 7.87, SD = 2.01)	Fury's scales	Global Scales: 86%	(1) Adopted children: higher on Vulnerability, Emotional Distance, Tension, Bizarreness and Global Pathology (2) Control group: higher on Vitality and Pride.	5
Jin et al. (2018)	Mixed: clinical and community	96	Korea (Not-W)	53 (55%)	7–9 (M = 8.5, SD = NA)	ABCD AND Fury's scales	NA	(1) Clinical children: 50.9% insecure (2) Control group: 62.2% secure	4
Kallitsoglou et al. (2021)	Community	49	Greece (W)	29 (58%)	4–6 (M = 5.29, SD = 0.45)	Secure-insecure AND ABCD	Four-way classification: k = . 80.	(1) 57% insecure (2) Most Avoidant (46%)	5
Leon et al. (2007)[e]	Community	52	USA (W)	26 (50%)	4.2–8.5 (M = 5.8, SD = 1.1)	Fury's scales	Global Scales: from .81 to .91	(1) Age negatively correlates with Vulnerability and Role-reversal	3
Madigan et al. (2003)	Community	123	CANADA (W)	50 (41%)	7 (M = 7.2, SD = NA	ABC AND Fury's scales	Two-way: k = 0.70 Global Scales: from 0.54 to 0.85	(1) 11% Avoidant, 78% Secure, 11% Resistant (2) Avoidant FD higher on Emotional Distance than other FDs; (3) Ambivalent FDs: higher on Vulnerability and Role Reversal than other FDs (4) Secure FD: higher on Pride and lower on Global Pathology than other FDs	5

(*Continued*)

Table 1. (Continued).

Source	Child Sample(s)	N	Country	Gender (% male)	Age range, years (M, SD)	Coding system	Inter-rater agreement	Main outcomes	NOS quality
Pace et al. (2020a)[f]	Mixed: ah risk (adopted) and community	38	Italy (W)	20 (53%)	5.4–7.8 (M = 6.37, SD = 1.09)	ABCD AND Fury's scales	Two-way: 92.1% k = .77 ($p < .001$); Four-way: 71.1% k = .60 ($p < .001$); Global Scales: from .41 ($p < .01$) to .85 ($p < .001$)	(1) Adopted children: 88.9% insecure; more insecure, lower on Vitality and Pride, higher on Role Reversal and Bizarreness than controls. (2) No relations with children's gender	7
Pianta et al. (1999)	Community	200	USA (W)	88 (44%)	5.7 – 7.2 (M = 5.11, SD = NA)	ABCD	Four-way: k = .82	(1) 54% insecure	3
Procaccia et al. (2014)[c]	Community	117	Italy (W)	58 (50%)	6–10 (M = 8.96, SD = 1.31)	Fury's scales	Global Scales: 87%	(1) Secure FDs: higher on Vitality and Pride, lower on Vulnerability, Emotional Distance, Tension, Bizarreness, Global Pathology, and Role Reversal (than ambivalent group only) (3) Ambivalent FDs: higher on Bizarreness and Global Pathology than Avoidant FDs; (4) Avoidant FDs: highest on Emotional Distance and higher on Vitality than the Ambivalent FDs.	3
Rehder et al. (2020)[g]	At risk: (lower income)	879 [h]	USA (W)	635 (49%)	6–7 (M, SD = NA)	ABCD	Four-way: k > .78	(1) 51.9% insecure	7
Schechter et al. (2007)	At risk: (mothers with PTSD)	23	USA (W)	11 (48%)	4–7 (M = 5.91, SD = 11.8)	Secure-insecure AND ABCD	Global Scales: k = .74, $p < .001$	(1) 70% insecure (2) No relations btw age and degree of disorganization	3
Shiakou (2012)	Mixed: at risk (maltreated) and community	20	Cyprus (W)	12 (60%)	5–11 (M, SD = NA)	ABCD	Four-way classification: k = 0.88.	(1) Maltreated children: 100% insecure-avoidant (2) Community children: 100% secure	5

[a] 1 Sec-Ins.; 2) A, B, C; 3) A, B, C, D; 4) Fury's Scale; [b] Based on Van Ijzendoorn and Kroonenberg (1988); [c] Not include in subsequent quantitative synthesis; [d] Initial sample was N = 171, but only 76 completed the FD task; [e] Same sample of Leon and Rudy (2005); [f] Same sample of Pace et al. (2015); [g] Same sample of Wagner et al. (2015), Zvara et al. (2014), and Zvara & Mills-Koonce (2019)); [h] number of children who have completed the FD task (initial sample was comprised of 1166 children)

Results

Qualitative assessment

As shown in Table 1, only three studies (15%) reached standards of high-quality, while the majority (n = 11; 55%) fell in the range of moderate risk of bias (fair quality), and six (30%) were at high risk of bias (poor quality). The Supplementary Table reports details of the quality assessment of each article, revealing the dimension of comparability as the main weakness of most studies in terms of absence of control for age, gender, and culture which is also reflected in data extracted by this study.

Meta-analysis

Attachment representations in community (low-risk/non-clinical) children through the FD

ABCD classifications. Overall, 17 studies with community samples were selected, of which the two-way and four-way distributions of attachment categories were available for 10 studies after contacting authors (see Table 2). In the combined sample of 866 community children (aged 4–12 years old), the pooled two-way distribution revealed 48% classified as secure and 52% as insecure, specifically 20% as A, 21% as C, and 11% as D, as reported in Table 2.[5]

Table 2. Two-way and four-way distribution of attachment classifications across studies with the family drawing.

		Two-way		Four-way			
Community groups[a]	N	Secure	Insecure	B	A	C	D
Behrens & Kaplan	47	16	31	16	5	0	26
Goldner & Sharf	222	92	130	92	43	68	19
Goldner	81	31	50	31	8	30	12
Goldner et al.	77	34	43	34	13	11	19
Jin et al.	51	25	26	25	10	12	4
Kallitsoglou et al.	49	21	28	21	23	4	1
Madigan et al.	118	92	26	96	13	13	0
Pace et al.	11	5	6	5	2	1	3
Pianta et al.	200	92	108	92	56	41	11
Shiakou	10	10	0	10	0	0	0
N_{tot}	866	418	448	418	173	180	95
Pooled %		*48%*	*52%*	*48%*	*20%*	*21%*	*11%*
At-risk groups[b]	N	Secure	Insecure	B	A	C	D
Fury et al.	76	31	45	31	13	24	0
Pace et al.	27	3	24	3	10	3	11
Rehder et al.	879	423	456	423	131	144	181
Schechter et al.	23	7	16	7	1	1	14
Shiakou	10	0	10	0	10	0	0
N_{tot}	1015	464	551	464	165	172	206
Pooled %		*46%*	*54%*	*46%*	*16%*	*17%*	*20%*
Clinical groups[c]	N	Secure	Insecure	B	A	C	D
Jin et al.	51	25	26	25	10	12	4
		49%	*51%*	*49%*	*20%*	*24%*	*8%*

B = secure, A = insecure-avoidant, C = insecure-ambivalent, D = disorganized.
[a]typical functioning and developing and with physical diseases.
[b]low-income, social disadvantages families, with diseased parents, or children with adverse traumas in early attachment relationships (prolonged separation, neglect, maltreatment, etc.), or adopted or in foster-care.
[c]with psychiatric diagnoses.

As expected, considering the four-way system, B category was overrepresented compared to either A, $X^2(1) = 16.24$, $p < .001$, $\varphi_c = .30$ (OR = 3.69, 95% CI 1.97 to 6.92), C, $X^2(1) = 19.42$, $p < .001$, $\varphi_c = 32$ (OR = 4.07, 95% CI 2.19 to 7.58), or D, $X^2(1) = 37.08$, $p < .001$, $\varphi_c = .44$ (OR = 8.76, 95% CI 4.18 to 18.35). However, among insecure categories (A, C, and D), similar percentage rates of A and C, $X^2(1) = 0$, $p = 1$, $\varphi_c = .01$ (OR = .94, 95% CI .47 to 1.87) emerged, and A classifications were not significantly more frequent than D classifications, $X^2(1) = 2.44$, $p = .12$, $\varphi_c = -.12$ (OR = 2.02, 95% CI .91 to 4.48)[3].

Fury et al. **scales**. Concerning global scales, average scores were calculated based on scores of nine samples[6] (detailed in Table 3), including 575 community children aged 5–13 years old.

As expected, low-risk/non-clinical children (nine samples, N = 575[7]) scored higher in Vitality (linked to B) than in Tension (linked to A), $t(7) = 2.19$, $p = .032$ (95% CI −.65 to 1.38), Role reversal (linked to C), $t(8) = 3.61$, $p = .003$ (95% CI −.70 to 2), and Bizarreness (linked to D), $t(7) = 1.94$, $p = .047$ (95% CI −.96 to 1.92), while no differences were found regarding Emotional Distance, Vulnerability or Pathology (all $p > .08$). Community children also scored higher in Pride (linked to B) than in Role-reversal, $t(8) = 3.09$, $p = .007$ (95% CI −.63 to 1.61), but no other differences were found with scales associated to insecurity (all $p > .07$). Furthermore, as expected, scores in Role-reversal were lower than both Emotional Distance, $t(8) = 4.53$, $p = .001$ (95% CI −.35 to 1.16), and Tension, $t(7) = 3.45$, $p < .005$ (95% CI −.31 to .86), while scores in Vulnerability surpassed those in Tension, $t(7) = 3.39$, $p < .006$ (95% CI −.22 to .60).

Cultural differences in community groups

ABCD classifications. Table 4 reports the distribution of FD classifications of samples with Western and non-Western (i.e. Africa, Israel, Japan, Korea) cultural backgrounds, on which basis pooled distributions were calculated.

As hypothesised, there was no difference in rates of B category between Western and non-Western children, $X^2(1) = 3.38$, $p = .066$, $\varphi_c = .14$ (OR = .57, 95% CI .32 to 1.00). Contrary to hypotheses, Western children did not show significantly higher rates of A category than non-Western, $X^2(1) = 41.53$, $p = .216$, $\varphi_c = .01$ (OR = 1.66, 95% CI 1.66 to .50), who in turn did not show significantly more C classifications, $X^2(1) = 1.48$, $p = .112$, $\varphi_c = -.12$ (OR = .53, 95% CI .53 to −.64). No difference emerged in rate of D category, $X^2(1) = 2.59$, $p = .107$, $\varphi_c = -.13$ (OR = .34, 95% CI .10 to 1.10).

Fury et al. **scales**. Table 5 shows average mean scores from 261 Western community children from six samples and 314 non-Western community children from three samples.

As expected, there was no difference between Western and non-Western children in security-related scores of Vitality, $t(433) = 1.12$, $p = .262$ (95% CI −.09 to .33, $g = .09$), and Pride, $t(679) = 1.86$, $p = .063$ (95% CI −.43 to 0.11, $g = .16$). Additionally, as expected, Western children scored significantly higher than non-Western children in A-related scales, such as Tension $t(199) = 7.13$, $p < .001$ (95% CI −.64 to 1.13, $g = .76$) and Emotional Distance, $t(599) = 8.70$, $p < .001$ (95% CI .67 to 1.05, $g = .51$). Contrary to expectations, non-Western children received significantly lower scores than Western children in C-related scales of Vulnerability, $t(623) = 12.62$, $p < .001$ (95% CI 1.04 to 1.42, $g = 1.05$ and Role-reversal, $t(573) = 16.12$, $p < .001$ (95% CI 1.11 to 1.43, $g = 1.35$), and they also showed significantly lower scores in D-related scales of Bizarreness $t(258) = 4.92$, $p < .001$ (95% CI .39 to .90, $g = .51$), and Global Pathology $t(509) = 12.30$, $p < .001$ (95% CI 1.05 to 1.45, $g = 1.03$).

Table 3. Average scores on the family drawing's fury global scales in community[a], at-risk, high-risk and clinical children.

		Secure				Insecure-avoidant				Insecure-ambilavent				Disorganized			
		Vitality		Pride		Tension		Emotional distance		Vulnerability		Role Reversal		Bizarreness		Pathology	
Community[a]	N	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Behrens & Kaplan[b]	47	3.04	1.72	3.01	1.82	1.90	1.21	2.20	1.15	1.83	0.83	1.14	.35	3.88	1.80	2.96	1.73
Clarke et al.	19	4.40	1.10	4.20	1.10	3.70	1.00	4.30	1.00	4.50	0.90	3.10	1.00	3.40	0.90	4.30	1.00
Dallaire et al.	20	3.40	1.57	3.65	1.22	4.35	1.14	4.75	0.85	5.00	0.65	4.15	1.42	4.15	1.50	5.00	0.79
Goldner & Sharf[c]	222	3.95	1.21	3.24	1.01	3.40	1.45	3.64	1.46	3.53	1.32	2.17	1.43	1.96	1.07	3.05	0.89
Howard et al.	41	2.10	0.45	2.02	0.55	1.70	0.55	1.59	0.46	1.88	0.52	1.37	0.49	1.81	0.47	1.84	0.51
Jin et al.	45	4.80	1.06	5.09	1.16	2.56	0.66	3.02	1.23	2.96	1.43	2.31	0.51	1.80	0.92	1.87	0.92
Leon et al.	52	4.08	1.63	3.87	1.77	3.81	1.63	4.37	1.53	4.54	1.55	3.87	1.61	3.37	1.51	4.35	1.67
Madigan et al.[ac]	118	4.84	1.34	4.19	1.33	N/A	N/A	3.38	1.50	3.82	1.33	3.38	1.14	N/A	N/A	4.04	1.36
Pace et al.	11	5.50	1.28	4.04	2.18	4.00	2.12	4.45	1.62	4.23	1.91	2.95	1.06	3.25	2.26	3.77	2.08
N_{tot}	575																
Average $score_{tot}$		4.01	1.26	3.70	1.35	3.18	1.22	3.52	1.16	3.59	1.16	2.72	1.00	2.95	1.30	3.46	1.22
At-risk[d]	N	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Dallaire et al.	24	3.67	1.6	3.67	1.58	4.29	1.68	4.71	1.46	5.08	1.21	4.21	1.79	3.92	1.74	4.92	1.53
Howard et al.	48	1.70	0.63	1.48	0.58	2.19	0.48	2.43	0.51	2.51	0.51	1.41	0.6	2.47	0.45	2.48	0.52
Pace et al.	27	4.83	1.03	2.8	1.7	4.79	1.48	4.48	1.16	4.75	1.38	3.67	0.88	4.06	1.97	4.36	1.62
N_{tot}	99																
Average $score_{tot}$		3.40	1.09	2.65	1.29	3.76	1.21	3.87	1.04	4.11	1.03	3.10	1.09	3.48	1.39	3.92	1.22
Clinical[e]	N	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Clarke et al.	19	3.70	1.60	2.90	1.30	4.80	1	4.80	1	5.50	1	4.10	1.30	4.90	1.1	5.90	1
Jin et al.	51	4.08	1.47	4.35	1.13	3.45	1.42	3.90	1.29	3.55	1.33	3.12	1.01	1.82	0.95	2.33	1.07
N_{tot}	70																
Average $score_{tot}$		3.89	1.54	3.63	1.22	4.13	1.21	4.35	1.15	3.89	1.17	3.61	1.16	3.36	1.03	4.12	1.04

[a]typical functioning and developing and with physical diseases.
[b]unpublished data provided for this review.
[c]calculated for this review based on means of means.
[d]low-income, social disadvantages families, with diseased parents, or children with adverse traumas in early attachment relationships (prolonged separation, neglect, maltreatment, etc.), or adopted or in foster-care. [e] with psychiatric diagnoses.

Table 4. Two-way and four-way distribution of attachment classifications with the Family Drawing in community children with Western (W) or not-Western (NW) cultural backgrounds.

		Distribution of attachment classifications											
		Two-way				Four-way							
		Secure		Insecure		B		A		C		D	
Community groups [a]	N	W	NW	W	NW	W	NW	W	NW	W	NW	W	NW
Behrens & Kaplan	47	0	16	0	31	0	16	0	5	0	0	0	26
Goldner & Sharf	222	0	92	0	130	0	92	0	43	0	68	0	19
Goldner	81	0	31	0	50	0	31	0	8	0	30	0	12
Goldner et al.	77	0	34	0	43	0	34	0	13	0	11	0	19
Jin et al.	45	0	28	0	17	0	28	0	7	0	9	0	1
Kallitsoglou et al.	49	21	0	28	0	21	0	23	0	4	0	1	0
Madigan et al.	118	92	0	26	0	92	0	13	0	13	0	0	0
Pace et al.	11	5	0	6	0	5	0	2	0	1	0	3	0
Pianta et al.	200	92	0	108	0	92	0	56	0	41	0	11	0
Shiakou	10	10	0	0	0	10	0	0	0	0	0	0	0
N_{tot}	860	220	201	168	271	220	201	94	76	59	118	15	51
Pooled %		*57%*	*43%*	*43%*	*57%*	*57%*	*43%*	*24%*	*16%*	*15%*	*25%*	*4%*	*11%*

Western = Canada, USA, Italy, Greece (n = 388) Not-Western = Japan, Korea, Cameroon, Israel (n = 472); B = secure, A = insecure-avoidant, C = insecure-ambivalent, D = disorganized. No studies reported the 3-way distribution.
[a]typical functioning and developing and with physical diseases.

Table 5. Average scores on the family drawings fury scales of Western[a] and Non-Western[b] children.

	Western		Non-Western	
	M	*SD*	*M*	*SD*
Vitality	4.05	1.23	3.93	1.33
Family Pride	3.66	1.36	3.78	1.33
Tension	3.51[(c)]	1.29[(c)]	2.62	1.11
Emotional Distance	3.81	1.09	2.95	1.28
Vulnerability	4.00	1.14	2.77	1.19
Role-reversal	3.14	1.12	1.87	.76
Bizarreness [c]	3.20	1.33	2.55	1.26
Global Pathology	3.88	1.24	2.63	1.18

[a]N = 261 (six samples, Clarke et al., 2002; Dallaire et al., 2012; Howard et al., 2017; Leon et al., 2007; Madigan et al., 2003; Pace et al., 2020a); [b] N = 314 (three samples, Behrens & Kaplan, 2011; Goldner & Scharf, 2011; Jin et al., 2018); [c] five samples (N = 143) due to not available scores in Madigan et al. (2003).

Attachment representations in at-risk and clinical children through the FD

ABCD classifications (community *vs* at-risk). Table 2 also reports the distribution of attachment categories in at-risk groups, including five samples, aged 4–12 years old. Contrary to our hypothesis, at-risk children (N = 1015) did not show fewer B classifications than community children (N = 866), $X^2(1) = 0.02$, $p = .887$, $\varphi_c = -.02$ (OR = 0.92, 95% CI .53 to 1.61), and consistently, no significant difference emerged between at-risk and community children with respect to each insecure category: A, respectively 16% and 20%, $X^2(1) = .30$, $p = .584$, $\varphi_c = .05$ (OR = 1.31, 95% CI .63 to 2.71), C, respectively 17% and 21% $X^2(1) = .29$, $p = .590$, $\varphi_c = .05$ (OR = 1.30, 95% CI .64 to 2.64) or D respectively 21% and 11% $X^2(1) = 2.44$, $p = .118$, $\varphi_c = -.12$ (OR = 0.49, 95% CI 0.22 to 1.09).

Only one study reported ABCD distribution in clinical children (Jin et al., 2018, reported in Table 2), not allowing meta-analytic tests, but highlighting that children (n = 51) were classified mainly as insecure (51%), and mostly insecure-ambivalent.

Fury et al. **scales (community *vs*. at-risk, community *vs* clinical, at-risk *vs* clinical)**. Table 3 also reports mean scores on global scales in three samples of at-risk children aged 5–13 years old and two samples of clinical children aged 5–10 years. As hypothesised, at-risk children (N = 99) received significantly lower scores on secure-related scales, Vitality, t(134) = 5.02, $p < .001$ (95% CI .38 to .85, g = .49), and Pride, t(137) = 7.43, $p < .001$ (95% CI .77 to 1.33, g = .78), than community children (N = 575), as well as obtaining significantly higher scores on all insecure-related scales, Tension, t(133) = −4.31, $p < .001$ (95% CI −.84 to −.31, g = .48), Emotional Distance, t(162) = −3.04, $p = .003$ (95% CI −.58 to −.12, g = −.31), Vulnerability, t(169) = −4.55, $p < .001$ (95% CI −.74 to −.29, g = −.45), Role-Reversal, t(135) = −3.33, $p = .001$ (95% CI −.62 to −.16, g = −.45), Bizarreness, t(127) = −3.47, $p = .006$ (95% CI −.83 to −.22, g = .40), and Global Pathology, t(129) = −3.46, $p < .001$ (95% CI −.72 to −.20, g = .37).

As hypothesised, clinical children (N = 70), compared to community children (N = 575), received significantly higher scores on all scales related to insecurity, Tension, t(94) = −6.11, $p < .001$ (95% CI −1.28 to −.64, g = .78), Emotional Distance, t(96) = −5.70, $p < .001$ (95% CI −1.12 to −.54, g = .72), Vulnerability, t(90) = −2.03, $p = .046$ (95% CI −.59 to −.01, g = .26), Role-Reversal, t(74) = −6.91, $p < .001$ (95% CI −1.29 to −.71, g = −.87), Bizarreness, t(119) = −2.99, $p = .003$ (95% CI −.69 to −.14, g = .32), and Global Pathology, t(86) = −4.91, $p < .001$ (95% CI −.93 to −.39, g = .56). However, no expected differences were found in scales associated with security, such as Vitality, t(78) = 0.62, $p < .001$ (95% CI −.26 to .50, g = .09), and Pride, t(91) = 0.45, $p = .655$ (95% CI −.24 to .38, g = .05).

Finally, at-risk children (N = 99) compared to clinical children (N = 70) showed lower scores on Vitality, t(115) = −2.28, $p = .024$ (95% CI −.91 to .50, g = .38), and Pride, t(91) = −5.02, $p < .001$ (95% CI – 1.36 to −.59, g = .78), although clinical children scored higher than at-risk children on Tension, t(151) = −2.17, $p = .032$ (95% CI −.78 to −.04, g = .34), Emotional Distance, t(151) = −2.78, $p = .006$ (95% CI −.82 to −.14, g = .44) and Role-reversal, t(146) = −2.89, $p = .002$ (95% CI −.86 to −.16, g = .45). No differences were found on Vulnerability (p = .208), Bizarreness ($p = .520$) and Global Pathology ($p = .254$) scales.

Gender differences and relations with age

Gender differences in secure-insecure classifications. As shown in Table 6, distributions were calculated for 205 children aged 4–12 years, 90 boys and 115 girls, drawn from mixed community and high-risk samples. As hypothesised, girls received more secure classifications than boys ($47\%_{girls}$ vs. $28\%_{boys}$), who reported more insecure classifications ($53\%_{girls}$ vs. $72\%_{boys}$), $X^2(1) = 9.11$, $p = .002$, $\varphi_c = -.22$ (OR = 2.53, 95% CI 1.41 to 4.53).

Data were too few and/or heterogeneous to perform meta-analyses for the remaining objectives, so they were investigated with the following systematic review, including all 20 studies reported in Table 1.

Gender differences in ABCD classifications. Rehder et al. (2020) reported female gender as related to more B and less A and D categories, suggesting a difference in the four-way distribution. Conversely, the majority of studies reporting on gender, as well as authors contacted (Jin et al., 2018; Madigan et al., 2003; Pace et al., 2020b; Procaccia et al., 2014; Shiakou, 2012), claimed no gender difference in attachment classifications either in community, at-risk, or clinical samples.

Table 6. Two-way distribution of attachment categories in boys and girls aged 4–12 years in studies employing the family drawing.

		Two-way			
		Secure		Insecure	
	N	Boys	Girls	Boys	Girls
Behrens & Kaplan	39	4	14	8	13
Goldner	79	10	21	23	25
Kallitsoglou et al.	49	9	13	19	8
Pace et al.[a]	38	2	6	15	15
N_{tot}	205	25	54	65	61
pooled %		*28%*	*47%*	*72%*	*53%*

Boys n = 91, Girls n = 115. B = secure, A = insecure-avoidant, C = insecure-ambivalent, D = disorganized.
[a]unpublished data provided for this review

Gender differences in Fury et al. **scales**. The systematic review led to contrasting results: four studies (Behrens & Kaplan, 2011; Dallaire et al., 2012; Fury et al., 1997; Goldner, 2014) reported higher scores of Vitality and Pride in girls, and boys rated higher on scales related to insecurity – particularly in Tension, Role-reversal, Bizarreness, and Global pathology. Another four studies did not find gender differences (Fihrer & McMahon, 2009; Leon & Rudy, 2005; Schechter et al., 2007; Shiakou, 2012).

Age differences in ABCD classifications. Age did not affect attachment classifications in the FD in seven (Behrens & Kaplan, 2011; Fihrer & McMahon, 2009; Kallitsoglou et al., 2021; Pianta et al., 1999; Procaccia et al., 2014; Rehder et al., 2020; Schechter et al., 2007; Shiakou, 2012) of the 12 studies reporting on children's age (Clarke et al., 2002; Dallaire et al., 2012; Howard et al., 2017; Kallitsoglou et al., 2021; Leon & Rudy, 2005).

Age differences in Fury et al. **scales**. Six studies found contrasting results: some reported higher Vitality (Howard et al., 2017), Pride (Behrens & Kaplan, 2011; Howard et al., 2017; Pace et al., 2020b), Emotional distance (Clarke et al., 2002), Vulnerability, Anger and Global pathology (Howard et al., 2017) and Bizarreness (Clarke et al., 2002) in older children. In contrast, three studies reported lower scores for Pride (Dallaire et al., 2012), Emotional distance, Tension, Bizarreness (Dallaire et al., 2012; Pace et al., 2020b), Vulnerability (Dallaire et al., 2012; Leon & Rudy, 2005; Pace et al., 2020b), Role-reversal (Leon et al., 2007) and Global Pathology (Pace et al., 2020b) with children's increasing age, while Fihrer and McMahon (2009) did not find any differences related to age.

Discussion

In this study, the literature on Family Drawing with an attachment-based coding system was systematically reviewed for the first time, aiming to synthesise the usefulness of this methodology to evaluate attachment in pre-school and school-aged children. Data synthesised came from 20 studies with 2408 children from 10 different countries, in a period of 23 years from 1997 to 2020, contributing to define the current literature on this assessment tool.

First, this study provided a baseline of ABCD distribution by FD in community children, with typical development and functioning, raised in low-risk families. Meta-analytic data on more than 800 children revealed that almost half of them (48%) classified as secure,

and the rates of secure categories surpassed those of each insecure classification, as hypothesised. However, contrary to expectations, insecure-avoidant was not the prevalent insecure category, as the avoidant and ambivalent categories were almost equally distributed (respectively, 20 and 21%), with a lower prevalence of the disorganised classification (11%). Therefore, compared to the meta-analytic distribution of the SSP (Van Ijzendoorn et al., 1992), this meta-analysis highlights similar rates of B (55% with the SSP), A, and D categories (respectively 23% and 15% with the SSP), but a marked difference in rates of insecure-ambivalent classifications (only 7% with the SSP). This discrepant result concerning C classifications may be explained in different ways: increasing C category prevalence across time (from the SSP metanalysis in 1992 to this in 2020), or across age (0–2 years old for SSP, 4–13 years old for FD), or a methodological problem of a possible overrating of C category through the FD, but each one of these explanations deserves to be examined in future reviews and meta-analyses. For the first objective, this study also examined scores on Fury et al.'s scales for almost six hundred community low-risk children. Results confirm the hypothesis of prevalent security in this group, as children generally received higher scores in Vitality and Pride, related-to-security scales, than in others. Further, both Emotional Distance and Tension scores, related to A pattern, surpassed Role-reversal ones, related to C pattern, which also was the lower average score in community children, supporting the hypothesised prevalence of avoidance over ambivalence among insecure categories. Overall, these results obtained through continuous scores on Fury et al.'s scales, rather than ABCD classification of drawings, would look more convergent with findings obtained with other methods, such as the SSP (Van Ijzendoorn et al., 1992).

As a second objective, this study examined group differences in community children from Western (i.e. Canada, Germany, Greece, Italy, USA) and non-Western (Cameroon, Israel, Japan, Korea) cultural backgrounds on both ABCD distribution and Fury et al. scores. As expected, no group differences emerged between Western and non-Western children concerning the secure category, which was prevalent in both groups, and security-related global scales such as Vitality and Pride, supporting the universality of secure classification when attachment is assessed through FD (Mesman et al., 2016). Contrary to expectations, different patterns of insecurity (A and C) now appear similarly diffused in pre-school and school-aged children coming from Western and non-Western countries, but only when their FD was classified in ABCD categories. This can have different explanations needing further investigation, such as: methodological weakness of the original coding system in discriminating ABCD classifications in non-Western samples; effects of international changes and/or differences in parental practices and growth environments; the nature of the sample (e.g. urban *vs* rural; Mesman et al., 2016), or contextual differences (Chao, 2001; Kondo-Ikemura, 2001), etc. When children's FDs were rated on global scales, Western children rated higher than Non-Western children on A-related scales but also on C-related ones, suggesting that the FD, focusing on the entire family and leaving the child free to decide on his/her own representation, potentially may be more appropriate to capture attachment representations based on multiple, non-parental caregivers characterising non-Western collectivistic cultures, such as in East Asia and Africa (Mesman et al., 2016). Therefore, these meta-analytic results seem to encourage the use of FD as a possible cross-cultural method to assess attachment, reducing the focus on dyadic parent–child relationships observed in several measures

developed in Western countries. However, given the FD's limited empirical evidence, it should be preferably combined with other, robust, and more validated attachment measures within mixed-method studies until the FD is more broadly and empirically validated.

For its third objective, this study examined group differences on both ABCD distribution and global scores among at-risk, clinical, and community (low-risk) children. Surprisingly, at-risk children were not classified as less secure and more insecure (A, C, and D) than community children when their FDs were classified with ABCD categories. Conversely, as expected, both at-risk and clinical children scored higher on all insecurity and disorganisation-related global scales compared to low-risk/non-clinical children. Moreover, at-risk samples reported lower scores on the two security-related scales than both community and clinical samples, although the latter was rated higher on Tension, Emotional Distance and Role-reversal than at-risk samples.

Globally taken, these findings suggest that Fury et al.'s global scales applied to FD would be more useful than ABCD categories to discriminate specific features of attachment representations in at-risk/clinical children, providing attachment-related information more convergent with those reported by studies using other methods, such as the SSP and the MCAST (Allen et al., 2018; Cassibba et al., 2013; Van Ijzendoorn et al., 1992). This again argues for the adoption of a micro-dimensional approach rather than a macro-categorical one. Specifically, concerning at-risk and clinical populations, these findings suggest that at-risk children would find it more difficult to internalise a secure attachment representation, as lower scores on Vitality and Pride suggest. Additionally, clinical children appear to be more insecurely attached as their higher scores on Tension, Emotional Distance and Role-reversal suggest. Finally, both groups present as similarly disorganised, as no difference in Bizarreness and Pathology was suggested. However, a marked unbalancing in the use of ABCD classifications compared to Fury et al.'s scales (1015 vs 90 children), prevents definitive conclusions. In line with this, more studies focusing on at-risk and clinical children are needed to test the accuracy of FD global scales in these groups. This may be especially true considering that FD may be particularly useful in atypically developing populations who may have language difficulties resulting from adverse backgrounds or clinical conditions (Hollo et al., 2014; Kloft et al., 2017; Lum et al., 2015).

Regarding the fourth objective focused on gender and age differences, meta-analytic tests were performed only on the secure-insecure distribution of more than two hundred boys and girls, drawn from both low-risk and at-risk samples. As expected, these confirmed that girls are classified more often as secure and boys are classified more often as insecure, supporting results previously observed in pre-school and school-age children (Brennan et al., 1998; Del Giudice, 2009). Further studies about the three-way or four-way distributions are needed to test the hypothesis of more avoidant categories in boys and ambivalent categories in girls, suggested by Rehder et al. (2020). Regarding age, findings from this systematic review suggest that this variable does not affect the ABCD classifications, being related only to continuous scores on global scales, but this is difficult to determine due to contrasting results, regardless of the type of participants (Behrens & Kaplan, 2011; Dallaire et al., 2012; Howard et al., 2017; Pace et al., 2020b). With the current knowledge, the lower security and greater disorganisation detected in younger children with other measures cannot be confirmed employing FD (Allen et al., 2018; Green et al., 2000).

Strengths, limitations, and conclusion

The main strength of this study is the first attempt to collate the results of the widely used Family Drawing with an attachment-based coding system, highlighting its strengths -in terms of cultural invariance and accuracy of Fury et al.'s eight global scales in detecting signs related to insecure or secure attachment representations in low-risk, at-risk, and clinical groups- and limitations -in terms of both poor reliability and convergence with other methods of the ABCD classifications rated through FD.

Despite this valuable aim, this work has some limitations. First, the lack of homogeneity of the studies in terms of coding systems used led to a lack of necessary information, and, in some cases, invalidated the possibility of undertaking a meta-analysis (e.g. age). In this regard, it is noteworthy that most of the authors contacted to provide data were not able to provide it, which reduced the studies that were eligible to include in the meta-analysis, diminishing the precision of general effect sizes estimated. Although it was a consequence of some situational conditions of the authors, this implies that the data provided in this meta-analysis can be considered only a beginning point rather than a benchmark. Hopefully, it can be a driving force for increasing research with FD, encouraging researchers to provide more precise data in future meta-analysis updates. Future studies providing data on at-risk and clinical samples, gender differences (Gernhardt et al., 2016), and age appear especially necessary, given the paucity of data essential for meta-analysis. Second, to further suggest caution in interpreting current findings, it is also notable that 30% of articles showed poor quality, while only 15% resulted in high-quality articles, suggesting the need to improve adherence to shared quality criteria in performing research with FD. Additionally, the choice to include only documents with abstract or keywords written in English potentially limited the exploration of cultural differences. Despite this being common practice in performing reviews and meta-analyses, it exposes the current study to the risk of selection bias (Higgins et al., 2013). Hopefully, authors who have carried out studies with FD reporting results in non-English languages can be encouraged to comment on the article or add information. Third, since it was not possible to find some fundamental full texts (Fury, 1996; Kaplan & Main, 1986), it was impossible to compare the meta-analytical distributions extracted from the original FD data, which is a common practice in meta-analyses (Allen et al., 2018; Bakermans-Kranenburg & Van Ijzendoorn, 2009a; Cassibba et al., 2013).

In conclusion, this work highlights a substantial need for further research employing FD to draw solid conclusions. In particular, more studies are required regarding at-risk and clinical samples, and/or reporting more complete data related to ABCD distribution and Fury et al.'s global scores according to gender and cultural background, as well as mixed-method research to test the convergent validity of FD with other measures for the same age range.

Notes

1. None of the eligible studies was a single-case study.
2. Below the age of 18 years in a widely shared definition of a child provided by the United Nations Convention on the Rights of the Child (1988), even if the majority of studies were expected to include participants aged 6-10 years, and less below 6 or older than 13 years old.
3. Based on Van Ijzendoorn and Kroonenberg (1988).

4. It was not considered informative, nor methodologically appropriate, to compare this community distribution with that reported in the meta-analysis on the SSP, for the following reasons: 1) FD and SSP are different measures, relying on different methods (observational vs. drawing); 2) the meta-analysis is dated 1992, so the temporal gap between the included distributions was considered too large to make a comparison reliably informative; 3) such meta-analyses included only participants from USA, while studies here included involving participants from different countries and cultures.
5. This distribution of international community children was used as a normative distribution in most of the following analyses.
6. Shiakou (2012) provided data for both community and high-risk children, but this author rated Kaplan & Main's markers and not Fury et al.'s scales, so such data were not included in this analysis.
7. Differences with Tension and Bizarreness are based on eight samples (N = 457), and five samples of western children (n = 143), as mean scores for these scales were not available in Madigan et al. (2003).

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Appendix

Cochrane Library
"Family drawing" AND "Attachment" in Title Abstract Keyword

EBSCO (PsycINFO, PsycARTICLES and Psychology and Behavioral Science Collection)
("Family drawing" AND " Attachment"); published 1980 to 2020

Eric
("Family drawing" AND " Attachment"); since 2001

PubMed
("family drawing"[All Fields] AND "attachment"[All Fields]) AND (child[Filter] OR adolescent[Filter] OR preschoolchild[Filter])

SCOPUS
TITLE-ABS-KEY ("Family drawing" AND "Attachment")

WEB OF SCIENCE
TOPIC: ("Family drawing" AND "Attachment")
Timespan: 1980–2020.