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A narrative review on clinical and research applications of The Mirror Paradigm: body image, psychopathology, and attachment

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Abstract

The Mirror Paradigm (MP) is an innovative technique that explores the influences of body representation, affect regulation, and nonverbal mirror behavior in children, adolescents and adults. The critical element of the MP is the use of a full-length mirror in front of which the interviewee is asked to answer questions about how they think and feel about their body, including perception, parental and sociocultural influences and the mind-body connection. Though research on MP is limited and focused mainly on adults, its many advantages are recognized. This narrative review aims to summarize its broad applicability, strengths and weakness and potential uses in both research and clinical settings.

The review of the literature was performed through a research on PsycArticles, PsycInfo, Psychology & Behavioral Sciences Collection, PubMed and Web of Science Scopus databases, plus Google Scholar and ResearchGate, including pertinent and providing quantitative or qualitative data documents. Of 505 documents, 7 articles were eligible for this review (1.4% of initial records).

Results revealed three main application of the MP: 1) Body image, where MP scores have been significantly correlated to body dissatisfaction assessed through questionnaires; 2) Psychopathology, where MP scores were useful in discriminating individuals with personality disorders and internalizing, externalizing, dissociative, and disordered eating symptoms; 3) Attachment, with nonverbal expressions and narratives about relationships to important others distinguishable between secure, preoccupied, and dismissive speakers as classified in the Adult Attachment Interview. Limitations and future directions are discussed, suggesting the MP as an innovative technique and measure promising for further integration in research and clinical practice.

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1. Introduction

Psychological literature widely recognizes the link between psychopathological symptoms, e.g., eating disorders, anxiety, depression, muscle dysmorphia and body dissatisfaction (Fisher, 1964;

Fuchs & Schlimme, 2009; Marco et al., 2017; Ricciardelli & McCabe, 2001; Veale & Riley, 2001), i.e., disturbances in body image - a crucial component of self-image and the conscious awareness of one's body, including physical appearance, such as size, spatial position, boundaries, and competence (Cash, 2004; Cash & Pruzinsky, 1990). Specifically, disturbances in body image have been shown to increase psychopathological vulnerability in the form of dissociative disorders, depression, and anxiety (Akhtar & Samuel, 1996; Cattarin & Thompson, 1994; Krueger, 2013), while a positive body image is related to greater self-confidence, self-esteem, self-perceived body acceptance by others, and recognized as a protective factor of psychophysical well-being (Tylka & Wood-Barcalow, 2015).

Despite this relevance, the field of body image research is a nascent one and suffers from methodological limitations, which are almost exclusively grounded in self-report data (for a review, see Kling et al., 2019). Most of these measures appear reliable in adult populations, but few were tested both in community and clinical populations reliably, e.g., the body dissatisfaction subscale of the Eating Disorder Inventory third edition (EDI-3; Garner, 2004). Moreover, Kling et al. (2019) observed that these measures were limited to specific age demographics (i.e., adults or children). These limitations were further supported by Marzola et al. (2018) who identified that only three assessment tools exist to evaluate body image in children and adolescents. These studies often make use of figure-rating drawings such as the Figure Rating Scale (Collins, 1991) and Children Body Image Scale (CBIS; Truby & Paxton, 2008). Additionally, distortions in one's own body image can be observed by using the Test for Body Image Distortion in Children and Adolescents (BID-CA; Schneider et al., 2009).

These methods are advantageous as they allow researchers to obtain relevant information about body image in a short amount of time with low fees and short trainings but are limited in that they do not allow for the understanding of conscious representations of body image that the individual holds. To capture unconscious and conscious aspects of body image, semi-structured interviews represent a more effective means of capturing a holistic representation of the thoughts and feelings that one has about their body; though there are limitations in the time needed to administer and code interviews, bias in face-to-face interactions, and subjective judgment in scoring (Gwyer, 2015). Considering these concerns, recording interviews can prevent these limitations, and videorecording, specifically, can be useful in gathering additional observational data in the form of nonverbal behavior of the interviewee that is coded by reliable coders that allows for greater inter-rater reliability (Eisler et al., 1973; Juffer & Steele, 2014). However, despite these considerations and advantages, no studies have employed observational data to assess body dissatisfaction and risk for psychopathology and none have employed video recording procedures for nonverbal behaviors.

The Mirror Paradigm (MP; Kernberg, 1987; Kernberg & Normandin, 1999, 2002; Kernberg et al., 2007) is an innovative technique that assesses the intersecting influences on body dissatisfaction, including sociocultural and parental influences.

1.1 The origin of the Mirror Paradigm between psychoanalysis, neuroscience and attachment theory.

The development of the Mirror Paradigm emerged from the recognition that the way one sees their body may have links to mental health, e.g., one's perception of their own body image has been shown to be a risk or resilience factor against psychopathology (Tylka & Wood-Barcalow, 2015). The process of experiencing one's body is one that is grounded in psychoanalytic, neuroscientific and attachment research recognizing the importance of the mother-child interaction – *specifically the role that mirroring plays in face-to-face interactions* that initiates and fosters the individual's cognitive, emotional, and development from infancy to adulthood (Fonagy & Target, 2002; Gallese & Ammaniti, 2014; Lacan, 1949; Winnicott, 1967). Indeed, from a psychoanalytic perspective, mother's mirroring is crucial for the development of the infant, as the mother or significant caregiver, mirrors the emotional experience of the child, helping them recognize their own affective experience and increasing awareness in infancy of the boundaries between self and other, fostering children's affect regulation abilities (Fonagy & Target, 2002; Gallese & Ammaniti, 2014; Winnicott, 1967). Although children are primarily focused on parents' gaze in infancy, later in development, the importance of peers' gaze begins to influence the development of self-perception and integration: the child integrates their understanding of the *me-self* by integrating who they are to important peers (Harter, 2016). This includes body image perception i.e., *body as seen and self as seen* (Lacan, 1949; Van Tergouw, 2011; Ylmaz & Boso, 2019).

Support for these findings comes from the neuroscientific discovery of mirror neurons, which suggest the activation of the same cortical structures in individuals performing the task and those observing the action (Di Pellegrino et al., 1992; Gallese et al., 1996; Rizzolatti et al., 1996). This supports the importance of mirroring in nonverbal mother-child interaction that facilitate understanding in emotional exchanges i.e., the emotion expressed by the mother can activate the same emotions in the child observing her. Further, attachment literature posits that the influence of other's mirroring on the self is related to the significance of the relationship between the observer and the observed, and particularly the relationship between parental attachment and body evaluation or satisfaction (Amianto et al., 2017; Cash et al., 2004; Laporta-Herrero et al., 2020).

From this framework, Kernberg (1987) and Kernberg and Normandin (1999, 2002) initially proposed the Mirror Paradigm as an observational procedure for infants, in which a clinician observes and rates infants and preschool children's behaviors in front of the mirror, particularly focusing on the quality of child's engagement in front of the mirror, as considered clinically useful and indicative of the mother-infant interaction and relationship. Later, Kernberg et al. (2007) developed a 14-questions interview (MI) to employ the MP also with school-aged children, adolescents and adults, similar to when George et al. (1985) developed the Adult Attachment Interview (AAI) following the observations of infants in the Strange Situation Procedure (SSP; Ainsworth et al., 1978).

1.2 The Mirror Paradigm administration and coding system(s).

In the MP, participant stand in front of a full-length mirror as they look at their reflection. Participants are asked to think about their thoughts, feelings, and perceptions of their body including the role they think that culture and parents have played in shaping these perceptions. The presence of the mirror and the interviewer's semi-structured interview approach allow for a deep understanding of the body and to facilitate access to their inner world. In fact, questions consider positive and negative aspects of *body representation* (e.g., "What do you like/don't about the way you look?"), *perception* (e.g., "Do you feel that the image in the mirror is fatter or thinner than you actually are?"), *parental influences in shaping perceptions of the body and self* (e.g., "Is there anything about the way you look that reminds you of your mother?", and "Do you feel your father has influenced the way you feel about your body?[...]about yourself in general?"), and potential *dissociative aspects* (e.g., "Do you feel that the image in the mirror can have a life of its own?"). The MP encourages participants to contend with the multiple dimensions of self, including *self as seen* and *self as felt*. In this way, this paradigm serves to enhance individuals' awareness of their physical appearance and the thoughts, feelings, and behaviors associated with these representations, providing deep insight into the subjective experience of body dissatisfaction.

Although the interviewer cannot see the interviewer during the MP - which limits face-to-face biases – their presence can induce a state of self-objectification, which is critical for understanding body shame and body dissatisfaction, that can manifest in increased self-monitoring, self-surveillance behaviors, and shame and embarrassment reactions (Probst et al., 2008, p. 341). Therefore, interviews are video-taped to be rated through a multidimensional coding system, accounting for both verbal and non-verbal behavioural responses in front of the mirror, rated on a 5-point Likert scale.

With respect to the coding system, original non-verbal analyses focused on four main categories: vocal quality (i.e., vocal anxiety), gaze, postural holding and affect. Participants are scored on their ease with the task and their level of comfort/discomfort in front of the mirror and their engagement in the task (Kernberg et al., 2007). Subsequently, Buhl-Nielsen et al. (2008) proposed a coding manual for the coding of both the specific verbal narrative of how participants describe their body and nonverbal expressions of shame and body dissatisfaction - which are assessed via postural tension, facial tension, vocal anxiety and nervous laughter, and hiding strategies - during the course of the semi-structured interview. Specifically, the coding system proposed by Buhl-Nielsen et al. (2008), includes six areas: 1) *Relatedness Codes* (i.e., relatedness with parents and others); 2) *Cognition Codes* (i.e., Conceptual Level, Narrative Coherence, Reflective Functioning-Other, Reflective Function-Self, Exploration – Curiosity/Interest, Exploration – Productive); 3) *Self-Worth Codes* (i.e., Self-Acceptance vs. Self-Criticism, Body Esteem, Global Esteem vs. Shame, Global Esteem vs. Grandiosity, Self-Objectification); 4) *Self Integration* (i.e., Agency/Autonomy, Sense of Self, Self-Recognition vs. Alienation); 5) *Affects* (i.e., Positive Hedonic Tone, Impression, Friendliness vs. Hostility); and 6) *Nonverbal Behavior* (i.e., Gaze Wandering, Gaze-Fixed, Facial Expressiveness, Postural Control-Holding, Vocal Calmness vs. Anxiety). For each scale, nonverbal scores in the lower range reveal more vocal anxiety, postural rigidity, fixed or wandering gaze and limited facial expressiveness; higher scores reveal more flexible responses: natural eye contact, vocal calmness and relaxed posture. With respect to relatedness codes, lower scores reveal more difficult interpersonal relationships, lack of acceptance of parental influences on body representation while higher scores reveal mutually beneficial reciprocal interpersonal relationships and warmth and acceptance of paternal influences on the body. Lastly, higher scores on the cognition codes reveal depth to cognitive processes are indicative of understanding of the self on multiple levels in terms of thoughts and feelings, while also incorporating a developmental focus (i.e., the development of self over time).

The MP appears to have several advantages over existing body image assessment tools: (1) the administration procedure can discourage aforementioned possible biases related to face-to-face interaction, also guaranteeing supervision on administration and ratings assignment as video-taped and checkable by other researchers and clinicians (Eisler et al., 1973); (2) it usually lasts around twenty minutes, which is a relatively short time respect to other structured interviews, e.g., from 45 to 90 minutes for the AAI (George et al., 1985); (3) the coding system allows the assessment of body image but also of several related domains deserving clinical attention, and potential target in intervention, e.g., psychopathological symptoms and attachment to parental caregiver and other important others.

1.3 Objective

The aim of this paper is to review 15 years of research on the MP, with the intention of summarizing its broad applicability, strengths and weakness and potential uses in both clinical and research settings.

2. Methods

The methodological approach used in this paper is the one of a narrative review, which employs the research method of a systematic review - aimed at reducing bias in the selection of articles for review- and a qualitative critical approach to the discussion of the results (Green et al., 2006). Because, differently from the systematic review, in the narrative review there are no precise guidelines, Ferrari (2015) suggests following the five subsequent steps in order to improve its scientific quality:

- (1) Identification of a topic of interest and related research objectives (applications of the Mirror Paradigm);
- (2) Literature search (explanation of searching strategy- defining the inclusion and exclusion criteria- and screening of results);
- (3) Summary of results and discussion for each objective in relation to the research query;
- (4) Conclusions.
- (5) Writing of the abstract.

2.1 Searching strategy and search terms

The first step was to verify the absence of ongoing reviews or meta-analyses on the objective of this article, checking on the international Cochrane Database of Systematic Reviews (CDRS), Center for Reviews and Dissemination (CRD) and PROSPERO databases by entering the keywords "Mirror Interview" or "mirror paradigm" as search parameters. This research produced 2 results in CRD, resulted not pertinent with the topic when screened. Subsequently, "Mirror Interview" OR "Mirror Paradigm" OR "entrevista en el Espejo" OR "intervista allo specchio" keywords were used in order to do a research by consulting the PsycArticles, PsycInfo, Psychology & Behavioral Sciences Collection, PubMed and Web of Science Scopus databases, plus Google Scholar and ResearchGate- so as to identify unpublished or pre-print documents or dissertations- between December 2020 and January 2021.

The keywords were used in all databases without restriction of fields, written in English, Spanish or Italian languages according with authors' ability to proceed with a reliable screening of abstracts.

After finding records in each database, two independent investigators (i.e., the first and second author) exported all records in .RIS packages, importing them into Zotero data manager software, employed to remove duplicates, i.e. copies of the same document on multiple databases. When Zotero failed to automatically recognize duplicates, these duplicates were removed. Then, both investigators independently screened abstract and titles, full-texts, according to selection criteria detailed below, reaching 100% of agreement on the full-text included, $k = 1$.

The first and second authors also performed the research of unpublished or pre-print documents, i.e., grey literature, checking the first 200 records on Google Scholar and ResearchGate. The third author sought additional records through contacts with experts in the field (B. Buhl-Nielsen and M. Steele).

2.2 Selection criteria

The inclusion/exclusion criteria for the papers were:

- 1) Pertinence: only papers with target on the Mirror Paradigm were included. Papers using different tools were excluded.
- 2) Type: included articles were original empirical studies - such as research articles, short reports or communications, abstracts and conference papers, experimental/doctoral dissertations- case studies, and also qualitative studies if reporting empirical data. Theoretical articles not containing clinical-empirical data, or articles with replicated data were excluded.
- 3) Language: only papers with title, abstract and/or keywords written in English, Spanish or Italian languages were included, according to authors' ability to screen full-texts for other inclusion criteria.

As shown in the flow-chart in Figure1, 502 records were retrieved through databases, none of them through the additional search in Google Scholar or ResearchGate (all replicates of records identified through databases). The third author retrieved 3 additional eligible documents through expert consultation, for a total of 505 records. After the removal of duplicates, the remained 479 documents were screened for the aforementioned inclusion criteria. The screening of the abstracts resulted in the elimination of 467 not pertinent articles and 3 excluded for type (commentaries to chapter on MP). In this way, only 9 articles were evaluated for eligibility (1.8% of the initial records). Of these, 1 full text did not contain data (Buhl-Nielsen, 2006) and 1 reported data from another article (Steele et al., 2015a), so these authors were contacted to request unpublished empirical data, but they cannot provide them because empirical data were still in preparation. In the end, only seven articles were included in this review (1.4% of the

records submitted to the initial screening), of which only 5 reported quantitative data (Boiardo & Steele, 2021; Ensink et al., 2016; Erdem, 2019; Knafo, 2016; McBirney-Goc, 2016).



PRISMA 2009 Flow Diagram

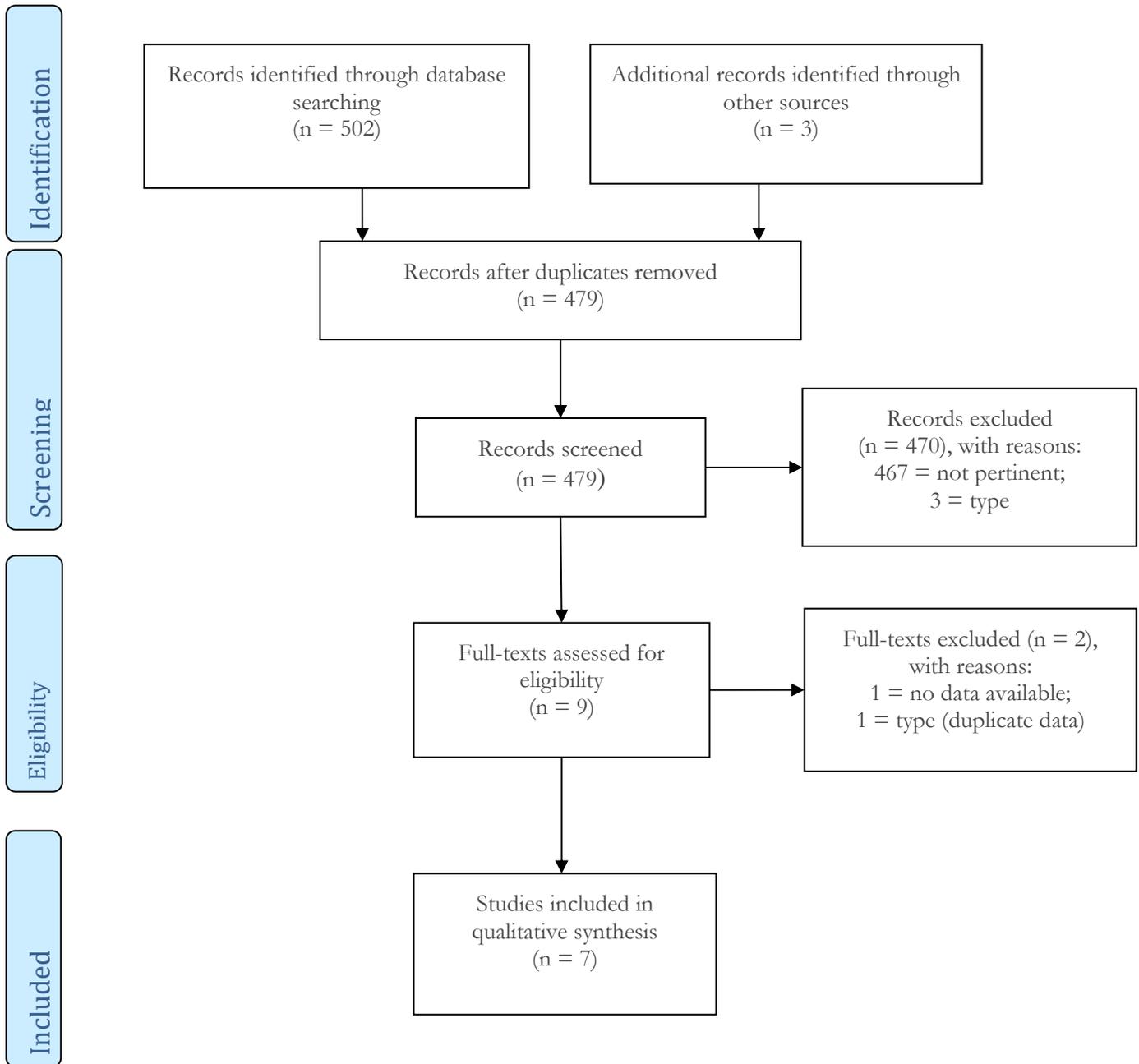


Figure1. Flowchart of the searching strategy for the narrative review on the Mirror Paradigm.

3. Results

Details and main results of the seven studies included in this review are reported in Table1. Results were reported and discussed according to three main applications of the Mirror Paradigm, as recognized after full-texts analyses: 1) body image; 2) assessment of the psychopathology; 3) parental influence and attachment-oriented applications.

Table1. Full-texts selected for the narrative review on the applications of the Mirror Paradigm

Authors (year)	Type of document	Other measures ^a	Main results
Author (2021a)	Conference abstract	BAS; OBCS	1) Strong positive correlation between body appreciation (BAS) and maternal representation ($p = .024$) and paternal representation ($p = .015$); 2) Small negative correlation between the body shame (OBCS) and embodied self-awareness ($p = .049$) and postural holding ($p = .048$); 3) Negative correlation between body surveillance (OBCS) and self-acceptance was observed ($p = .048$).
Buhl-Nielsen (2017)	Article (case-study)	NA	1) Non-clinical participants showed verbally and non-verbal satisfaction about themselves (normal prosody of speech, authenticity in the answers provided, with no indication of tension or negative emotions, harmonicity in the movements, ability to initiate and maintain the gaze at the image reflected in the mirror); 2) Clinical participants with a personality disorder showed both non-verbal and verbal signs of tension, anxiety, inability to keep looking in the mirror, low tone of voice, frequent freezing reactions, verbal expressions of bodily dissatisfaction and difficulty in recognizing themselves in the reflected image.
Buhl-Nielsen & Kernberg (2015)	Conference abstract	AAI; CBCL; DSQ; ICI	1) Quality of contact with mirror image, differences between self as felt and self as seen, and effect of the interview on the viewer differentiated participants with personality disorder and controls; 2) Controls showed direct and quite stable eye contact, warm positive affect (harmonious stance with the participant smiling at her/himself and deriving pleasure from the mirror image), smooth relationship between self as seen and as felt, and less effect of the interview on the viewer. 3) Participants with severe personality disorder showed wandering or staring and transfixed eye contact, little positive affect

Ensink et al. (2016)	Article (empirical)	CBCL; TRF; CDC; CSBI	<p>towards the mirror image; inability to coordinate self as seen with self as felt, intense effect of the interview on the viewer.</p> <p>1) Lower MP global score (i.e., more negative affects toward the body) of the children correlates with higher parent-reported externalizing problems (i.e., aggression, rule-breaking behaviors), $p = .001$, and internalizing problems (i.e., withdrawal, anxiety and somatic complaints), $p = .020$ in the CBCL;</p> <p>2) Lower global MP scores correlates with more teacher-reported externalizing problems in the TRF, $p = .040$.</p> <p>3) Lower global MP scores correlates with more sexualized behaviors on the CSBI, $p = .003$;</p> <p>4) Lower global MP scores were related to higher dissociative symptoms, $p < .001$.</p>
Erdem (2019)	PhD Dissertation	AAI; BAS-2; EAT-26; OBCS; TOSCA-3	<p>1) Higher body appreciation in the BAS-2 was related to more postural control ($p < .05$), positive hedonic tone ($p < .05$), body esteem ($p < .05$), global self-esteem ($p < .05$), secure maternal ($p < .05$), and paternal ($p < .001$) representations in the MP;</p> <p>2) Shamed self-talk on the TOSCA-3 was related to a more negative paternal representation on the MP ($p = .031$);</p> <p>3) Higher body objectification in the OBCS was related to more self-criticism in the MP ($p < .01$);</p> <p>4) No significant correlations were found between maladaptive eating attitudes on EAT-26 and MP variables;</p> <p>5) Securely-attached, compared to insecurely attached ones, showed higher ability to establish and maintain the gaze with mirror ($p = .025$); impression; global self-esteem ($p = .017$); positive maternal representation; reflective functioning on self and in self-recognition; narrative coherence ($p = .048$); exploration and curiosity;</p> <p>6) Higher scores on several MP non-verbal ratings indicative of greater body and self-acceptance (e.g., higher scores in Facial Expressiveness, Positive Hedonic Tone, Self-Acceptance, Global Self-Esteem) were related to lower scores indicative of insecure attachment toward the mother in the AAI (i.e., Role-reversal, Anger, Derogation), all $p < .05$. A more positive maternal representation in the MP was related to a more positive one in the AAI, i.e., Loving mother, also related to higher Self-esteem in the AAI (both $p < .01$).</p>

			7) Higher scores on MP non-verbal ratings indicative of greater body and self-acceptance (e.g., Positive Hedonic Tone, Self-Acceptance, Global Self-Esteem, Self-recognition) were related to lower scores indicative of insecure attachment toward the father in the AAI (i.e., Derogation, Anger, Reject, Neglect), all $p < .05$. A more positive paternal representation in the MP was related to a more positive experience with the father in the AAI, i.e., less reject and neglect (both $p < .05$).
Knafo (2016)	PhD Dissertation	AAI; CMI; FRS	1) There were no relationships between the FRS scores and Children-MI ($p < .05$), suggesting no convergent validity; 2) Bigger-ideal group's mothers on the FRS showed more positive maternal representations and higher body esteem on MP; 3) MP scores were not correlated to AAI ones of the mothers.
McBirney-Goc (2016)	Correlational	EAT-26; OBCS	1) The comparison between interviewees with and without the mirror show that with mirror group had higher depression ($p = .000$) and anxiety ($p = .002$). 2) The regression in the full sample demonstrated 35% to 42% of variance in disordered eating scores as predicted by more negative parental representations in the MP (adj. $R^2 = .08$, $p = .001$), regardless of the body-shame level; 3) Negative parental representations in the MP explained more 47% to 55% higher scores of disordered eating only in the mirror-group (adj. $R^2 = .08$, $p = .010$), while parental representations were not significant predictors of disordered eating in the without-mirror group.
<p>^aAAI = Adult Attachment Interview (George et al., 1985); BAS-2 = Body Appreciation Scale (Tylka & Wood-Barcalow, 2015); CBCL = Child Behavior checklist and TRF = Teacher Report Form (Achenbach et al., 2001); CDC = Child dissociative checklist (Putnam et al., 1993); CMI = Child Mirror Interview (adapted by Knafo (2016) from Kernberg et al., 2007); CSBI = Child sexual behavior inventory (Friedrich et al., 2001); DSQ = Defence Style Questionnaire (Bond et al., 1989); EAT-26 = Eating Attitudes Test-26 (Garner et al., 1982); FRS = Figure Rating Scale (Tiggemann & Wilson-Barrett, 1998); ICI = Identity Consolidation Inventory (Samuel & Akhtar, 2009); OBCS = The Objectified Body Consciousness Scale (McKinley & Hyde, 1996); TOSCA-3 = Test of Self-Conscious Affect (Tangney et al., 2000).</p>			

3.1 MP and body image.

Three studies employed the MP to investigate the body image in terms of objectification, appreciation and satisfaction of the body, also investigate parental influences on it (Boiardo & Steele, 2021; Erdem, 2019; Knafo, 2016). Specifically, Boiardo & Steele (2021) assessed thirty

gay-identifying men, revealing that participants who endorsed greater body shame in the Objectified Body Consciousness Scale (OBCS; McKinley & Hyde, 1996), discussed their bodies more negatively in the MP. Interestingly, these participants also demonstrated greater nonverbal behaviors of mirror avoidance, appearance-monitoring and postural tension and rigidity. Erdem (2019) assessed thirty-nine male adults aged between 18 and 35 years ($M = 27$, $SD = 4.80$), reporting greater body satisfaction along verbal expressions of prevalent positive emotions and higher self-esteem, and greater non-verbal ability to maintain a controlled posture during the interview. Both authors also suggest possible parental influences on body image. Boiardo & Steele (2021) showed that participants who spoke positively of maternal and paternal influence on body image demonstrated greater body appreciation on the Body Appreciation Scale (BAS; Tylka & Wood-Barcalow, 2015). Erdem (2019) found a link between positive parental representations in the MP and greater body satisfaction. Knafo (2016), who administered the MP to thirty-four mothers aged 30 to 51 years ($M = 38.84$, $SD = 4.30$) and assessed the body satisfaction of their daughters aged between 5 and 7 years old ($N = 40$; $M = 6.1$, $SD = 0.81$), found that mothers who spoke more positively of their bodies and who endorsed a more positive maternal representation on body image had daughters who engaged similarly in front of the mirror. Their daughters were more likely to demonstrate higher self-esteem and body satisfaction, highlighting the possibility of the intergenerational transmission of body representation that may be passed from one generation to the next.

Because shame has been linked to a wide range of psychopathology including body dissatisfaction, poor mental health outcomes (Barnes et al., 2020), Erdem (2019) designed a study to assess links between the MP and trait level shame. Results highlighted that individuals who scored higher on shame self-talk – assessed with the Test of Self-Conscious Affect (TOSCA-3, Tangney et al., 2000), which measures trait level shame, guilt, and externalization of guilt and detachment and pride in situation specific scenarios - endorsed difficult parental representations, indicating the link between how one experiences the parent's effect on body representation and its link with shame. Knafo (2016) supported these findings by suggesting that parental representations are linked to body representations.

3.2 MP and psychopathology

As shown in Table 1, three studies used the MP in addition to other tools aimed at investigating psychopathology. Specifically, they were focused on the evaluation of *internalizing* (e.g., depression or anxiety) and *externalizing* (e.g., aggression, rule-breaking behaviors) symptoms as reported by parents and teachers, or self-rated dissociative symptoms and disordered eating behaviors respectively (Ensink et al., 2016; Erdem, 2019; McBirney-Goc, 2016).

Specifically, Ensink et al. (2016) found that more negative affects regarding the body in the MP were linked to more externalizing and internalizing problems, and sexual abuse and in both sexually abused and community children, and curiously with lower dissociative symptoms. On the contrary, Erdem (2019) did not find relations between MP scores and eating disorder attitudes, perhaps due to male participants, where eating behaviors are less frequent and detectable than in women. McBirney-Goc (2016) investigated the usefulness of the MP in a sample of ninety-nine women, aged 18-26 years old ($M = 20$, $SD = 1.57$). One group was administered the interview in front of the mirror (with-mirror condition), the other without the mirror (without-mirror condition). Results suggest that more internalizing symptoms were observed in the with-mirror condition. This group demonstrated greater body dissatisfaction and negative parental representations in the MP which predicted more disordered eating behaviors even after accounting for body mass index. These results highlight the utility of the mirror as helpful for practitioners aiming to diagnose depression, anxiety and eating disorders.

Further evidence of a possible diagnostic utility of MP came from Buhl-Nielsen (2017) and Buhl-Nielsen and Kernberg (2015), who were able to discriminate between participants with or without personality disorders both through verbal cues (self-representation, self-integration, affects relatedness to others), and through non-verbal behaviors in front of the mirror.

3.3. MP and attachment.

Two doctoral dissertations (Erdem, 2019; Knafo, 2016) used the Mirror Paradigm to explore body representation and attachment using the AAI, the gold-standard measure to assess state of mind with respect to attachment and early childhood experiences. Specifically, as shown in Table1, Erdem (2019) found that securely attached individuals (as measured by the AAI) demonstrated increased self-acceptance and self-worth and positive parental representations. Additionally, these participants were less likely to engage in mirror avoidance and mirror checking behaviors. Interestingly, these participants demonstrated greater reflective functioning- mental processes that underlie the ability to understand one's own and another's behavior, thoughts, feelings, and intentions (Fonagy et al., 2002). Importantly, participants who were unresolved with respect to loss or trauma were less able to maintain eye contact in front of the mirror ($p = .013$), endorsed negative maternal representation of their bodies ($p = .017$), endorsed significantly lower levels of self-acceptance ($p = .043$) and global esteem ($p = .023$) than securely attached men.

However, Knafo (2016) did not find similar group differences between the MP and AAI of insecure and securely attached mothers. No significant correlations between MP and AAI scores were observed. However, in this study, dimensions of insecurity in maternal attachment states

of mind (i.e., parental Role-reversal) were related to their children's ratings in an age-adapted version of the MP, the *Child Mirror Interview* (CMI, adapted from Kernberg et al., 2007), suggesting that insecure maternal attachment can influence the child's relatedness, affect/hedonic tone, and connectedness in front of the Mirror ($p < .001$).

4. Discussion

The main objective of this review was to summarize the findings of the Mirror Paradigm. Currently, there is a dearth of studies utilizing the Mirror Paradigm to assess psychopathology and body dissatisfaction. The MP provides a lens to understand the influence of paternal figures on body image. Erdem (2019) suggests that participants with negative parental representations were more alienated from their mirror image and demonstrated difficulties integrating *body as seen* and *body as felt*. Nonverbal and verbal correlations were observed. Specifically, maternal representation was positively correlated with gaze, facial expressiveness, and postural control, suggesting the importance of parental relationships in structuring self-confidence, self-acceptance, and self-worth and non-verbal mirror behavior. As has been conceptualized by Kernberg et al. (2007), the mirror is diagnostic of the mother-infant relationship. Furthermore, it was observed that the mirror is critical to the task and is central to uncovering affect regulation difficulties in front of the mirror – this was observed in both community and clinical samples respectively. Women with greater body dissatisfaction are more likely to demonstrate these qualities in front of the mirror, specifically when considering affect, self-view, and quality and coherence of narratives (McBirney-Goc, 2016). Furthermore, children who have experienced sexual abuse demonstrate these difficulties both verbally and nonverbally in: 1) verbalization; 2) the ability to engage in the task; and 3) the capacity to express their emotions (Ensink et al., 2016). These results are also confirmed by another study - which was not included in this review as it was not possible to recover quantitative or qualitative data - which highlights how adolescents with borderline personality disorder, unlike to their healthy peers, show less ability to have structured and organized affects and cognitions (Buhl-Nielsen, 2006), also demonstrated in Buhl-Nielsen (2017) case study.

These findings highlight the clinical utility in recognizing cognitions and affects. The MI provides rich information into affect regulation, positive hedonic tone, and the quality of the relationship to the self and cognitive processes, including self-representation, self-confidence, coherence in speech and reflective functioning. The clinical importance of this instrument is thus noted and allows for the detection of aspects of concern for the individual but also aspects of protective factors of psychological well-being, which of course are clinically useful (Davern

et al., 2007; DeNeve & Cooper, 1998; Houben et al., 2015; Karatzias et al., 2006; Schultheis et al., 2019; Tommasi et al., 2018).

4.1 Application of the Mirror Paradigm to the assessment of body image.

A strong positive relationship between parental representation and body appreciation was observed in gay-identifying men (Boiardo & Steele, 2021) and heterosexual men (Erdem, 2019). Furthermore, self-acceptance was negatively correlated with self-surveillance, revealing that the more people accept themselves the less they monitor their appearance and the less shame they experience of their body (Boiardo & Steele, 2021). These results also seem to be supported by Erdem (2019): men who experienced greater body dissatisfaction were more rigid in front of the mirror and endorsed negative parental representations and had lower self-esteem. Additionally, supporting Cheng and Mallinckrodt's (2009) findings, individuals who have positive memories of early childhood experiences with their caregivers are more likely to demonstrate lower self-objectification (Erdem, 2019). Importantly, these results indicate that positive and supportive relationships with caregivers are fundamental for well-being and mental health of individuals (Gilbert et al., 1996).

It is possible that the more relationships with parents are marked by love and support, the greater the chances of feeling good about the body, resulting in a harmonious experience of the latter, having a good level of self-esteem and security, which is manifested by the lesser need to control one's body. This data is supported by the result found by Erdem (2019) relating to the relationship between greater self-criticism and increased body dissatisfaction, which, considering the relationship found between a hypercritical parental style and the assumption of a self-critical style in turn (Werner et al., 2019), points out the close relationship between a positive parental influence and a greater capacity for acceptance of one's own body.

4.2 Application of the Mirror Paradigm in the evaluation of psychopathology.

The mirror serves as a critical diagnostic tool in detecting internalizing and externalizing symptoms. Specifically, lower scores on the Mirror Paradigm scales in children correlated with greater internalizing and externalizing symptoms reported by parents and teachers, as well as more dissociative symptoms (Ensink et al., 2016). Furthermore, in women, the presence of the mirror during the administration of the MP increased the perception of anxiety and depression and positive parents' representations predicted fewer dysregulated eating behaviours (McBirney-Goc, 2016). The same study above, not included in the present review, but also demonstrated in Buhl-Nielsen (2017) case study, also highlighted that adolescents with Borderline Personality Disorder could be adequately distinguished from healthy peers using this tool (Buhl-Nielsen, 2006). These results highlight how the MP can be a valid tool applied to the study of

psychopathology, as it is capable of analysing those elements that are considered to be at risk in the development of psychopathology, such as lower self-esteem, poor reflective functioning, greater self-criticism (Cook-Cottone, 2016; Katznelson, 2014; Marco et al., 2017; Priebe & Röhrich, 2001; Rosenfeld, 1964; Ruffolo et al., 2006; Suardi et al., 2018; Tremblay & Limbos, 2009 ; Werner et al., 2019). Furthermore, McBirney-Goc (2016) found that both higher body shame and negative parents' representation together were the two main predictors of dysregulated eating behaviors, indicating the relationship between these two domains as found by Boiardo & Steele (2021) and Erdem (2019).

4.3 Application of the Mirror Paradigm in the assessment of the attachment.

Erdem (2019) found that men with preoccupied attachment, compared to securely attached men, had significantly lower self-esteem, were more shame prone, and tended to describe themselves in negative terms. Additionally, they were less reflective and lacked coherence in front of the mirror.

Finally, Knafo (2016) did not observe significant correlations between AAI and MP scores. However, the more the parent-child relationship was characterized by role-reversal/ involving features, the more narrative in front of the mirror was characterized by negativity and feelings of responsibility for the parent. These features were linked to depression, negative hedonic tone, and difficulties with the interview process, marked by disengagement and avoidance in the interview context.

5. Conclusions.

The findings presented in this review highlight the usefulness of the Mirror Paradigm in discerning not only the intersecting influences on the development of body representation (composed of the thoughts and feelings one has about their bodies) but also its clinical applicability in detecting psychopathology and its risk factors in clinical contexts. First, the link between body dissatisfaction and poor mental health outcomes has been extensively supported in the literature.

Not only has the MP been useful in discerning the presence of borderline personality disorder, but the MP was also able to distinguish children who had experiences of childhood sexual abuse whose internalizing and externalizing behaviors were corroborated by teachers and parents and whose nonverbal behaviors in front of the mirror were noteworthy (Ensink et al., 2016).

Specifically, findings from these studies highlight the importance of mirror behavior in detecting disordered eating behaviors and risk factors for psychopathology. The findings suggest that the existence of links between what assessed in the Mirror Interview and eating disordered

behaviors, dissociation, and internalizing/externalizing disorders (Ensink et al., 2016; McBirney-Goc, 2016). It would suggest that the mirror can indirectly evaluate the presence of these characteristics that are not always apparent in clinical contexts. Additionally, the links between shame and psychopathology have also been supported by these studies highlighting the quality of attachment, self-conscious affect, and psychopathology (Erdem, 2019; Knafo, 2016). The parent-child relationship is instrumental in facilitating affect regulation strategies and integrating one's sense of self and personality as is argued by Krueger (2001) and Jones et al. (2015) the mirroring in the parent child relationship facilitates the development of these strategies.

5.1 Limitations and future directions.

While this review presents many of the significant contributions inherent in these studies, different limitations are recognized. Specifically, the robustness and generalizability of these findings is not without limitations: the small number of studies that have used the Mirror Paradigm, the small sample size of studies which reported quantitative data ($N = 310$), the different age groups (school-aged children vs adults) and the absence of a common comprehensive coding system. Moreover, except for Ensink's (2016) study, the MP has been poorly used in non-psychiatric at-risk samples, such as low SES families and individuals suffering from past or current adverse childhood experiences (ACEs), such as children and adolescents placed in adoption or out-of-family care, i.e., institutions or foster-care (Muzi & Pace, 2021).

Despite these limitations, the comprehensive coding system by Buhl-Nielsen et al. (2008) allows for the investigation of multiple clinically relevant dimensions, such as reflective functioning, affect regulation, and emotional awareness (Aldao et al., 2010; Steele et al., 2015b). The robustness of the MP in detecting these qualities should be further explored through mixed-methods studies with measures evaluating constructs of both reflective functioning, and difficulties in emotion regulation in different community, clinical and at-risk samples (Bermond et al., 2015; Gross & John, 2003; Muzi, 2020). Moreover, despite neuroscientific findings contributing to the development of the MP, no research study has investigated brain areas activated in front of the mirror during the interview. This may be specifically relevant for use in patients with borderline personality disorder (Steele & Siever, 2010).

Future research may be geared towards studying parental representations, affects, self-view and narrative quality while discussing oneself and one's body in front of the mirror. Further application of the MP is recommended, increasing sample size of participants, which would contribute to the dearth of research using this methodological technique.

It is recommended to use the MP in research studies specifically designed to assess mirror behavior and risk factors for psychopathology, which could further support the MP as a diagnostic tool in clinical practice. This would further support the links between body dissatisfaction and links to mental health (Frederickson & Roberts, 1997; Ganem et al., 2009; Pace et al. 2017). Further, current findings highlight a possible intergenerational transmission of body image between parents and daughters, which should be further investigated (Knafo, 2016). In this regard, the line of studies that employs MP from an attachment framework is suggested. For example, to date there are no studies that have used it in conjunction with a measure of attachment in adolescents, such as the Friends and Family Interview (FFI, Steele & Steele, 2005; Pace et al., 2020), or with parent-adolescent dyads evaluated with AAI and FFI respectively, mutually concordant (Pace et al., 2019).

Lastly, given the advantage of video recording, future adaptations use the MP with video-feedback interventions, foci of growing attention among scholars and therapists (Steele et al., 2014). This may lead to improved treatment outcomes for patients experiencing body dissatisfaction, difficulties in emotion regulation, and dissociation.

In conclusion, the MP can be considered an innovative and novel technique that has the potential to be a robust measure in research and clinical practice. Researchers and clinicians may benefit from integrating the MP into a wide range of studies on psychopathology, body dissatisfaction, attachment, neuroscience, emotion regulation and by implementing the MP as a diagnostic interview in clinical contexts.

Conflict of Interest Statement

The authors declare that the research was conducted in the absence of any potential conflict of interest.

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